論　説

Globalization, Child Labour,
and Adult Unemployment

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Abstract

　We analyse the impact of globalization on child labour and adult unemployment. In a dual economy setting, our model incorporates （ⅰ）child labour in a rural region, （ⅱ）unskilled and skilled labour in both regions, and （ⅲ）urban unemployment. The interregional movement of unskilled and skilled labour leads to different outcomes from the existing literature on child labour: （a）foreign direct investment decreases child labour when an urban manufacturing sector is unskilled labour intensive compared to a rural agriculture sector; and （b）consumer boycott decreases child labour and urban adult unemployment when unskilled labour is substitute to skilled labour in the urban sector.

JEL Classification: J13, O10, R23

Key words: child labour, dual economy, unemployment, foreign direct investment, consumer boycott

1　Introduction

　Child labour is one of unsolved development issues. The recent ILO estimate reports that about one fourth of children aged from 5 to 17 in developing countries were engaged in child labour under hazardous working conditions in 2012 （ILO 2013）. As well as moral appeal from images that small children are economically and socially exploited, child labour does have substantial impacts on economic development through stagnated human capital accumulation and expansive inequality in living standards and opportunities. On 25 Septem-

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ber 2015, responding to international calls for actions to eliminate child labour, the United Nations and its member states envisaged to end all forms of child labour by 2025 in the 2030 Agenda for Sustainable Development（United Nations, 2015, Goal 8, Target 7）.

In response to this global agenda, more economic research on child labour is demanded. Theoretical analysis on child labour started in Basu and Van（1998）. They modelled the decision on supply of child labour in a household collective decision model, where a head of household decides the working hours of its child by balancing the income the child brings in and the moral cost of sending the child to work. Several works has developed with this model, such as Di Maio and Fabbri（2013）. On the other hand, Dinopoulos and Zhao （2007） focused on the demand side of child labour. In their dual economy model, an increase in urban wage, which is triggered by trade liberalization or foreign direct investment into urban manufacturing sector, stimulates migratory inflows of skilled labour to urban area. Since child labour（and unskilled labour）is complementary to skilled labour and is employed only in the rural area in their model, this migration effect always reduces child labour.

Our model now incorporates two new aspects into Dinopoulos and Zhao（2007）. The first aspect is to allow urban sector to employ unskilled labour who can move freely between the two regions. In our three-input production technology, the relation between skilled and unskilled labour in the urban sector can be complementary or substitute, leading to different outcomes of the migration effect from Dinopoulos and Zhao（2007）. The second aspect is to introduce urban unemployment of unskilled labour, enabling us to analyse both child labour and adult unemployment at the same time.

We analyse the impact on child labour of foreign direct investment, consumer boycotts and international labour migration. Foreign direct investment increases child labour when an urban manufacturing sector is unskilled labour intensive compared to a rural agriculture sector. In such situation, FDI attracts unskilled labour to the urban area more than skilled labour. Since a substitution effect between unskilled and child labour dominates a complementarity effect between skilled and child labour in the rural sector, FDI results in an increase in child labour. In addition to an increased unemployment of unskilled labour, FDI indeed deteriorates labour conditions in such case.

Consumer boycott on a child-labour tainted good, on the other hand, may improve labour conditions. When unskilled labour is a substitute input to skilled labour in the urban sector, consumer boycott decreases child labour and urban unemployment. A lower price of the child-labour good leads to a lower wage of skilled labour, expanding the employment of skilled labour in the urban sector, and reducing that of unskilled labour. The latter lowers the expected wage for unskilled adult workers in the urban area and then decreases the migratory inflow to the urban area. Thus, child labour and unemployment decreases since unskilled labour stay in the rural area. This is an opposite result to the existing literature

on child labour showing that consumer boycotts are harmful.

Lastly, the impact on labour markets from international migration is all absorbed in the rural area in our setting. Thus, urban unemployment does not change. Child labour decreases when unskilled workers migrate, while it increases when skilled workers migrate, due to the production technology of the rural sector.

