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Bandopadhyay, Titas Kumar  
Bagnan College

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**FOREIGN ENCLAVES, INFORMAL SECTOR AND URBAN UNEMPLOYMENT ---  
--- A THEORETICAL ANALYSIS.\***

BY  
TITAS KUMAR BANDOPADHYAY  
BAGNAN COLLEGE, P.O. BAGNAN  
DIST. HOWRAH, WESTBENGAL,  
INDIA.

ABSTRACT :- We consider a small open Harris-Todaro economy with a rural foreign enclave and urban informal sector. We introduce consumption-efficiency relation to explain the simultaneous existence of informal sector and urban unemployment. Different types of immobility and mobility of capital are assumed in different sections of this paper. We also analyse the effects of expansion of foreign enclave on urban unemployment and on domestic factor income. In many cases, we get the results opposite to that obtained in the young-Miyagiwa model.

Address for communication :-

TITAS KUMAR BANDOPADHYAY

24/1, Binod Bihari Halder Lane,

Shibpur, Howrah – 711 102

West Bengal, India.

# **FOREIGN ENCLAVES, INFORMAL SECTOR AND URBAN UNEMPLOYMENT --- --- A THEORETICAL ANALYSIS.**

## **1. INTRODUCTION :**

The recent literature on foreign enclave has enlightened the expansion of foreign enclave and its effects on unemployment and national income. The issue on foreign enclave includes the works of Young (1987, 1992), Young and Miyagiwa (1987), Miyagiwa(1993), Dutta Chaudhury and Adhikari (1993) and Gupta (1994a). All the models are basically Harris-Todaro (1970) type complementing a foreign enclave and in all the models foreign enclave uses sector-specific capital.

In the Young-Miyagiwa (1987) model, foreign enclave is located in the rural sector and capital is purely non-shiftable among all the sectors. They have shown that the expansion of foreign enclave through the reduction in tariff on intermediate inputs lowers unemployment.

Dutta Chaudhury and Adikari (1993) have considered capital mobility between the rural sector and the urban sector and have introduced supply function of foreign capital in the Young-Miyagiwa (1987) model. They have shown that tariff reduction on intermediate input raises unemployment.

In Gupta (1994a), we find DFZ in the urban area and domestic capital is shiftable between the rural sector and the urban non-DFZ. He has shown that the reduction in import duty on intermediate goods, used in the foreign sector, raises unemployment, but we get opposite result if tariff on final goods is reduced.

In this paper, we consider a small open Harris-Todaro economy with rural foreign enclave and urban informal sector. None of the existing models on foreign enclaves considers the co-existence of these two sectors. To explain the simultaneous existence of informal sector and urban unemployment we introduce consumption-efficiency relation in the informal sector.<sup>1</sup> We assume that foreign enclave uses sector-specific foreign capital and the other sectors use domestic capital.

We consider both the shiftable and non-shiftable capital and we examine the impact of expansion of the foreign enclaves, thru the fiscal concessions, on urban unemployment and domestic factor income.

The model is described in section<sup>2</sup>. In this section we assume the non-shiftable of domestic capital among the rural sector, urban formal sector and urban informal sector<sup>2</sup>. The basic model is extended in three ways. In section3., the basic model is extended by

introducing capital mobility between the rural sector and the urban informal sector<sup>3</sup>, whereas the foreign enclaves uses sector specific foreign capital and the urban formal sector uses sector-specific domestic capital. Section4. extends the basic model by assuming capital mobility between the rural sector and the urban formal sector<sup>4</sup>, while the foreign enclave uses sector-specific foreign capital and the urban informal sector uses sector-specific domestic capital. Another extension is made in section5.by assuming perfect intersectoral mobility of domestic capital among the rural sector, the urban formal sector and the urban informal sector<sup>5</sup>, whereas the foreign enclaves uses foreign capital. Conclusions are made in Section6.

## 2. THE MODEL :

### 2.1. ASSUMPTIONS :

We consider a small open Harris-Todaro (1970) economy complementing the rural foreign enclave and the urban informal sector. Here, the foreign enclave is a labor supplying sector, since it is located in the rural areas<sup>6</sup>. All the sectors produce internationally traded goods and the prices of these goods are exogenously given<sup>7</sup>.

The production functions of all the sectors exhibit CRS and have positive and diminishing marginal productivity to each input. Each sector uses only two inputs-labor and capital. Capital is measured in physical unit, while labor is measured in efficiency unit<sup>8</sup>.

