

IMPACT OF RESTRICTIVE TRADE POLICY ON ADULT UNEMPLOYMENT, WELFARE AND THE INCIDENCE OF CHILD LABOUR -A THREE SECTOR GENERAL EQUILIBRIUM ANALYSIS

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Abstract

This paper considers a three sector competitive general equilibrium model of a small open, less developed economy suffering from unemployment problem in the adult labour market on the one hand, and from the existence of employment of child labour on the other . The economy is divided into one rural, and two urban sub-sectors. Four inputs are used in the model among which three are – sector specific in nature. The representative adult worker in this model not only supplies his own labour ,but also sends his children out to work. Factor market distortion in this model is captured by the existence of a factor price differential between urban and rural sectors. The model is used to analyze the effect of imposition of tariff protection in import competing sector on the unemployment of adult workers on the one hand , and on the incidence of child labour supply on the other. An interesting result of the present exercise is that the supply of child labour moves in the opposite direction to the level of unemployment in the adult labour market as the tariff rate protection in import competing sector changes. This result runs counter to the existing view that unemployment in the adult labour market is one of the important causes for the existence of child labour market.

Keywords: Child labour, General equilibrium, Urban adult unemployment, Trade policy.

JEL Classification: F10, J13, J22.

1. Introduction

The term 'Child Labour' is used as a synonym for 'employed child' or 'working child'. Child labour, can be defined as that segment of the child population which participates in work, either paid or unpaid with the parents, family or outside. Any work by children that interferes with their full physical development, the opportunities for a desirable minimum of education and their needed recreation is called child labour.

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It has been recognized by several authors that policies of trade restrictions may not have their intended effect in curtailing the incidence of child labour (Bhagawati, 1995; Jafarey and Lahiri, 2002; Maskus, 1996; and Ranjan, 2001). Edmonds and Pavcnik (2002) find empirical support for the concern that trade restrictions may indeed raise child labor in the rice sector in Vietnam using data from 1993 to 1998.

On the supply side, child labour is often viewed as being driven by the needs of basic survival in developing nations, where children need to work to sustain themselves or their families. Basu and Van (1998) recognize this and establish that even though adults dislike child labour, they may have to endure it for survival of their poor households. Baland and Robinson (2000) also find altruistic parents enduring child labour because of poverty (the case of zero bequests) or imperfect capital markets. Higher family incomes, improved educational opportunities (Basu, 1999; Maskus, 1996; Ray, 2002) and a general increase in the living standards of the poor through liberalized trade and improved access to world markets (Bhagawati, 1995) are expected to reduce child labour.

A number of demographic studies on child labour and fertility made in the context of developing countries show the existence of a positive relationship between child labour as a part of labour force and high fertility rates (Rosenzweig and Evenson (1977)).

The present paper considers a three sector competitive general equilibrium model of a small open less developed economy suffering from unemployment problem in the adult labour market on one hand, and from the existence of a child labour market on the other hand. The economy is divided into one rural and two urban sub-sectors. Four inputs are used in the model among which three are –sector specific in nature. The representative adult worker in this model not only supplies his own labour but also sends his children out to work. Factor market distortion in this model is captured by the existence of a factor price differential between urban and rural sectors. In this framework, the major motivation of the paper is to investigate the effectiveness of trade restrictive policy in the import competing sector in reducing the incidence of child labour use. Since there are impacts –both direct and indirect –on other variables following a policy change, a policy designed to eradicate any one problem of an economy may have perverse impact on other problems. Hence we are interested to examine the impact of tariff protection in the import-competing sector on the other two macroeconomic variables, viz, adult unemployment and national welfare. An interesting result of the present paper is that with the change in the tariff rate, the supply of child labour moves opposite to the movements in the level of adult unemployment. This result runs counter to the prevailing view that unemployment in the adult labour market is one of the important causes for the existence of child labour market. Interesting work has been done in this area by Gupta (1997). Since free trade (i.e., zero tariff rate) is the first-best trade policy for a small open economy, the justification of our exercise on national welfare lies in the presence of factor market distortion. Kemp (1962) argued that for a country with no monopoly power in trade, and without any domestic distortions, a higher tariff is inferior to a lower tariff. Batra (1973) also argued that if there is a wage differential between sectors and the wage differential is paid by the producers of the exportable good, the social welfare is uniquely and negatively related to the rate of tariff, given that the price - output response is positive, but if the differential is paid by the import competing industry, an increase in the tariff rate may augment community welfare and vice-versa.

