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20 July 2007

Online at <https://mpra.ub.uni-muenchen.de/4370/>

MPRA Paper No. 4370, posted 07 Aug 2007 UTC

## **Globalization, consumerism and child labour**

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**(This version: July 2007)**

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**Abstract:** This paper highlights the implication of consumerism on the incidence of child in a developing economy using a two-sector general equilibrium model. It finds that although consumerism raises incomes of the poor households and decreases the earning opportunities of the children, this is not sufficient to control the flow of children to workplace and is likely to worsen the child labour situation. The analysis provides a theoretical framework that can be used for explaining the positive linkage between consumerism and child labour.

**Keywords:** Child labour, globalization, consumerism, general equilibrium.

**JEL classification:** F10, J10, J13, I28.

## **Globalization, consumerism and child labour**

### **1. Introduction:**

The process of globalization has some important implications on a number of social and economic aspects of the developing economies and child labour is central to this agenda. Policy makers, NGOs and researchers are engaged in protracted debates on whether globalization has increased the incidence of child labour. While analyzing its impact on children's economic activity, one must recognize 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 which may help in reducing the child labour problem.

Empirical evidences available so far give us some conflicting signals. Cigno et al. (2002), Edmond and Pavcnik (2006) and Neumayer and Soysa (2005) have analyzed the impact of liberalized trade and investment policies on child work using cross-country data and found that countries with more liberalized trade regime and greater penetration by foreign direct investment are associated with lower child labour incidence. On the contrary, there are some studies that claim that globalization has made the child labour situation worse. Loker (1999) argued that many nations, including parts of Latin America, became home to millions of children who resembled "grit in the prosperity machine" Lieten (2003) argued that openness led to more poverty, more decentralization of production and more sourcing of cheap labour for export and so more child labour.

Despite many of the developing economies achieving high growth rates during this process of globalization, the incidence of child labour has not decreased at the expected rate and in many of the transition economies the problem has been on the rise. In this connection, it is worthwhile to mention the empirical finding of a study conducted by Swaminathan (1998) in a city in Gujarat, India. Despite high economic growth achieved through inflows of foreign capital, Swaminathan (1998) has found that the incidence of child labour has increased significantly in the city of Bhavnagar in the liberalized regime. Chaudhuri and Dwibedi (2007) have given a possible explanation as to why growth with foreign capital may not be sufficient to solve the problem of child labour. They have shown that a higher economic growth may sufficiently raise the demand for commodities/services that use child labour thereby worsening the problem of child labour.

There could be other explanations as well. Consumerism, a natural bi-product of globalization, might be responsible for the increasing child labour incidence in the high growth-prone areas. Globalization perpetuates consumerism and encourages values based on an individual's freedom to pursue his own monetary interests and resulting into societies obsessed with consuming. It implies a trend towards commodification which is manifested by eagerness to acquire new goods and services. As the UN Commission on Sustainable Development, 7th Session (1999) points out "....consumption and production patterns in developed countries strongly influenced patterns in developing countries, particularly in the context of globalization and trade liberalization. This occurred not only through trade and investment, but also through communication, mass media, advertising and marketing". In this age of increasing influence of information technology and media, even the underprivileged sections of the developing world are also allured by consumerism. As viewed by FAO (2005) the consumption pattern of even the urban low income group is showing significant change towards non-cereal consumption and more towards industrial items. Rao (2000) has pointed out that demonstration effect and availability of a variety of foods could be some of the reasons behind change in the consumption pattern in case of India. Strong demonstration effects not only affected food consumption pattern, it also resulted in increased preference for disposables and non-essential luxury items. Using data from the National Home Sampling Survey, carried out in 2001 in Brazil, Sawaya et al. (2005) have shown how globalization influenced consumption and dietary pattern in Brazil. For example their study reveals that television ownership has permeated all layers of the society, from the upper and middle classes to less privileged areas. In the poorest urban areas such as Natal, in the state of Maranhão, the penetration of television sets was close to 86 per cent. Television is today the main source of entertainment, even for lower-income families, who spend five to eight hours a day in front of the television. As the developing economies are moving towards a world of homogeneous consumption, poorer section of the society is finding it difficult to maintain their relative consumption standard.