Workers' efficiency is positively related to the wage rate they receive. Such efficiency wage relation is more pronounced when the wage rate is low. It is assumed that the worker's efficiency is equal to one after a certain level of wage  $W^*$  and is less than one below that specified level of wage. The wage rates in the urban formal sector, rural sector and the foreign enclave are higher than this specified level of wage, while the wage rate in the urban informal sector is assumed to be less than this level. Thus, for the UFS, RS and the foreign enclave, labor expressed in labor time is identical to that expressed in efficiency unit. However, for the UIS efficiency units of labor differ from the labor time units of labor.

All the markets are assumed to be perfectly competitive. The assumptions of CRS production functions and profit maximizing behaviour of the firm imply the equality between price and unit cost in each sector and the minimisation of cost of one efficiency unit of labor.

Workers migrate from the rural sector to the urban region. Some of them are absorbed either in the UFS or in the UIS and a portion of them remains unemployed in the urban sector. The migration mechanism is of Harris-Todaro (1970) type.

Urban formal wage rate is institutionally fixed and is higher than the wage rates in all other sectors. The rural wage rate and the wage rate in the foreign enclave are equal since the workers are perfectly mobile between the RS and the foreign enclave.

We assume that the foreign enclave uses sector specific foreign capital and its supply is assumed to be exogenously given<sup>9</sup>. It is also assumed that the entire foreign capital income is fully repatriated<sup>10</sup>. Domestic capital is also assumed to be non-shiftable. Thus, we have different rate of returns on capital in different sectors. The endowment of labor and domestic capital are also exogenously given.

It is assumed that the urban formal sector is more capital intensive than the rural sector which is more capital intensive than the urban informal sector.

## 2.2. NOTATIONS :

$j =$  u, i, r, F.

$u =$  Urban formal sector.

$i =$  Urban informal sector

$r =$  Rural sector.

$F =$  Foreign enclave.

$X_j =$  Level of output in the  $j$  th sector.

$L_j =$  Level of employment in the  $j$  th sector

$k_j =$  Capital intensity of the  $j$  th sector.

$W_j =$  wage rate in the  $j$  th sector.

$h =$  Worker's efficiency.

$R_j =$  Rental rate on capital in the  $j$  th sector.

$V_i =$  Cost of one efficiency unit of labor in the urban informal sector.

$L =$  Labor endowment of the entire economy.

$K_j =$  Stock of capital in the  $j^{\text{th}}$  sector.

$P_j =$  Producer's effective price of the  $j$  th good.

$f_j =$  Intensive production function of the  $j$  th good.

$C_j =$  Unit cost of production of the  $j$  th good.

$U =$  Level of urban unemployment.

$Y =$  Domestic factor income of the economy.

### 2.3 THE EQUATIONS :

The intensive production functions of the four sectors are given by :

$$X_u = L_u f_u(k_u) \dots \dots \dots (1) ;$$

$$X_i = L_i f_i(k_i, h) \dots \dots \dots (2) ;$$

$$X_r = L_r f_r(k_r) \dots \dots \dots (3) ;$$

$$X_F = L_F f_F(k_F) \dots \dots \dots (4) ;$$

The efficiency-wage relation in the informal sector is given by :

$$h = h(W_i) \dots \dots \dots (5) ;$$

Following restrictions are imposed on this efficiency function :

i)  $h'(W_i) > 0$  for  $W_i < W^*$  ; ii)  $h(W_i) = 1$  for  $W_i \geq W^*$  ;

ii) and iii)  $h''(W_i) \geq 0$  for  $W_i \leq W^{**} < W^*$  .

The cost of one efficiency unit of labor in the UIS is :

$$V_i = (W_i / h(W_i)) \dots \dots \dots (6) ;$$

The minimisation of efficiency unit cost of labor implies :

$$(h'(W_i), W_i / h(W_i)) = 1 \dots \dots \dots (7) .$$

The long run equilibrium of a competitive firm implies that price is equal to the unit cost in each sector. Hence, we have the following equations :

$$P_u = C_u(\bar{W}_u, R_u) \dots \dots \dots (8) ;$$

$$P_i = C_i(V_i, R_i) \dots \dots \dots (9) ;$$

$$P_r = C_r(W_r, R_r) \dots \dots \dots (10) ; \text{ and}$$

$$P_F = C_F(W_r, R_F) \dots \dots \dots (11)$$

The optimum capital – labor ratios are given by :

$$K_u = k_u(\bar{W}_u / R_u) \dots \dots \dots (12) ;$$

$$k_i = k_i(V_i / R_i) \dots \dots \dots (13) ;$$

$$k_r = k_r(W_r / R_r) \dots \dots \dots (14) ;$$

$$k_F = k_F(W_r / R_F) \dots \dots \dots (15) ;$$

$$W_r = (L_u / (L - L_r - L_F)) \bar{W}_u + (L_i / (L - L_r - L_i)) W_i \dots \dots \dots (16) ;$$

Is the Harris-Todaro (1970) migration equilibrium condition.