The comparative static exercises of our model yields the following results:

- Due to protectionism in import-competing sector, adult unemployment rate will go up which is an undesirable incidence;
- Child labour supply will also be reduced due to protectionism in import competing sector as number of adult labourers engaged in rural sector of the economy goes down;
- Due to tariff protection in import-competing sector, national welfare may or may not be reduced.

2. The Model

We consider a small open dual economy, which is broadly divided into rural and urban sector. The rural sector (sector X) produces its product (the export commodity of the economy) with adult labour and child labour. In our model adult labour is perfectly mobile in all the three sectors and capital and child labour are specific factors of production. Following Basu (1999), we make the assumption of substitution in the rural sector, which suggests that adult labour is a substitute for child labour, or more generally, adults can do what children do. The rural sector is concerned mainly with activities relating to cultivation. For no such activities children are essential, so that adults can always replace them. Thus the substitution axiom is quite relevant in the rural sector. It is assumed that a child's labour is equivalent to $\frac{1}{\beta}$ units of adult's labour, where $\beta > 1$. In other words, each adult, working all day produces 1 unit of labour, whereas each child, working all day, produces $\frac{1}{\beta}$ units of labour. The adult labour in rural sector earns W^A while a child labour earns $\frac{1}{\beta} W^A$. The urban sector is further sub-divided into two sub-sectors so that on the whole we have three sectors in the economy. The first sector (Y sector) within the urban sector produces the non-traded intermediary with the help of adult labour and capital. The second sector (sector Z) within the urban sector is the tariff protected import competing sector that produces its product using adult labour and a non-traded intermediary input.

The wage rate in the two urban sectors are W^* . It is exogenously given with $W^* > W^A$. In our model we consider the case of factor market imperfection. The kind of factor market imperfection analysed here concerns the existence of a factor price differential between sectors. We consider Harris-Todaro type of rural-urban classification and the wage rate of the urban sector is higher than in the rural sector.

In our model, wage differential between rural and urban sector leads to migration of labour from the rural to urban sector, resulting in Harris-Todaro type of urban adult unemployment. Capital and child labour are assumed to be fully employed. The rural and urban wage rates are related by the migration equilibrium condition. The complete flexibility of rural adult and child wage rates lead to the equality between the expected urban income for a prospective rural migrant family and their actual family income in the rural sector. Unemployment in the rural sector is ruled out due to complete flexibility of wage rate.

Production functions reflect CRS with diminishing marginal productivity to each factor. Product markets are competitive owing to the small open economy assumption, prices of the traded goods X and Z are given internationally. Since Y is non-traded, its price is endogenously determined by the domestic demand-supply mechanism. The supply of Y is constrained by the demand for Y.

In this framework we will examine the effect of protectionism in import competing sector of the economy on the incidence of child labour as well as on urban adult unemployment.

The following symbols will be used in the formal presentation of the model:

$a_{L_a i}$:	Adult labour - output ratio in the i^{th} sector $i = X, Y, Z$
$a_{L_c X}$:	Child labour - output ratio in the X sector
a_{K_Y}	:	Capital - output ratio in the Y sector
a_{Y_Z}	:	Non-traded intermediary input-output ratio in Z sector
θ_{ij}	:	Distributive share of the i^{th} input in the j^{th} commodity, $i = LA, LC, K, Y, J = X, Z$
P_i	:	World Price of the i^{th} commodity, $i = X, Z$
t	:	Ad-valorem tariff rate on the import of Z
P_Y	:	Domestically determined price of Y
WA	:	Adult wage rate in the rural sector
$W^c = \left(\frac{W^A}{\beta} \right)$:	Child wage rate in the rural sector
W^*	:	Adult wage rate in the urban sectors
r	:	Rate of return to capital
K	:	Capital stock of the economy
L	:	Total adult labour endowment
LU	:	Level of urban adult unemployment in the economy
L_c	:	Aggregate supply of child labour
\wedge	:	Proportional change