This paper is organized as follows. The next section sets up a theoretical model with two sectors and four inputs, allowing free sectoral movement of skilled and unskilled labour. The third section describes the equilibrium. The fourth section evaluates the impact on child labour of globalization, notably foreign investment, consumer boycott by other countries, and international migration. The last section make a conclusion and proposes future research.

2　Model

We construct a small open economy model with urban and rural regions. There are four inputs in the economy: skilled labour, unskilled labour, child labour, and capital. The first two can move freely between the regions, but the others are region-specific. The urban region produces a manufactured good by using skilled labour, unskilled labour and capital. There, child labour is strictly prohibited. Further, the minimum wage for unskilled is set to above the market-clearing level, so that there exists unemployment of unskilled labour in the urban region. On the other hand, the rural region produces an agricultural good with skilled, unskilled, and child labour since it is away from the reach of government's monitoring. The wage rate for unskilled is flexible in this region so that unskilled labour in the rural region is in full employment.

2.1　Urban Manufacturing Sector

The urban region accommodates H^U of skilled labour, L^U of unskilled labour, and K of capital. It produces the manufacturing good with the production function $M(H_M, L_M, K_M)$, in which $H_M, L_M,$ and K_M are the manufacturing sector's demand for skilled, unskilled labour, and capital respectively. We assume that $M(\cdot)$ is increasing, strictly quansi-concave, and homogeneous of degree 1 in $H_M, L_M, K_M.$ Setting the price of the manufacturing good to one, the profit function of the sector is given by

$$\pi_M = M(H_M, L_M, K_M) - w_H H_M - \underline{w} L_M - r K_M \qquad (1)$$

where w_H is the wage rate for skilled labour, which is common in both urban and rural region due to the migration adjustment, $\underline{w}$ is the minimum wage for unskilled, and r is the rental rate of capital. $\underline{w}$ is set to above the market-clearing wage（and the rural wage rate

for unskilled labour) so that the full employment of unskilled labour in the urban area is not achieved. Whereas the other two are in full employment.

The profit maximizing conditions are given by, evaluatedat $H_M = H^U$ and $K_M = K$,

$$M_H(H^U,\ L_M,\ K) = w_H, \tag{2}$$

$$M_L(H^U,\ L_M,\ K) = \underline{w}, \tag{3}$$

$$M_K(H^U,\ L_M,\ K) = r, \tag{4}$$

where M_x is the first derivative of $M(\cdot)$ with respect to the respective variable $x = \{H,\ L,\ K\}$. These conditions yield $H^U(w_H;\ \underline{w},\ K), L_M(w_H;\ \underline{w},\ K)$, and $r(w_H;\ \underline{w},\ K)$.

From total differentiation on (2) and (3), we have

$$\begin{pmatrix} M_{HH} & M_{HL} \\ M_{LH} & M_{LL} \end{pmatrix} \begin{pmatrix} \dfrac{\partial H^U}{\partial K} \\ \dfrac{\partial L_M}{\partial K} \end{pmatrix} = \begin{pmatrix} -M_{KH} \\ -M_{LK} \end{pmatrix} \tag{5}$$

Further, from the assumption of the constant-return-to-scale production function, we have

$$\begin{pmatrix} M_{HH} & M_{HL} \\ M_{LH} & M_{LL} \end{pmatrix} \begin{pmatrix} \dfrac{H^U}{K} \\ \dfrac{L_M}{K} \end{pmatrix} = \begin{pmatrix} -M_{KH} \\ -M_{LK} \end{pmatrix} \tag{6}$$

From (5) and (6), we have

$$\frac{\partial H^U}{\partial K} = \frac{H^U}{K} > 0, \tag{7}$$

$$\frac{\partial L_M}{\partial K} = \frac{L_M}{K} > 0. \tag{8}$$

Thus, the marginal impact of an increase in K on other inputs are proportional. In other words, foreign investment increases H^U and L_M proportionally since it must keep the left hand side of (3) equal to $\underline{w}$. In addition, it does not change the rental rate for capital at all from (4) since M_K is homogeneous of degree 0.