Full utilisation of capital and labor implies the following equations :

$$k_u L_u = K_u \dots \dots \dots (17) ;$$

$$k_i L_i = K_i \dots \dots \dots (18) ;$$

$$k_r L_r = K_r \dots \dots \dots (19) ;$$

$$k_F L_F = K_F \dots \dots \dots (20) ; \text{ and}$$

$$\sum_{j=u,i,r,F} L_j + U = L \dots\dots\dots(21)$$

The domestic factor income is given by :

$$Y = \bar{W}_u L_u + W_i L_i + W_r L_r + W_r L_F + \sum_j R_j K_j \dots\dots\dots(22)$$

Using equations (16) , (21) and (22) we get,

$$Y = W_r L + \sum R_j K_j \dots\dots\dots(22a)$$

This completes the equational structure of the model.

#### 2.4. WORKING OF THE MODEL :

The working of the model is described as follows :

Equation (7) yields the equilibrium value of  $W_i$ . Then, we get the value of  $V_i$  from equation (6) and of  $h$  from equation (5). Given,  $P_u$  and  $\bar{W}_u$  , we get  $R_u$  from equation (8). Equation (9) gives the equilibrium value of  $R_i$  , given  $P_i$  and  $V_i$ .

Now ,  $k_u$  and  $k_i$  are obtained from equations (12) and (13). So, we get  $L_u$  and  $L_i$  from equations (17) and (18), given  $K_u$ ,  $K_r$ ,  $k_u$  and  $k_i$ .

From equation (10) we find that  $R_r$  is a function of  $W_r$ . Equation (11) shows  $W_r$  as function of  $R_F$ . Thus, equations (14) and (15) show that both  $k_r$  and  $k_F$  are also functions of  $R_F$ . This implies that  $L_r$  and  $L_F$  are also functions of  $R_F$  (see equations (19) and (20)). Thus, we can determine the equilibrium value of  $R_F$  from equations (16), given  $L_u$ ,  $L_i$ ,  $\bar{W}_u$  and  $W_i$ . Hence, we get the equilibrium values of  $W_r$ ,  $R_r$ ,  $k_r$ ,  $k_F$ ,  $L_r$  and  $L_F$ .

Equilibrium value of unemployment is obtained from equation (21), given  $L_j$  (  $j = u,i,r,F$ ).

$X_j$  s are obtained from equations (1) to (4). Finally, equation (22a) yields equilibrium value of  $Y$ .

#### 2.5. COMPARATIVE STATIC EFFECTS :

2.5.1. CHANGE IN  $P_F$ ; If foreign enclave is expanded through the subsidization to this sector,  $P_F$  will rise. Appendix (A.1) shows that when  $P_F$  is raised, both  $W_r$  and  $R_F$  rise. Now, equation 10 implies that  $R_r$  falls, given  $P_r$ . Thus,  $k_r$  rises but  $k_F$  may move in any direction.

Thus,  $L_r$  falls but  $L_F$  may change in any direction. From equation 16 we get,  $(\bar{W}_u - W_r) L_u - (W_r - W_i) L_i = W_r U$ . This shows that  $U$  falls if  $P_F$  rises, given  $\bar{W}_u$ ,  $L_u$ ,  $W_i$  and  $L_i$ .

Now, we examine the effect of a rise in  $P_F$  on  $Y$ . As  $P_F$  is raised,  $W_r$  rises and  $R_r$  falls,  $R_F$  fall. So we can write  $dY = L_d W_r + K_r dR_r$ ; or  $dy = dR_r (L_d W_r / dR_r + K_r) = dR_r (k_r L_r - L k_r) = k_r dR_r (L_r - L) > 0$  (since  $dR_r < 0$ ). So  $Y$  will rise.

The above results lead to the following proposition :

**PROPOSITION 1:** Expansion of foreign enclave thru the subsidization to this sector lowers urban unemployment and raises domestic factor income.

In the Y-M model, expansion of foreign enclave lowers Unemployment and in Dutta Chaudhuri it raises unemployment. However , in these two models foreign enclave expands thru the reduction in import duty on intermediate input used in this sector.