A general equilibrium of the system is given by the following set of equations:

$$a_{L_a X} W^A + a_{L_c X} \left(\frac{W^A}{\beta} \right) = P_X \quad \dots (1)$$

$$a_{L_a Y} W^* + a_{K_Y} r = P_Y \quad \dots (2)$$

$$a_{L_a Z} W^* + a_{Y_Z} P_Y = P_Z (1+t) \quad \dots (3)$$

$$a_{K_Y} Y = K \quad \dots (4)$$

$$a_{L_a X} X + a_{L_a Y} Y + a_{L_a Z} Z + L_U = L \quad \dots (5)$$

$$a_{L_C X} X = L_C^S (W^A, a_{L_A X} X), \frac{\partial L_C^S}{\partial W^A} < 0, \frac{\partial L_C^S}{\partial a_{L_A X} X} > 0 \quad \dots (6)$$

$$\frac{a_{L_A Y} W^* Y + a_{L_A Z} W^* Z}{a_{L_A Y} Y + a_{L_A Z} Z + L_U} = W^A + \frac{W^A}{\beta} \quad \dots (7)$$

$$a_{VZ} Z = Y \quad \dots (8)$$

Equations (1) – (3) are the usual price- unit cost equality conditions in the three sectors of the economy. Equation (4) is the full-employment condition of capital. Equation (5) is the endowment equation of adult labour. Equation (6) gives the child labour market equilibrium condition. The left hand side of equation (5) gives the demand for child labour in the economy and the right hand side reflects the aggregate supply of child labour in the economy (Harris and Todaro 1970). Child labour supply depends on adult wage rate (Basu, 2000) as well as on number of adult workers engaged in informal sector as these people send their kids to the job market, due to poverty of the household. Higher the adult wage rate, lower will be child labour supply as some adults will then decide to send their children to school instead of job market. Moreover, higher the number of people engaged in informal sector, higher will be child labour supply. The Harris-Todaro migration equilibrium condition is given by equation (7). The total income of a working family in the rural sector (the right hand side of (7)) must be equal to the expected total income of the family in the urban sector (the left hand side) in migration equilibrium. The demand-supply equilibrium condition for the intermediate input is given by equation (8).

There are eight endogenous variables in the system: W^A , r , P_Y , X, Y, Z, L_C^S , L_U and eight independent equations. Hence the system is solvable. The parameters in the system are $P_X, P_Z, t, W^*, L, K, \beta$. We should note that the system possess decomposition property. The three unknown factor prices W^A , r and P_Y are determined from equation (1) – (3) independent of the factor endowments. Once factor prices are known factor co-efficient are also determined.

From (1), given P_X, t and β , W^A is determined. From (3), given W^* and P_Z , P_Y is obtained and substituting the value of P_Y in (2), r can be solved. From (4) given K , output of Y is determined. Once Y is obtained, Z is automatically obtained from (8). The level of urban adult unemployment is then obtained from (7). Substituting the value of Y, Z and L_U in (5) we shall solve for X . Finally, L_C^S can be solved from equation (6).

Before going to comparative static exercise, it is important to mention that our measure of welfare in the small open economy is national income at world prices (N) and it is expressed as follows:

$$N = \left(a_{L_A X} W^A + a_{L_C X} \frac{W^A}{\beta} \right) X + (a_{L_A Y} Y + a_{L_A Z} Z) W^* + rK \quad \dots (9)$$

In equation (9) $\left(a_{L_a X} W^A + a_{L_c X} \frac{W^A}{\beta} \right) X$ gives the wage income of adult and child workers in the rural sector. On the other hand, $(a_{L_a Y} Y + a_{L_a Z} Z) W^*$ gives the wage income of adult workers in the urban sector. rK is the rental income from capital .

3. Comparative Static Exercise

3.1 Effect of Protectionism on Unemployment

To find out the impact of protectionism in import competing sector on urban adult unemployment we have to investigate the effect on factor prices and composition of output in urban sub-sectors.

From (1) we can infer that since P_X remains unaffected due to protectionism in the import competing sector, the wage rates of adult and child labourers will remain unaffected. From (3), it is clear that as adult wage rate in urban sector is fixed , so protectionism must raise the price of non-traded intermediate commodity.