From differentiation on conditions (2) and (3) with respect to H^U, L_M and w_H, we have

$$\begin{pmatrix} M_{HH} & M_{HL} \\ M_{LH} & M_{LL} \end{pmatrix} \begin{pmatrix} dH^U \\ \mathrm{d}L_M \end{pmatrix} = \begin{pmatrix} 1 \\ 0 \end{pmatrix} dw_H. \tag{9}$$

The determinant of the matrix is given by $\det M = M_{HH}M_{LL} - M_{HL}M_{LH} > 0$ due to the second maximization condition. Applying Clamer's rule, we have

$$\frac{\partial H^U}{\partial w_H} = \frac{M_{LL}}{\det M} < 0 \tag{10}$$

$$\frac{\partial L_M}{\partial w_H} = \frac{-M_{LH}}{\det M} \tag{11}$$

A marginal increase in w_H decreases the employment of skilled labour. However, how demand in the employment of unskilled labour responds to the increase depends on the relationship between skilled and unskilled labour in production of manufacturing goods. Here is a lemma, which is crucial to the result of our analysis.

Lemma 1 *When M_{LH} is negative, skilled and unskilled labour are substitute so that $\partial H^U/\partial L_M < 0$. Otherwise, they are complementary so that $\partial H^U/\partial L_M > 0$.*

When the marginal product of unskilled labour is diminishing as skilled labour increases, we say that they are substitute in production of the manufacturing good. Meanwhile, the marginal product of unskilled labour is increasing as more skilled labour is put in, they are complementary.

2.2　Rural Agriculture Sector

The rural agriculture sector can hire child labour in production. Following Dinopoulos and Zhao（2007）, we introduce the nutritional efficiency wage for child labour. We assume that each child's productivity relies on amount and nutrition of food consumed. The nutritional efficiency function is defined as $h(w_c)$, where w_c is the wage rate for child labour, or the value of food for children to attain enough nutrition. It has the following properties: $h(w_c)=0$ if $w_c < \overline{w}_c$ which is some positive level of w_c, $h'(w_c)=dh(w_c)/dw_c > 0$ and $h''(w_c)=dc^2h(w_c)/dw_c^2 < 0$, and it is bounded from above[1]. By choosing the proper level of w_c, the agriculture sector can maximize its profit.

There are H^R of skilled labour, L^R of unskilled labour, and C of child labour in the rural region. The production function for the agriculture sector is given by $A(H_A, L_A + \gamma h(w_c)C_A)$, where H_A, L_A, C_A are the agriculture sector's demand for skilled, unskilled, and child labour respectively. We assume that $A(\cdot)$ is increasing, strictly quansiconcave, and homogeneousof degree1in inputs. $\gamma \in (0, 1)$ is the constant adult-equivalent scale so that one unit of child labour is equivalent to γ unit of adult labour without any consideration on nutritional efficiency. Please note that unskilled labour and child labour are perfect substitute, while these are complementary to skilled labour from the form of the production function.

The profit of the agriculture sector is defined as

$$\pi_A = p_A A(H_A, \ L_A + \gamma^h(w_c)C_A) - w_H H_A - w_L L_A - w_C C_A \tag{12}$$

where p_A is the relative price of agricultural good measured by the manufacturing good,

and w_L is the wage rate for rural unskilled labour which is flexible to achieve the full employment of the unskilled in the rural region. The wage rate for rural skilled labour is equal to w_H due to the migration adjustment.

Assuming $C_A \in (0, C)$, we have the profit maximizing conditions such as, evaluated at $H_A = H^R$ and $L_A = L^R$,

$$p_A A_H(H^R, \ L^R + \gamma h(w_C) C_A) = w_H, \tag{13}$$

$$p_A A_L(H^R, \ L^R + \gamma h(w_C) C_A) = w_L, \tag{14}$$

$$p_A A_L(H^R, \ L^R + \gamma h(w_C) C_A) \gamma h(w_C) = w_C, \tag{15}$$

$$p_A A_L(H^R, \ L^R + \gamma h(w_C) C_A) \gamma h'(w_C) = 1. \tag{16}$$

Conditions (15) and (16) determine the profit maximizing wage for children $w_C{}^*$, which satisfies

$$h'(w_C{}^*) = \frac{h(w_C{}^*)}{w_C{}^*}. \tag{17}$$

Furthermore, from conditions (14) and (16), we have the equilibrium wage for unskilled labour $w_L{}^*$ such as

$$w_L{}^* = \frac{1}{\gamma h'(w_C{}^*)}. \tag{18}$$

Note that $w_C{}^*$ and $w_L{}^*$ are determined only by the form of $h(\cdot)$ and γ.