**2.5.2. CHANGE IN  $K_f$  :**

If the stock of foreign cpaital is increased,  $L_r$  will rise, given  $k_F$ . So, the effect of a rise in  $K_F$  on  $W_r$ ,  $R_F$  and  $R_r$  are similar to those obtained in section 2.5.1.

**3. CAPITAL MOBILITY BETWEEN THE URBAN INFORMAL SECTOR AND THE RURAL SECTOR ;**

3.1. In this Section the basic model is extended by introducing capital mobility between the rural sector and the urban informal sector. The other two sectors use sector-specific capital.

**3.2. EQUATIONS ;**

Since the capital is mobile between the rural sector and the urban informal sector, we have a common rate of return on capital in these two sectors. Thus, the price equations for the rural sector become :

$$P_r = C_r (W_r, R_i) \dots\dots\dots(10a)$$

The two capital endowment equations will merge into one equation :

$$k_i L_i + K_r L_r = K_i \dots\dots\dots(19a)$$

The optimum capital intensity for the rural sector becomes :

$$K_r = k_r (W_r / R_i) \dots\dots\dots(14a)$$

The domestic factor income is now given by

$$Y = W_r L + R_u K_u + R_i K_i \dots\dots\dots(22a')$$



### 3.3. WORKING OF THE MODEL :

Like the model of Section 2. the optimum values of  $W_i$ ,  $h$ ,  $V_i$ ,  $R_u$ ,  $R_i$ ,  $k_u$ ,  $k_i$ ,  $L_u$ ,  $X_u$  and  $X_i$  are obtained from equations (5) to (7), (8), (9), (12), (13), (14), (1) and (2).

Now, equation (10a) yields the equilibrium value of  $W_r$ , given  $P$  and  $R_i$ .

Then, we get  $R_F$  from equation (11), given  $P_F$  and  $W_r$ . The equilibrium values of factor prices  $W_r$ ,  $R_i$  &  $R_F$  give the optimum capital intensity  $K_r$  and  $K_F$  (see equations (14), (15)). From equation (20), we get  $L_F$ , given  $k_F + K_F$

The equilibrium level of employment of the urban informal sector and the rural sector can be obtained from equations (16) and (19a). The determination of  $L_i$  and  $L_r$  may be shown in a simple diagramme (see fig. 1).

#### SPACE FOR FIGURE 1

The LL curve is obtained from equation (16). The solve of the LL curve is given by  $(dL_i / dL_r)_{LL} = - (W_r / W_i)$ . Thus, the LL curve is negatively sloped and it shifts when  $L$ ,  $L_F$ ,  $\bar{W}_u$  and  $L_u$  are changed. Equation 18a) gives the KK curve. The slope of the KK curve is given by  $(dL_i / dL_r)_{KK} = - (k_r / k_i)$ . So, this curve is also negatively sloped and it shifts when  $K_i$  is changed. Here, the KK curve is steeper than the LL curve because the rural sector is more capital intensive than the urban informal sector in value terms<sup>11</sup>. The intersection of the two curves determine  $(L_r^*, L_i^*)$ .

Now, equilibrium level of unemployment is obtained from equation (21). The level of output of the rural sector and the urban informal sector are obtained from equations (2) and (3). Finally, equation (22a') yields the domestic factor income.

### 3.4. COMPARATIVE STATIC EFFECTS :

#### 3.4.1. CHANGE IN $P_F$ :

Subsidization to output in the foreign enclave raises  $P_F$ . Then, equation (11) shows that  $R_F$  will rise, given  $W_r$ . Thus,  $(W_r / R_F)$  falls and so also  $k_F$ . Hence,  $L_F$  rises, given  $K_F$  (see equation (20)).

The increase in  $L_F$  leads to a leftward shift of the LL curve. Thus, in new equilibrium,  $L_r$  rises and  $L_i$  falls, given the KK curve. (See the appendix A.2)

From equation (16) we can write,  $(\bar{W}_u - W_r)L_u - (W_r - W_i)L_i = W_r U$ .

This shows that  $U$  rises with  $P_F$ , given  $\bar{W}_u$ ,  $W_r$ ,  $L_u$  and  $W_i$ .

It is assumed that the income from foreign capital is totally repatriated. As the rise in  $P_F$  has no effect on  $W_r$ ,  $R_u$  and  $R_i$ , it has also no effect on  $Y$ . Thus, we can get the following proposition :

**PROPOSITION 3 :** Expansion of the foreign enclave thru the output subsidy to that sector raises urban unemployment. However, its effect on  $Y$  is nil.