Differentiating (3) we get,

$$a_{L_a Z} dW^* + W^* da_{L_a Z} + a_{Y Z} dP_Y + P_Y da_{Y Z} = P_Z dt \quad \dots (10)$$

$$\text{or, } \theta_{L_a Z} \hat{a}_{L_a Z} + \theta_{Y Z} \hat{P}_Y + \theta_{Y Z} \hat{a}_{Y Z} = dt$$

$$\text{or, } \theta_{Y Z} \hat{P}_Y = dt \quad (\because \text{from condition of cost minimization } \theta_{L_a Z} \hat{a}_{L_a Z} + \theta_{Y Z} \hat{a}_{Y Z} = 0)$$

$$\therefore \hat{P}_Y = \frac{dt}{\theta_{Y Z}} > 0 \quad \dots (11)$$

To see the effect on rental, differentiating equation (2) we obtain that

$$a_{L_a Y} dW^* + W^* da_{L_a Y} + a_{K Y} dr + r da_{K Y} = dP_Y$$

$$\text{or, } \theta_{L_a Y} \hat{a}_{L_a Y} + \theta_{K Y} \hat{r} + \theta_{K Y} \hat{a}_{K Y} = \hat{P}_Y$$

$$\text{or, } \theta_{K Y} \hat{r} = \hat{P}_Y = \frac{dt}{\theta_{Y Z} \theta_{K Y}} > 0$$

$$\text{or, } \hat{r} = \frac{\hat{P}_Y}{\theta_{K Y}} = \frac{dt}{\theta_{Y Z} \theta_{K Y}} > 0 \quad \dots (12)$$

Due to protectionism in import competing sector, the capital owners will be benefited but there will be no change in the wage rates of adult as well as of child labour. However, price of non-traded intermediate input will be increased.

The initial impact of increased price of import competing good falls on the non-traded intermediary producing sector. Since adult wage rate is exogenously given in this model for the

urban sector, hence P_Y must rise due to increase in protectionism. The next obvious consequence is gain of capital owners.

Now we concentrate on output composition in urban sector.

Differentiating (4) we get,

$$\hat{Y} = -\hat{a}_{KY} = -\theta_{LaY}\sigma_Y(W^* - \hat{r}) = \theta_{LaY}\sigma_Y\hat{r} > 0^3 \quad \dots (13)$$

Differentiating (8) we get,

$$a_{YZ}dZ + Zda_{YZ} = dY$$

$$\Rightarrow \hat{Z} + \hat{a}_{YZ} = \hat{Y}$$

$$\text{Now, } \hat{a}_{YZ} = \theta_{LaZ}\sigma_Z(W^* - \hat{P}_Y) = -\theta_{LaZ}\sigma_Z\hat{P}_Y = -\frac{\theta_{LaZ}\sigma_Z dt}{\theta_{YZ}} < 0$$

$$\begin{aligned} \hat{Z} &= \hat{Y} - \hat{a}_{YZ} \\ &= \theta_{LaY}\sigma_Y\hat{r} + \theta_{LaZ}\sigma_Z\frac{dt}{\sigma_{YZ}} \\ &= \theta_{LaY}\sigma_Y\frac{dt}{\theta_{YZ}\theta_{KY}} + \theta_{LaZ}\sigma_Z\frac{dt}{\sigma_{YZ}} \\ &= \frac{dt}{\theta_{YZ}}\left(\frac{\theta_{LaY}}{\theta_{KY}}\sigma_Y + \theta_{LaZ}\sigma_Z\right) > 0 \quad \dots (14) \end{aligned}$$

Thus, if protection is provided to import competing sector of the economy then the two urban sub-sectors will expand.

Due to increase in the price of the non-traded intermediate, rental rate on capital increases. Hence, cost-minimizing producers will try to curtail the use of capital in per unit production of Y. Since capital is specific in Y production, full employment of capital indicates expansion of the sector producing the non-traded intermediate input. Now, the expansion of import-competing sector can be analyzed using the Rybczynski result. The exact Rybczynski effect does not work because of sector specificity of Y input in Z production. In production of Z, Y acts as an intermediate input. Hence the increase in the supply of this factor of production will create an expansion in the import-competing sector. In addition, the per unit requirement of specific input Y in Z production will also be reduced due to rise in price of Y input. This will also create an expansionary impact in import competing sector. Hence, the two urban sub-sectors will expand.