Poverty is believed to be the single largest force behind the problem of child labour. If we accept the 'luxury axiom' of Basu and Van (1998) and assume that poor households send out their children to work only when their family incomes from non-child labour source fall below a certain critical level, then increases in incomes resulting from higher economic growth should lift these households above that critical level and eventually mitigate the poverty-driven child labour incidence. However, the 'critical level' itself is not constant and in the present consumerist society the minimum acceptable income limit is indeed increasing. So, even if globalization raises

the earning opportunities of the poor, it may be insufficient (given a slow rate of trickle down effect)<sup>1</sup> for them to maintain the relative consumption standard. So they may like to use the only means in their possession, their hapless children, for higher earnings. In this way, globalization may push<sup>2</sup> the poor households to use their only wealth, their children, to support growing consumption needs in a consumerist society.

The objective of this paper is to highlight and analyze the implication of consumerism on the household decision regarding children's economic activity. We formalize this idea using a two-sector general equilibrium model with child labour. We assume that there are two sectors in a small open economy, one of which ( the informal sector) produces an agricultural exportable product with the help of adult labour, child labour and capital. The second sector (formal sector) is the import-competing sector of the economy producing a manufacturing commodity. It uses adult labour and capital in its production. Our analysis suggests that, even though increased preference for commodities raises incomes of the poor households and decreases the earning opportunities of the children, it is not sufficient to control the flow of children to workplace and is likely to worsen the child labour situation through strong demonstration effects. Thus, our analysis provides a theoretical framework that can be used to explain the positive link between consumerism and child labour.

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<sup>1</sup> Even though some developing countries like India and China have managed to grasp the opportunities of globalization in terms of higher rate of growth in GDP, due to little trickle down, inequality is increasing. Strong economic growth has failed to translate into significant reductions in poverty in these countries. For others, the situation is even worse. One may go through Khan (1998), Tendulkar et al. (1996), Wade (2004), Reddy and Minoiu (2005), Wade and Wolf (2002), Riskin (2004), Sen and Himanshu (2004) and Basu (2005) for more details on this issue.

<sup>2</sup> Some argue that consumerism in the north displaced the problem to other southern countries with lenient labour policies concerning child workers. Their desire for cheaper goods allows for the exploitation of vulnerable children in manufacturing and other industries. Based on this argument they advocate policies like social labeling or even banning import of products produced by children, which will discourage consumption and weaken the pull effect. But given the fact that only 5 % of child workers in the developing world are engaged in the export sector (UNICEF 1997), the strength of this pull effect is not expected to be quite large. However, one cannot ignore the pull effect of increase in domestic consumption of goods and services produced by child labour. See Chaudhuri and Dwibedi (2007) in this context.

## 2. The Model

We consider a small open economy with two sectors: one formal and the other informal. The informal sector (sector 1) produces an agricultural exportable product,  $X_1$ , using adult labour ( $L$ ), child labour ( $L_C$ ) and capital ( $K$ ).<sup>3</sup> The formal sector (sector 2) is the import-competing sector of the economy producing a manufacturing commodity,  $X_2$ , with the help of adult labour and capital. Production functions satisfy constant returns to scale with positive but diminishing returns to each factor. Resources are completely utilized. Capital is completely mobile between the two sectors while adult labour is imperfectly mobile. Markets, except the formal sector labour market, are perfectly competitive. The adult wage rate in the formal sector is fixed at  $W^*$  due to effective wage legislation and unionization of labour which is greater than the competitive informal sector adult wage rate,  $W$ . Adult workers first try to get employment in the formal sector that offers a high unionized wage and those who are unable to find employment in the said sector are automatically absorbed in the informal sector, as there is complete wage flexibility there. Capital is perfectly mobile between the two sectors of the economy. It is reasonable to assume that the formal sector is more capital-intensive vis-à-vis the informal sector with respect to adult labour. In mathematical terms, this implies that  $(\lambda_{K1} / \lambda_{L1}) < (\lambda_{K2} / \lambda_{L2})$ , where  $\lambda_{ji}$  is the proportion of the  $j$ th input employed in the  $i$ th sector. All commodity prices are given by the small open economy assumption.