Now, let us define the skilled and unskilled labour used for one unit of production as

$$a_H \equiv \frac{H^R}{Y_A}, \tag{19}$$

$$a_L \equiv \frac{L^R + \gamma h(w_C{}^*) C_A}{Y_A}, \tag{20}$$

where Y_A is the level of production. We can rewrite conditions (13) and (14) as

$$p_A A_H(a_H, \ a_L) = w_H, \tag{21}$$

$$p_A A_L(a_H, \ a_L) = w_L{}^*. \tag{22}$$

These yield $a_H(w_H; w_L{}^*)$ and $a_L(w_H; w_L{}^*)$. From (21), we have the equilibrium wage for skilled labour $w_H{}^*$, which satisfies

$$p_A A_H(a_H(w_H{}^*, \ w_L{}^*), \ a_L(w_H{}^*, \ w_L{}^*)) = w_H{}^*. \tag{23}$$

The first derivative of $w_H{}^*$ with respect to p_A is given by, from (23),

$$\frac{dw_H{}^*}{dp_A} = A_H > 0. \tag{24}$$

As the relative price of agricultural decreases, the wage rate for skilled workers decreases. Lastly, from ⑴⑼ and ⑵⓪, we have

$$H^R = a_H{}^* Y_A, \tag{25}$$

$$L^R + \gamma r(w_C{}^*) C_A = a_L{}^* Y_A, \tag{26}$$

where $a_H{}^* \equiv a_H(w_H{}^*, w_L{}^*)$ and $a_L{}^* \equiv a_L(w_H{}^*, w_L{}^*)$

3　Equilibrium

We have eleven unknowns $(r, w_H, w_L, w_C, L_M, L^U, L^R, H^U, H^R, C_A, Y_A)$. First, $w_C{}^*$ is determined by equation ⑴⑺, and then equation ⑴⑻ gives $w_L{}^*$. Equation ⑵⑶ yields $w_H{}^*$, which gives $r^* \equiv r(w_H{}^*, \underline{w}, K)$, $L_M{}^* \equiv L_M(w_H{}^*, \underline{w}, K)$, and $H^{U*} \equiv H^U(w_H{}^*, \underline{w}, K)$ from ⑵–⑷.

Second, migration of unskilled labour would stop when the expected wage of the urban region equates the wage of the rural region, or $\underline{w} L_M{}^*/L^U = w_L{}^*$. This gives us the equilibrium number of urban unskilled labour as

$$L^{U*} = \frac{\underline{w}}{w_L{}^*} L_M{}^*. \tag{27}$$

Next, the economy-wide endowment of skilled and unskilled labour must equate the sectoral allocation of both labors such as $L^{U*} + L^R = L$ for the unskilled labour market, and $H^{U*} + H^R = H$ for the skilled labour market, where L and H are the economy-wide endowment of skilled and unskilled labour respectively, and $H^{U*} \equiv H^U(w_H{}^*, \underline{w}, K)$. These yield

$$L^{R*} = L - L^{U*}, \tag{28}$$

$$H^{R*} = H - H^{U*}. \tag{29}$$

From ⑵⑸ and ⑵⑼, we have the equilibrium level of total production of the agricultural good, such as

$$Y_A{}^* = H^{R*}/a_H{}^*. \tag{30}$$

Lastly, inserting ⑶⓪ into ⑵⑹, we have the equilibrium number of child labour in the economy as

$$C_A{}^* = \frac{1}{\gamma h(w_C{}^*)} [\theta_A H^{R*} - L^{R*}], \tag{31}$$

where $\theta_A \equiv a_L{}^*/a_H{}^*$. Child labour increases when the employment of skilled labour expands

in the agricultural sector, while it reduces when the employment of unskilled labour decreases. Now, we all the equilibrium values of the eleven unknowns.