Rewriting (7), we get

$$W^* (a_{LaY}Y + a_{LaZ}Z) = \left(W^A + \frac{W^A}{\beta}\right) (a_{LaY}Y + a_{LaZ}Z + L_U)$$

³ See Appendix I for detailed derivation

$$\Rightarrow (a_{L_aY}Y + a_{L_aZ}Z) \left(W^* - W^A - \frac{W^A}{\beta} \right) = L_U \left(W^A + \frac{W^A}{\beta} \right) \quad \dots (15)$$

Differentiating (15) we get,

$$\begin{aligned} & \left(W^* - W^A - \frac{W^A}{\beta} \right) d(a_{L_aY}Y + a_{L_aZ}Z) = dL_U \left(W^A + \frac{W^A}{\beta} \right) \\ & \Rightarrow \left(W^* - W^A - \frac{W^A}{\beta} \right) (a_{L_aY}dY + Yda_{L_aY} + a_{L_aZ}dZ + Zda_{L_aZ}) = dL_U \left(W^A + \frac{W^A}{\beta} \right) \\ & \Rightarrow \left(W^* - W^A - \frac{W^A}{\beta} \right) \{ a_{L_aY}Y(\hat{Y} + \hat{a}_{L_aY}) + a_{L_aZ}Z(\hat{Z} + \hat{a}_{L_aZ}) \} = dL_U \left(W^A + \frac{W^A}{\beta} \right) \\ & \Rightarrow \left(W^* - W^A - \frac{W^A}{\beta} \right) [\{ a_{L_aY}Y(\hat{a}_{L_aY} - \hat{a}_{KY}) \} + a_{L_aZ}Z(\hat{a}_{L_aZ} - \hat{a}_{YZ} - \hat{a}_{KY})] = dL_U \left(W^A + \frac{W^A}{\beta} \right) \\ & \Rightarrow \left(W^* - W^A - \frac{W^A}{\beta} \right) \{ (a_{L_aY}Y)\sigma_Y \hat{r} + (a_{L_aZ}Z)(\sigma_Z \hat{P}_Y + \theta_{L_aY}\sigma_Y \hat{r}) \} = dL_U \left(W^A + \frac{W^A}{\beta} \right) \\ & \Rightarrow \left(W^* - W^A - \frac{W^A}{\beta} \right) \left(a_{L_aY}Y\sigma_Y \frac{dt}{\theta_{KY}\theta_{YZ}} + a_{L_aZ}Z\sigma_Z \frac{dt}{\theta_{YZ}} + \frac{a_{L_aZ}Z\theta_{L_aY}\sigma_Y dt}{\theta_{KY}\theta_{YZ}} \right) = dL_U \left(W^A + \frac{W^A}{\beta} \right) \\ & \Rightarrow dL_U = \frac{\left(W^* - W^A - \frac{W^A}{\beta} \right)}{\left(W^A + \frac{W^A}{\beta} \right)} \frac{dt}{\theta_{YZ}} \left(\frac{a_{L_aY}Y\sigma_Y}{\theta_{KY}} + a_{L_aZ}Z\sigma_Z + \frac{a_{L_aZ}Z\theta_{L_aY}\sigma_Y}{\theta_{KY}} \right) > 0 \quad (16) \end{aligned}$$

Proposition 1:

Due to protectionism in import-competing sector, adult unemployment rate will go up which is an undesirable incidence.

Since the two urban sub-sectors expand, it requires additional labour. Moreover, adult wage rate in urban sector is higher than in rural sector. Both of these will induce migration of labour from rural to the urban sector. However, urban unemployment level rises since new migrants outnumber the new vacancies created in the urban sector. We can prove it in the following manner:

Number of new vacancies created:

$$= a_{L_aY}dY + Yda_{L_aY} + a_{L_aZ}dZ + Zda_{L_aZ} \quad (17)$$

$$= a_{L_aY}Y(\hat{Y} + \hat{a}_{L_aY}) + a_{L_aZ}Z(\hat{Z} + \hat{a}_{L_aZ}) \quad (18)$$

Number of migrants from rural to urban sector:

$$a_{L_aX}dX = a_{L_aX}X\hat{X}$$

Taking the absolute value of \hat{X}

$$\begin{aligned}
&= \frac{a_{L_aX}X}{a_{L_aX}X} [a_{L_aY}Y(\hat{Y} + \hat{a}_{L_aY}) + a_{L_aZ}Z(\hat{Z} + \hat{a}_{L_aZ}) + dL_U] \\
&= a_{L_aY}Y(\hat{Y} + \hat{a}_{L_aY}) + a_{L_aZ}Z(\hat{Z} + \hat{a}_{L_aZ}) + dL_U \\
&= dL_U + \text{Number of new vacancies created.} \quad \dots (19)
\end{aligned}$$

Hence we get an increase in adult unemployment rate.