## 3. Supply function of child labour

In the economy there are  $L$  numbers of working families, which are classified into two groups with respect to the earnings of their adult members. The adult workers who work in the higher paid formal manufacturing sector comprise the richer section of the working population. On the contrary, labourers who are engaged in the informal sector constitute the poorer section. We

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<sup>3</sup> Though child labour is used intensively in the agricultural sector, they are also found in the production of non-traded inputs for the formal manufacturing sector. In fact, many large industries like the glass manufacturing industry, the bangle industry, shoe manufacturing industry and garment industry, etc. have split up into tiny units and shifted the production process into urban slums, in order to utilize the services of children. Some among these industries give sub-contract to enterprises, which produce a component of the formal sector output, on an informal basis, hiring child labour. Even if we incorporate a non-traded sector, which uses child labour, the qualitative result of our model holds under reasonable conditions.

assume that there exists a critical level of family (or adult labour) income,  $\bar{W}$ , from non-child labour sources, such that the parents will send their children out to work if and only if the actual adult wage rate is less than this critical level.<sup>4</sup> We further assume that each worker in the formal sector earns a unionized wage income,  $W^*$ , sufficiently greater than this critical level. So, the workers belonging to this group do not send their children to work. On the other hand, adult workers employed in the informal sector earn  $W$  amount of wage income, which is less than  $\bar{W}$  and, therefore, send many of their children to the job market to supplement low family income.

The supply function of child labour is derived from the utility maximising behaviour of the representative poor working household employed in the informal sector of the economy. We assume that each household consists of one adult (the decision making guardian) and  $n$  number of children. The adult member of the family decides the number of children,  $l_C$ , to be sent to the work place. The guardian behaves altruistically, derives utility from his child's leisure and maximizes the following family utility function.

$$U = U(C_1, C_2, (n - l_C))$$

where  $C_i$  denotes the family consumption of the  $i$  commodity for  $i = 1, 2$ ; and,  $(n - l_C)$  denoted children's leisure.

For analytical simplicity we consider the following Cobb-Douglas type of the utility function.

$$U = A(C_1)^\alpha (C_2)^\beta (n - l_C)^\gamma \quad (1)$$

with  $A > 0$ ,  $1 > \alpha, \beta, \gamma > 0$ ; and,  $(\alpha + \beta + \gamma) = 1$ .

It satisfies all the standard properties and it is homogeneous of degree 1.  $(\alpha + \beta)$  is the share of physical consumption of the two commodities in the family's total expenditure and consumerism in this model is captured by an increase in the value of  $(\alpha + \beta)$ . As  $(\alpha + \beta) = (1 - \gamma)$ , consumerism in the model implies a reduction in  $\gamma$ .

The budget constraint of the family is given by

$$P_1 C_1 + P_2 C_2 + (n - l_C) W_C = (n l_C + W)$$

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<sup>4</sup> See Basu and Van (1998).

where the left-hand side of the equation measures the aggregate family expenditure on consumption of different commodities including children's leisure ( $W_C$  being the opportunity cost of leisure) while the right-hand side is maximum possible family income. This can be simplified as follows.

$$P_1C_1 + P_2C_2 = (W_C l_C + W) \quad (2)$$

Maximization of the utility function (1) subject to the budget constraint (2) gives us the following family supply function of child labour.<sup>5</sup>

$$l_C = [n(1 - \gamma) - \gamma(\frac{W}{W_C})] \quad (3)$$

We now analyze the properties of this supply function. First,  $l_C$  varies negatively with the adult wage rate,  $W$ . A rise in  $W$  produces a positive income effect so that the adult worker chooses more leisure for his children and therefore decides to send a lower number of children to the workplace. An increase in  $W_C$ , on the other hand, produces a negative price effect, which lowers children's leisure and increases the supply of child labour from the family. A decrease in  $\gamma$  implies household's lesser preference for children's leisure and causes an upward parametric shift in the child labour supply curve at the given wage rates thereby raising the supply of child labour from the family.<sup>6</sup>

There are  $a_{L1}X_1$  ( $a_{L1}$  is the adult labour-output ratio in sector 1) numbers of adult workers engaged in the informal sector and each of them sends  $l_C$  number of children to the workplace. Thus, the aggregate supply function of child labour in the economy is given by

$$L_C = [n(1 - \gamma) - \gamma(\frac{W}{W_C})]a_{L1}X_1. \quad (4)$$

#### 4. The General Equilibrium Analysis

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<sup>5</sup> See Appendix I for mathematical derivation.

<sup>6</sup> It may be checked that the results of this paper hold for any utility function generating supply function of child labour satisfying these properties.



Given the assumption of perfectly competitive markets, the usual price-unit cost equality conditions relating to the two sectors of the economy are given by the following two equations, respectively.

$$W a_{L1} + W_C a_{C1} + R a_{K1} = P_1 \quad (5)$$

$$W^* a_{L2} + R a_{K2} = P_2 \quad (6)$$

where  $a_{ji}$ s are input-output ratios; and,  $R$  is the return to capital.