For the latter part of this paper, we define the unemployment of urban unskilled labour as

$$U^* = L^{U*} - L_M^* = \frac{\underline{w} - w_L^*}{w_L^*} L_M^*, \tag{32}$$

which is positive if $\underline{w} - w_L^* > 0$. In our model, an increase in the employment in the urban region increases urban unemployment. This occurs that the expansion of employment of unskilled labour in the urban region excessively drives households from the rural to the urban regions, and it cannot fully absorb the increase of unskilled labour available in market.

4　Comparative Statics

In this section, we analyze the impact of globalization on child labour C_A^* and adult unemployment U^*. Specifically, we consider foreign direct investment to increase the endowment of capital, consumer boycott lowering the relative price of the agricultural good, and the inflow of skilled and unskilled labour.

4.1　Foreign indirect investment

Here, we consider foreign investment as an exogenous increase in K. From differentiation on (31) with respect to K, we have

$$\begin{aligned}
\frac{\partial C_A}{\partial K} &= \frac{1}{\gamma h(w_c)}\left[\theta_A \frac{\partial H^{R*}}{\partial K} - \frac{\partial L^{R*}}{\partial K}\right], \\
&= \frac{1}{\gamma h(w_c)}\left[-\theta_A \frac{\partial H^{u*}}{\partial K} + \frac{\underline{w}}{w_L^*} \frac{\partial L_M^*}{\partial K}\right] \\
&= \frac{L_M^*}{\gamma h(w_c) K}\left[-\frac{\theta_A}{\theta_M} + \frac{\underline{w}}{w_L^*}\right], \tag{33}
\end{aligned}$$

where $\theta_M \equiv L_M^*/H^{U*}$. For the transformation from the first to the second lines in (33), we use (7) and (8). The sign of the the bracket of equation (33) determines the impact of foreign investment on child labour. Note that θ_A/θ_M implies the relative intensity of unskilled labour to skilled labour between sectors. We have our first proposition as follows.

Proposition 1 *Foreign investment increases child labour when the manufacturing sector use unskilled labour more intensively than the agriculture sector.*

Proof When the manufacturing sector is more unskilled-labour intensive than the agricultural sector, θ_A/θ_M is less than unity. Meanwhile, the second part is always more than unity since $\underline{w}-w_L^*>0$. Thus, the sign of the bracket is positive, and $\partial C_A/\partial K>0$.　　　□

Foreign investment may increase child labour. This is a contrasting result to Dinopoulos and Zhao (2007), in which foreign investment increases skilled labour employed in the manufacturing sector, and then decreases child labour, which is complementary to skilled labour in the agricultural sector. In our model, foreign investment reallocates not only skilled labour but also unskilled labour from the agriculture sector to the manufacturing sector. When the manufacturing sector is more unskilled-labour intensive, the reallocation of skilled labour from the rural sector takes place in a smaller scale than that of unskilled labour. Therefore, child labour may increase since it is substitute to unskilled labour in the agriculture sector.

On the other hand, the impact of foreign direct investment becomes ambiguous when the manufacturing sector is more skilled-labour intensive than the agricultural sector. In an extreme case of $L_M^*=0$, child labour decreases due to foreign direct investment. This is consistent with Dinopoulos and Zhao (2007). However, allowing the manufacturing sector to hire unskilled workers, we may have an opposite result.

The impact of foreign direct investment on adult unemployment is given by

$$\frac{\partial U^*}{\partial K}=\frac{\underline{w}-w_L^*}{w_L^*}\frac{\partial L_M^*}{\partial K}>0. \tag{34}$$

Growth in the employment of the manufacturing sector due to foreign direct investment induces more unskilled labour to move to the urban region. However, the inflow of the unskilled outpaces the labour absorption by the manufacturing sector. As a result, foreign direct investment increases urban unemployment of adult unskilled labour.