3.2 Effect of Protectionism on Child Labour Supply

$$\text{In our model, } L_c^s = L_c^s(W^A, a_{L_aX}X), \frac{\partial L_c^s}{\partial W^A} < 0, \frac{\partial L_c^s}{\partial (a_{L_aX}X)} > 0 \quad \dots (20)$$

There are thus two determinants of child labour supply:

- Adult wage rate – higher is the income of adult workers engaged in rural sector, lower will be their incentive to send their children to job market.
- Number of adult workers engaged in rural sector- As rural workers send their children to job market so higher is the number of adult workers engaged in rural sector, higher is the supply of child labour.

In our model due to tariff protection in import competing sector adult wage rate in rural sector remains unaffected. To find out the impact of the second determinant we have to find out the impact on output of export sector. For this purpose, we differentiate equation (5) to obtain:

$$\begin{aligned}
&a_{L_aX}dX + a_{L_aY}dY + Yda_{L_aY} + a_{L_aZ}dZ + Zda_{L_aZ} + dL_U = 0 \\
\text{or, } &a_{L_aX}dX + a_{L_aY}Y(\hat{Y} + \hat{a}_{L_aY}) + a_{L_aZ}Z(\hat{Z} + \hat{a}_{L_aZ}) + dL_U = 0 \\
\text{or, } &(a_{L_aX}X)\hat{X} + a_{L_aY}Y\sigma_Y\hat{r} + (a_{L_aZ}Z)(\hat{Y} - \hat{a}_{L_aZ} + \hat{a}_{L_aZ}) + dL_U = 0 \\
\text{or, } &(a_{L_aX}X)\hat{X} = -[(a_{L_aY}Y)\sigma_Y\hat{r} + (a_{L_aZ}Z)(\hat{Y} - \hat{a}_{L_aZ} + \hat{a}_{L_aZ}) + dL_U] \\
\text{or, } &\hat{X} = \frac{-[(a_{L_aY}Y)\sigma_Y\hat{r} + (a_{L_aZ}Z)(\hat{Y} - \hat{a}_{L_aZ} + \hat{a}_{L_aZ}) + dL_U]}{a_{L_aX}X} < 0 \quad \dots (21)
\end{aligned}$$

Since the two urban sub-sectors expand, more adult labourers will migrate from rural to urban sectors. Thus the output of export sector will contract.

Differentiating (20), we get:

$$\begin{aligned}
dL_c^s &= \frac{\partial L_c^s}{\partial W^A} dW^A + \frac{\partial L_c^s}{\partial (a_{L_aX}X)} d(a_{L_aX}X) \\
&= \frac{\partial L_c^s}{\partial (a_{L_aX}X)} [a_{L_aX}dX]
\end{aligned}$$

$$= \frac{\partial L_c^s}{\partial (a_{L_a^x X})} (\hat{a}_{L_a^x X}) \hat{X} < 0 \quad \dots (22)$$

Proposition 2:

Thus child labour supply will also be reduced due to protectionism in import competing sector.

Although the migrants may be moving with their families in the urban sector, where they expect, but may not necessarily get, a job, they are unable to provide any employment opportunity to their children, since child labour is used in our model only in the rural sector producing exportable, whose output goes down. Thus the migration reduces the incidence of child labour.

3.3 Effect of Protectionism on National Welfare

National Income at world price is given at equation (9):

$$N = \left(a_{L_a^x} W^A + a_{L_c^x} \frac{W^A}{\beta} \right) X + (a_{L_a^y} W^*) Y + (a_{L_a^z} W^*) Z + rK \quad \dots (9)$$

Differentiating it, we get:

$$\begin{aligned} dN &= \left(a_{L_a^x} W^A + a_{L_c^x} \frac{W^A}{\beta} \right) dX + (a_{L_a^y} W^*) dY + Y W^* (da_{L_a^y}) + (a_{L_a^z} W^*) dZ \\ &\quad + Z W^* (da_{L_a^z}) + K dr \\ &= (P_x X) \hat{X} + (W^* a_{L_a^y} Y) (\hat{Y} + \hat{a}_{L_a^y}) + (W^* a_{L_a^z} Z) (\hat{Z} + \hat{a}_{L_a^z}) + K r \hat{r} \\ &= (P_x X) \hat{X} + \frac{(W^* a_{L_a^y} Y) \sigma_Y dt}{\theta_{KY} \theta_{YZ}} + (W^* a_{L_a^z} Z) \left(\frac{\theta_{L_a^y} \sigma_Y dt}{\theta_{KY} \theta_{YZ}} + \frac{\sigma_Z dt}{\theta_{YZ}} \right) + \frac{K r dt}{\theta_{KY} \theta_{YZ}} \\ &= -(P_x X) \left[\frac{dt}{\lambda_{L_a^x} \theta_{YZ}} \left(\frac{\lambda_{L_a^y} \sigma_Y}{\theta_{KY}} + \lambda_{L_a^z} \sigma_Z + \frac{\theta_{L_a^y} \sigma_Y}{\theta_{YZ} \theta_{KY}} \right) + \frac{dL_U}{L \lambda_{L_a^x}} \right] \\ &\quad + \frac{(W^* a_{L_a^y} Y) \sigma_Y dt}{\theta_{KY} \theta_{YZ}} + (W^* a_{L_a^z} Z) \left(\frac{\theta_{L_a^y} \sigma_Y dt}{\theta_{KY} \theta_{YZ}} + \frac{\sigma_Z dt}{\theta_{YZ}} \right) + \frac{K r dt}{\theta_{KY} \theta_{YZ}} \quad \dots (23) \end{aligned}$$

Hence impact on welfare of the small open economy is ambiguous due to the imposition of tariff protectionism in import competing sector.

National welfare of the small open economy will improve if

$$\begin{aligned} &\left| (P_x X) \left[\frac{dt}{\lambda_{L_a^x} \theta_{YZ}} \left(\frac{\lambda_{L_a^y} \sigma_Y}{\theta_{KY}} + \lambda_{L_a^z} \sigma_Z + \frac{\theta_{L_a^y} \sigma_Y dt}{\theta_{YZ} \theta_{KY}} \right) + \frac{dL_U}{L \lambda_{L_a^x}} \right] \right| \\ &< \left| \frac{(W^* a_{L_a^y} Y) \sigma_Y dt}{\theta_{KY} \theta_{YZ}} + (W^* a_{L_a^z} Z) \left(\frac{\theta_{L_a^y} \sigma_Y dt}{\theta_{KY} \theta_{YZ}} + \frac{\sigma_Z dt}{\theta_{YZ}} \right) + \frac{K r dt}{\theta_{KY} \theta_{YZ}} \right| \quad \dots (26) \end{aligned}$$

Proposition 3:

Due to tariff protection in import-competing sector, national welfare may or may not be reduced.

Following Batra (1973), if there is a wage differential between sectors and the wage differential is paid by the producers of the exportable good, we can categorically state that social welfare is uniquely and negatively related to the rate of tariff, given that the price-output response is positive. If the differential is paid by the import competing industry, social welfare and tariff rate are no longer uniquely related. An increase in the tariff rate may then augment community welfare and vice-versa. Thus we may conclude that if the price-output response is positive, free trade may be inferior to no trade, provided the differential is paid by the import competing industry. Needless to say, the necessary condition for free trade to be inferior to no trade in the presence of the differential and the negative price-output response is that the differential is paid by the producers of the exportable good.

Batra has explained the results in terms of the familiar concepts of production and consumption losses arising from the intervention in the free inter country flow of goods and services. As the rate of tariff is increased the consumer has to pay increasingly high prices for the importable and this leads to a consumption loss irrespective of the presence or absence of the wage differential. The consumption loss is maximized when the tariff wall is high enough to be prohibitive. In the case of production loss there are two possibilities, depending on whether the differential is paid by the producers of X and Z. When the differential is absent, the introduction of tariff gives rise to a decline in the output of the exportable good and hence to a decline in the country's specialization or to a production loss, given that the price output response is positive. In general, the output structure is biased against the industry which pays the differential, for at the prevailing market prices the output of the industry would be higher if factor markets were undistorted. Therefore, if the output of the industry suffering from the differential rises consequent upon a policy shift, the economic inefficiency declines in spite of the constancy of the wage differential, because the output structure moves closer to what that structure would be in the undistorted economy. This loss of inefficiency then constitutes a production gain. The converse is true when the output of the industry paying the differential declines. On balance, the policy switch from free trade to no trade may give rise to a production gain or loss, depending on which industry pays the differential. Thus a shift from free trade to no trade generates consumption loss and a production gain or loss. Thus the net effect on aggregate welfare may become ambiguous.