Complete utilization of adult labour, capital and child labour imply the following three equations, respectively.

$$a_{L1} X_1 + a_{L2} X_2 = L \quad (7)$$

$$a_{K1} X_1 + a_{K2} X_2 = K \quad (8)$$

$$a_{C1} X_1 = L_C \quad (9)$$

Using (4) equation (9) can be rewritten as follows.

$$a_{C1} = [n(1 - \gamma) - \gamma \left( \frac{W}{W_C} \right)] a_{L1} \quad (9.1)$$

There are six endogenous variables in the system:  $W, W_C, R, X_1, X_2$  and  $L_C$  and the same number of independent equations (namely equations (4) – (8) and (9.1)). Equations (5) and (6) constitute the price system. This is an indecomposable system. So factor prices depend on both commodity prices and factor endowments.  $R$  is obtained from equation (6) as  $W^*$  is given. Then using equation (5) and (9.1) we can find out  $W$  and  $W_C$ . Once the factor prices are known the factor coefficients,  $a_{ji}$ s, are also known. Then  $X_1$  and  $X_2$  are simultaneously obtained from equations (7) and (8). Finally,  $L_C$  is determined from (4).

## 5. Comparative Statics

What effect does consumerism produce on the incidence of child labour in the economy? The answer to this question might seem to be trivial. As the desire for commodities increases the working household will raise the supply of child labour as it has to earn and spend more on different commodities. However, the matter is not as straightforward as it appears to be at the first

sight due to various linkages that exist in the general equilibrium setup. The higher demand for commodities affects not only the family supply of child labour but also the output composition of the two sectors and the two wage rate through intersectoral linkages. Let us now examine the consequence of consumerism on the problem of child labour in the economy.

Totally differentiating equations (5), (9.1), (7), (8) and (4) and simplifying the following expression can be obtained.<sup>7</sup>

$$\hat{L}_C = -\frac{1}{|\theta|} \frac{1}{|\lambda|} [|\lambda| \{\theta_{L1}(S_{CC}^1 - S_{LC}^1) - \theta_{C1}(S_{CL}^1 - S_{LL}^1)\} - \lambda_{K1}\lambda_{L2} \{(S_{KL}^1 - S_{LL}^1)\theta_{C1} + (S_{LC}^1 - S_{KC}^1)\theta_{L1}\}] G \hat{\gamma} \quad (10)$$

$$\left. \begin{aligned} \text{where: } H &= \left(\frac{\gamma W}{l_C W_C}\right) > 0; \quad G = \left(\frac{\gamma(nW_C + W)}{l_C W_C}\right) > 0; \\ |\theta| &= \{\theta_{L1}(S_{CC}^1 - H - S_{LC}^1) - \theta_{C1}(S_{CL}^1 + H - S_{LL}^1)\} < 0; \\ |\lambda| &= (\lambda_{L1}\lambda_{K2} - \lambda_{K1}\lambda_{L2}) > 0; \text{ and,} \\ S_{ji}^k &= \text{the degree of substitution between factors } j \text{ and } i \text{ in the } k \text{ th} \\ &\text{sector, } j, i = L, K, L_C; \text{ and, } k = 1, 2 \text{ with } S_{ji}^k > 0 \text{ for } j \neq i; \text{ and, } S_{ji}^k < 0. \end{aligned} \right\} \quad (11)$$

Using (11) from (10) it is easy to find that

$$\hat{L}_C > 0 \text{ when } \hat{\gamma} < 0 \text{ if } S_{LC}^1 \geq S_{KC}^1. \quad (12)$$

This establishes the following proposition.

**Proposition 1:** An increase in the desire for consumption goods raises the incidence of child labour in the society if  $S_{LC}^1 \geq S_{KC}^1$ .

Proposition 1 may be explained in the following fashion. An increase in the desire for consumer goods, ceteris paribus, raises the supply of child labour by each family directly as it now requires more income to finance the extra consumption needs. This exerts an upward pressure on the aggregate supply of child labour in the economy given the different wage rates. The return to capital does not change as it is determined from equation (6). But the wage rates would not remain unchanged. The child wage rate decreases as the supply of child labour increases. From

<sup>7</sup> See Appendices II, III and IV for detailed derivations.