4.2 Consumer boycott

A decrease in p_A can be interpreted as consumer boycott on agricultural goods. The impact of consumer boycott on child labour is given by

$$\frac{\partial C_A^*}{\partial p_A}=\frac{1}{\gamma h(w_C^*)}\left[\frac{\partial\theta_A}{\partial p_A}H^{R*}+\theta_A\frac{\partial H^{R*}}{\partial p_A}-\frac{\partial L^{R*}}{\partial p_A}\right],$$

$$=\frac{1}{\gamma h(w_C^*)}\left[\frac{\partial\theta_A}{\partial p_A}H^{R*}-\theta_A\frac{\partial H^{U*}}{\partial w_H^*}\frac{\partial w_H^*}{\partial p_A}+\frac{\underline{w}}{w_L^*}\frac{\partial L_M^*}{\partial w_H^*}\frac{\partial w_H^*}{\partial p_A}\right]$$

$$=\frac{1}{\gamma h(w_C^*)}\left[\frac{\partial\theta_A}{\partial p_A}H^{R*}-\frac{1}{detM}\left(\theta_AM_{LL}+\frac{\underline{w}}{w_L^*}M_{LH}\right)\frac{\partial w_H^*}{\partial p_A}\right] \tag{35}$$

Proposition 2 *Consumer boycott decreases child labour when unskilled labour is substitute to skilled labour in the manufacturing sector.*

Proof First, we have $\partial\theta_A/\partial p_A = -M_L/M_{LL} > 0$ from $p_A M_L(\theta_A) = w_L{}^*$. Then, $\partial w_H{}^*/\partial p_A > 0$, and $M_{LL} < 0$ and det $M > 0$ due to the second condition for maximization. Lastly, when unskilled labour is substitute to skilled labour, we must have $M_{LH} < 0$. Thus, $\partial C_A{}^*/\partial p_A > 0$.　　　　□

Consumer boycott affects child labour though three effects. The first effect is a change in the ratio of unskilled labour to skilled labour employed in the rural sector, or θ_A. In our setting, a decrease in p_A lowers θ_A, implying a relative decrease in demand for unskilled labour and then child labour.

The second effect comes from the migration of skilled labour. A decrease in w_H due to consumer boycott expands the employment of skilled labour in the urban manufacturing sector. Since child labour is complementary to skilled labour in the agriculture sector, it lowers the use of child labour.

The final effect stems from the reallocation of unskilled labour between sectors. It depends on the relationship between skilled and unskilled labour in the manufacturing sector. When skilled labour is substitute to unskilled in production the manufacturing good, a decrease in w_H due to consumer boycott decreases the employment of unskilled labour in the urban manufacturing sector. This reallocates unskilled labour from the urban to the rural regions by lowering the expected wage of unskilled in the urban region. This reallocation lowers child labour employed in the agriculture sector since child labour is substitute to unskilled. In this case, all the three effects above causes a decrease in child labour, and we have Proposition 1: consumer boycott decreases child labour. Of course, when skilled labour is complementary to unskilled in the manufacturing sector, consumer boycott increases the employment of unskilled labour in the manufacturing, and child labour through this path.

Meanwhile, consumer boycott has the substantial impact on adult unemployment in the urban region. Differentiating equation (32) with respect to p_A gives

$$\frac{\partial U^*}{\partial p_A} = \frac{\mathrm{w} - w_L{}^*}{w_L{}^*} \frac{\partial L_M{}^*}{\partial w_H{}^*} \frac{\partial w_H{}^*}{\partial p_A}. \tag{36}$$

From this equation, we have the following proposition.

Proposition 3 *Consumer boycott decreases unemployment of unskilled labour when unskilled labour is substitute to skilled labour. Whereas, it increases unemployment of unskilled labour when unskilled labour is complementary to skilled labour.*

Proof The sign of $\partial U^*/\partial p_A$ hinges on the sign of $\partial L_M{}^*/\partial w_H{}^*$. When unskilled labour is substitute to skilled labour, $\partial L_M{}^*/\partial w_H{}^* > 0$ and $\partial U^*/\partial p_A > 0$. Otherwise, $\partial L_M{}^*/\partial w_H{}^* < 0$ and $\partial U^*/\partial p_A < 0$.　　　　□

The impact of consumer boycott on child labour and adult unemployment gravely hinges

on the relationship between skilled and unskilled labour in production of the manufacturing good. A decrease in w_H due to consumer boycott increases the employment of skilled labour in the manufacturing sector. When unskilled labour is substitute to skilled labour, the employment of unskilled labour decreases in response to the expansion of that of skilled labour. At the same time, it reduces the expected wage for unskilled to live in the urban region, and reduces the urban population of unskilled labour. Since the latter effect is larger than the former, the level of unemployment decreases.