The same kind of explanation is also offered by Kemp(1962), who argues that for a country with no monopoly power in trade and without any domestic distortions, a higher tariff is inferior to a lower tariff. The reason is very simple: under free trade all the necessary marginal conditions of a paretian national optimum are satisfied. In particular, the marginal rate of transformation between commodities in production is equal to the marginal rate of transformation between commodities in international trade and to their marginal rate of substitution in consumption. A tariff destroys this equality and the greater the duty, the greater the resulting inequality. However, if there is presence of distortion in the system this theorem will not be valid and we will get ambiguous result. This happens in our model also where higher tariff rate is not essentially inferior to a lower one.

4. Conclusion

The present model analyses the production side of the economy, without explicitly introducing the demand side effects. Thus when relative price change due to imposition of tariff, the income effect on consumption is washed out because of the implicit assumption that the tariff revenue is given back to the consumers in a lump-sum manner such that the budget constraint of the households do not change and therefore there is no income effect. Although there are variations in the incidence of child labour across countries, and there are indications that the incidence is on the decline, total elimination of use of child labour in different lines of production may be beyond the immediate reach of most countries. Some might even despair that this objective of the total elimination of child labour is of limited use because it is too long run in character. However, the goal of child labour abolition is itself a strong guiding principle in policy decisions. It can perhaps be argued that progress towards the reduction in child labour can be made if there is a revival of sustained economic growth, rapid economic expansion of the modern sector, more egalitarian pattern of growth, and compulsory schooling, particularly of woman is made universal, and adult literacy programs are launched and so on. Despite their inherent long term significance, the socio-economic policies are key solution to the problem of child labour, simply because of their significant economy wide influence on the root cause of child labour. The use of trade policies like imposition of tariff in the import competing sector in a wage-differentiated small open economy may induce resource allocation effect reducing the incidence of child labour, may be at the cost of aggravating adult unemployment, with ambiguous effect on national welfare.

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APPENDIX

In specific factor model we will prove that

$$\hat{a}_{LaY} = -\theta_{KY}\sigma_Y(\hat{W}^A \quad -\hat{r}) > 0$$

$$\hat{a}_{KY} = \theta_{LaY}\sigma_Y(\hat{W}^A \quad -\hat{r}) < 0$$

Where σ_Y = Elasticity of substitution

$$= \left(\frac{\hat{a}_{KY} \quad -\hat{a}_{LaY}}{\hat{W}^A \quad -\hat{r}} \right)$$

Proof: The zero profit conditions for the economy is shown by the following two equations:

$$a_{LcX} \left(\frac{W^A}{\beta} \right) + a_{Lax} W^A = Px \quad \dots (1)$$

$$a_{LaY} W^A + a_{KY} r = P_Y \quad \dots (2)$$

Cost minimization condition for the producer of Y entails that

$$\frac{da_{KY}}{da_{LaY}} = -\frac{W^A}{r} \quad \dots (3)$$

$$\text{or, } r da_{KY} + W^A da_{LaY} = 0$$

$$\text{or, } \theta_{KY} \hat{a}_{KY} + \theta_{LaY} da_{LaY} = 0 \quad \dots (4)$$

$$\text{Now, } \sigma_Y = \frac{\hat{a}_{KY} \quad -\hat{a}_{LaY}}{\hat{W}^A \quad -\hat{r}}$$

$$\therefore \hat{a}_{KY} = \sigma_Y(\hat{W}^A \quad -\hat{r}) + \hat{a}_{LaY} \quad \dots (5)$$

Substituting the value of \hat{a}_{KY} in (4) we get,

$$\theta_{LaY} \hat{a}_{LaY} + \theta_{KY} \hat{a}_{LaY} + \theta_{KY} \sigma_Y(\hat{W}^A \quad -\hat{r}) = 0$$

$$\text{or, } \hat{a}_{LaY} = -\theta_{KY} \sigma_Y(\hat{W}^A \quad -\hat{r})$$

\therefore From (5)

$$\begin{aligned} \therefore \hat{a}_{KY} &= (1-\theta_{KY})\sigma_Y(\hat{W}^A \quad -\hat{r}) \\ &= \theta_{LaY}\sigma_Y(\hat{W}^A \quad -\hat{r}) \end{aligned} \quad \dots (6)$$