the zero-profit condition for sector 1 (equation (5)) it leads to an increase in the adult competitive wage rate,  $W$ . The reason as to why  $W$  rises is quite clear. Sector 1 expands, as child labour is specific to this sector. The demand for adult labour rises which in turn raises  $W$ . The  $(W/W_C)$  ratio rises and this lowers the supply of child labour from each working family. This is called the *relative wage effect*. Sector 2 contracts as it has to release both adult labour and capital to the expanding agricultural sector. As more adult working families are now employed in the lower paid informal sector, the supply of child labour rises which we may call the *adult labour reallocation effect*. So there are three effects on the supply of child labour in total. The *direct effect* and the *adult labour reallocation effect* tend to raise the incidence of child labour while the *relative wage effect* lowers the incidence. However, the combined magnitude of the first two effects dominates over the third effect under the sufficient condition<sup>8</sup> that:  $S_{LC}^1 \geq S_{KC}^1$ . However, the result may be valid under alternative sufficient conditions as well. One such alternative condition is  $S_{KL}^1 \theta_{C1} \geq S_{KC}^1 \theta_{L1}$ .

## 7. Concluding remarks:

It was believed that globalization will bring about new opportunities for the developing economies, the fruits of which will percolate down to the bottom of the society, thereby leading to reduction of poverty and poverty-driven child labour incidence. But what has really happened is far from satisfactory. Even when some developing countries managed to grab the opportunities of globalization in terms of growth of the national economy, the incidence of child labour has not fallen satisfactorily and in some cases it has actually increased. Globalization has some major socio-economic implications on the developing societies apart from economic growth. For example, it has perpetuated consumerism which has not spared even the poorer section of the working population. The consequence has not been good for the hapless working children. The poor households who do not have any assets except their children have been increasingly sending them to the workplace to be able to raise their living standards. The theoretical analysis of this paper explains the positive linkage that exists between consumerism and the incidence of child labour in a globalizing developing economy. Empirical research to examine the existence of this crucial linkage is urgently needed.

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<sup>8</sup> In economic terms this means the degree of substitutability between the two types of labour is stronger than the same between capital and child labour in sector 1. This is quite realistic given the technological specification of the agriculture sector.

**APPENDIX I: Derivation of supply function of child labour**

Maximizing equation (1) with respect to  $C_1, C_2$  and  $l_c$  and subject to the budget constraint (2) the following first-order conditions are obtained.

$$((\alpha U)/(P_1 C_1)) = ((\beta U)/(P_2 C_2)) = ((\gamma U)/(n - l_c)W_c) \quad (\text{A.1})$$

From (A.1) we get the following expressions.

$$C_1 = \{\alpha(n - l_c)W_c / (\gamma P_1)\} \quad (\text{A.2})$$

$$C_2 = \{\beta(n - l_c)W_c / (\gamma P_2)\} \quad (\text{A.3})$$

Substitution of the values of  $C_1$  and  $C_2$  into the budget constraint and further simplifications give us the following child labour supply function of each poor working household.

$$l_c = [n(1 - \gamma) - \gamma(\frac{W}{W_c})] \quad (3)$$

**APPENDIX II: Effects on factor prices**

As  $R$  is determined from equation (6), it is independent of any changes in  $\gamma$ . In other words, we have  $\hat{R} = 0$ .

Totally differentiating equations (5) and using envelope condition we get the following expression.

$$\theta_{L1}\hat{W} + \theta_{C1}\hat{W}_c = 0 \quad (\text{A.4})$$

where:  $\theta_{ji}$  = distributive share of the  $j$  th input in the  $i$  th sector and, ' $\wedge$ ' = proportional change.

Totally differentiating equation (9.1) and rearranging terms the following expression is obtained.

$$(S_{CL}^1 + H - S_{LL}^1)\hat{W} + (S_{CC}^1 - H - S_{LC}^1)\hat{W}_c = -G\hat{\gamma} \quad (\text{A.5})$$

where,  $H = (\frac{\gamma W}{l_c W_c}) > 0$ ;  $G = (\frac{\gamma(nW_c + W)}{l_c W_c}) > 0$  and,

$S_{ji}^k$  = the degree of substitution between factors  $j$  and  $i$  in the  $k$  th sector,  $j, i = L, K, L_c$ ; and,  $k = 1, 2$  For example,  $S_{LK}^1 \equiv (R/a_{L1})(\partial a_{L1}/\partial R)$ ,  $S_{LL}^1 \equiv (W/a_{L1})(\partial a_{L1}/\partial W)$  etc.  $S_{ji}^k > 0$  for  $j \neq i$ ; and,  $S_{jj}^k < 0$ ;