On the other hand, when unskilled labour is complementary to skilled labour, consumer boycott increases adult unemployment. In some cases, consumer boycott may result in a reduction in child labour and an expansion in adult unemployment[2]. Thus, too much emphasis on child labour reduction deteriorates the employment of unskilled adult labour. This is not seen in Dinopoulos and Zhao（2007）.

4.3 International labour migration

In the era of global movement of workers, migration would affect labour markets and then return to labour in destination countries. Now, we evaluate the impact of international migration of unskilled and skilled workers on child labour. The migration of labour in the dual economy affect child labour in the following ways.

Proposition 4 *International migration of unskilled labour decreases child labour, while that of skilled labour increases child labour.*

Proof International migration of unskilled and skilled labour is modeled as an increases in L and H. Differentiating equation ⑶⑴ with respect to L and H gives

$$\frac{\partial C_A^*}{\partial L} = -\frac{1}{rh(w_c^*)}\frac{\partial L^R}{\partial L} < 0, \tag{37}$$

$$\frac{\partial C_A^*}{\partial H} = \frac{1}{rh(w_c^*)}\theta_A\frac{\partial H^R}{\partial H} = > 0. \tag{38}$$

Thus an increase in L decreases C_A^*, while that in H increases C_A^*. □

It turns out that the migration impact is all absorbed in the rural region through changes in labour demandintherural sector. The migratory inflow of unskilled labour substitutes child labour employed in the rural sector due to a lower wage for unskilled labour. Meanwhile, the inflow of skilled labour lowers the wage of the skilled and thus expands its employment in the rural sector. Since child labour is assumed to be complementary to skilled labour in agriculture, the inflow results in increasing child labour.

5 Concluding Remarks

This paper analyses how globalisation affects the incidence of child labour and urban adult unemployment, which are widely observed phenomena in the developing world. Extending Dinopoulos and Zhao（2007）, we construct a dual economy model with free movement of unskilled and skilled labour. Interregional migration leads to different outcomes from the existing child labour literature, depending on the technological attributes of urban manufacturing.

The first outcome is that foreign direct investment reduces child labour when an urban manufacturing sector uses more intensively unskilled labour than a rural agriculture sector. This happens mainly because foreign direct investment attracts more unskilled labour than skilled to the unskilled-labour intensive sector, resulting in more employment of child labour in the rural sector due to its substitutability to unskilled labour. Secondly, contrast to the existing literature, we find that consumer boycott improves the situation of child labour and urban adult unemployment when unskilled labour is a substitute input to skilled labour in urban manufacturing. Consumer boycott against child-labour-tainted goods reallocates unskilled labour to the rural sector, due to lower wage of the skilled and substitutability of unskilled and skilled labour in the urban sector. Thus, child labour decreases. The last outcome is rather straight forward: the increase in endowments of unskilled（skilled）labour reduces（increases）child labour due to its substitutability （complementarity）to each type of adult labour.

As concluding remarks, we point out possible extensions of this research. First of all, this analysis considers only the demand side of child labour. Like Basu and Van（1998）, the supply side of child labour is also of importance and needs to be incorporated to make rigorous assessment for the impact of globalisation on child labour. The household collective decision model could be an option. Secondly, modeling consumer boycotts is required. In our model. we consider consumer boycott as a decrease in an agricultural good. In reality, however, consumer boycotts are accompanied with a labeling scheme. In this respect, the heterogeneous pattern of child labour employment in agriculture should be modeled.

Notes

1) According to Dinopoulos and Zhao（2007）, the last restriction assures the existence of a nutritional efficiency wage.
2) When the complementarity of unskilled to skilled labour is at a reasonable degree, the sign of ⒂ becomes positive while the sign of ⒅ is negative.

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