Solving (A.4) and (A.5) by Cramer's Rule the following expressions are obtained.

$$\hat{W} = \left(\frac{1}{|\theta|}\right)\theta_{C1}G\hat{\gamma} \quad (\text{A.6})$$

$$\hat{W}_C = -\left(\frac{1}{|\theta|}\right)\theta_{L1}G\hat{\gamma} \quad (\text{A.7})$$

From (A.6) and (A.7) it follows that

$$(\hat{W} - \hat{W}_C) = \left(\frac{1}{|\theta|}\right)(\theta_{C1} + \theta_{L1})G\hat{\gamma} \quad (\text{A.8})$$

where,  $|\theta| = \{\theta_{L1}(S_{CC}^1 - H - S_{LC}^1) - \theta_{C1}(S_{CL}^1 + H - S_{LL}^1)\} < 0$

Given that  $|\theta| < 0$ , from (A.8) it follows that  $(\hat{W} - \hat{W}_C) > 0$  when  $\hat{\gamma} < 0$ . So, decrease in  $\gamma$  increases the  $(W/W_C)$  ratio.

### **APPENDIX III: Effects on the product mix.**

Totally differentiating equations (7) and (8), using (A.6) and (A.7) and simplifying the following two expressions are obtained.

$$\lambda_{L1}\hat{X}_1 + \lambda_{L2}\hat{X}_2 = -\left(\frac{1}{|\theta|}\right)\lambda_{L1}(S_{LL}^1\theta_{C1} - S_{LC}^1\theta_{L1})G\hat{\gamma} \quad (\text{A.9})$$

$$\lambda_{K1}\hat{X}_1 + \lambda_{K2}\hat{X}_2 = -\left(\frac{1}{|\theta|}\right)\lambda_{K1}(S_{KL}^1\theta_{C1} - S_{KC}^1\theta_{L1})G\hat{\gamma} \quad (\text{A.10})$$

Solving (A.9) and (A.10) by Cramer's rule and simplifying one gets

$$\hat{X}_1 = -\left(\frac{1}{|\theta|}\right)\left(\frac{1}{|\lambda|}\right)[(\lambda_{L1}\lambda_{K2}S_{LL}^1 - \lambda_{K1}\lambda_{L2}S_{KL}^1)\theta_{C1} - (\lambda_{L1}\lambda_{K2}S_{LC}^1 - \lambda_{K1}\lambda_{L2}S_{KC}^1)\theta_{L1}]G\hat{\gamma} \quad (\text{A.11})$$

(−) (+)                      (−)                      (+)                      (+)                      (+)                      (−)

where,  $|\lambda| = (\lambda_{L1}\lambda_{K2} - \lambda_{K1}\lambda_{L2}) > 0$  as the formal sector is more capital-intensive than the informal sector.

From (A.11) it now follows that,

$$\hat{X}_1 > 0 \text{ when } \hat{\gamma} < 0 \text{ under the sufficient condition that: } S_{LC}^1 \geq S_{KC}^1.$$

#### APPENDIX IV: Effects on the Child labour supply

We differentiate the aggregate child labour supply function (equation 4) to we get the following expression.

$$\hat{L}_C = -H(\hat{W} - \hat{W}_C) + \hat{X}_1 + S_{LL}^1 \hat{W} + S_{LC}^1 \hat{W}_C - G\hat{\gamma} \quad (\text{A.12})$$

Using (A.6) – (A.8) and (A.11) and simplifying one can rewrite equation (A.12) as follows.

$$\hat{L}_C = -\frac{1}{|\theta|} \frac{1}{|\lambda|} [|\lambda| \{ \theta_{L1} (S_{CC}^1 - S_{LC}^1) - \theta_{C1} (S_{CL}^1 - S_{LL}^1) \} - \lambda_{K1} \lambda_{L2} \{ (S_{KL}^1 - S_{LL}^1) \theta_{C1} + (S_{LC}^1 - S_{KC}^1) \theta_{L1} \}] G\hat{\gamma} \quad (\text{A.13})$$

From (A.13) we get the following result.

$$\hat{L}_C > 0 \text{ when } \hat{\gamma} < 0 \text{ if } S_{LC}^1 \geq S_{KC}^1 \quad (\text{A.14})$$

This is only a sufficient condition. The same result holds under different sufficient conditions (like  $\theta_{C1} S_{KL}^1 \geq \theta_{L1} S_{KC}^1$ ) as well.

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