### 3.4.2. CHANGE IN $K_F$ :

An increase in the stock of foreign capital raises  $K_F$ . As factor prices  $W_r$  and  $R_F$  do not depend upon  $K_F$ , the rise in  $K_F$  raises  $L_F$ . This rise in  $L_F$  produces the results similar to those obtained in the previous case. Thus, even if the foreign enclave is expanded thru the increase in the stock of foreign capital, urban unemployment rises and domestic factor income does not change.

## **4. CAPITAL MOBILITY BETWEEN THE UFS AND THE RS :**

4.1. **ASSUMPTIONS :** In this Section we extend the model of Section 2. by introducing capital mobility between the UFS and the RS. The other two sectors are assumed to use the sector-specific capital.

### 4.2. EQUATIONS :

Since the UFS and the RS use the same type of capital and there is no distortion in this capital market, we get a uniform rate of return on capital in these two sectors .,  $R_u$ .

Thus , the price equation for the rural sector (equation (10) becomes

$$P_r = C_r(W_r, R_u) \dots \dots \dots (10b).$$

The optimum rural capital intensity is given by

$$k_r = k_r (W_r / R_u) \dots \dots \dots (14a)$$

The capital endowment equations (17) and (18) become

$$k_u L_u + k_r L_r = K_u \dots \dots \dots (17a)$$

The domestic factor income is given by

$$Y = W_r L + R_u K_u + R_i K_i \dots \dots \dots (22a')$$

### 4.3 WORKING OF THE MODEL :

The equilibrium value of  $W_i$ ,  $V_i$  and  $h$  are obtained from equations (5) to (7). Equation (8) gives  $R_U$  and equation (9) gives  $R_i$ . Equilibrium  $W_r$  is obtained from equation (10b), given  $P_r$  &  $R_u$ . Then, we get  $R_F$  from equation (11), given  $P_F$ . Thus, we get optimum capital intensities. So, we obtain  $L_i$ , given  $K_i$ ,  $K_F$  &  $L_F$  (see equations 19 & 20)).

Now, from equations (16) and (17a) we get the equilibrium values of  $L_u$  and  $L_r$ . This may be shown graphically (see Fig. 2.) . The  $L' L'$  curve is obtained from equation (16) and the  $K' K'$  curve is obtained from equation (17a). Both the curves are negatively sloped. The  $K' K'$  steeper than the  $L' L'$  curve since we assume that the urban sector is more capital intensive than the rural sector in value terms. The intersection of the two curves determines  $(L_u^*, L_r^*)$  .

SPACE FOR FIG . 2.

Now, we can determine the equilibrium  $U$  from equation (21). Thus, the equilibrium levels of output can be obtained from equations (1) to (4).

Finally, equation (22a) yields the equilibrium value of  $Y$ .

### 4.3. COMPARATIVE STATIC EFFECTS :

#### 4.4.1. CHANGE IN $P_F$ :

Output subsidy given to the foreign enclave raises  $P_F$ . This also raise  $R_F$  ; given  $W_r$ . So,  $(W_r/R_F)$  falls and so also  $k_F$ . This implies that  $L_F$  will rise, given  $K_F$ . This will shift the  $LL$  curve to the left. As a result,  $L_u$  rises and  $L_r$  falls. (See the appendix A.3) From equations (16) and (21) we find if  $L_u$  rises,  $U$  also rises given  $\bar{W}_u$ ,  $W_i$ ,  $W_r$  and  $L_i$ .

So far as  $Y$  is concerned, we find the rise in  $P_F$  has no effect on  $Y$  since  $W_r$ ,  $R_u$  &  $R_i$  remain frozen in this case.

Thus , we can make the following proposition :

**PROPOSITION 4.** If foreign enclave is expanded thru the output subsidy given to this sector, urban unemployment rises, but domestic factor income does not change at all.

#### 4.4.2. CHANGE IN $K_F$ :

If foreign capital is enlarged,  $L_F$  rises, given  $k_F$ . In this case, we get the similar results as obtained when  $P_F$  is raised. Thus, even if the foreign enclave is expanded thru the

increase in the stock of foreign capital, urban unemployment rises, but domestic factor income remains unchanged.

## 5. CAPITAL MOBILITY AMONG THE UFS, UIS, AND THE RS :

### 5.1 ASUMPTIONS :

In this section, we assume perfect capital mobility among the UFS, UIS and Rs, while foreign enclave uses sector-specific foreign capital. Thus, we have a common rate of return on domestic capital.

We assume that the goods produced in the UIS is non-traded. UFS is more capital intensive than the RS which is more capital intensive than the UIS in value terms.

### 5.2. EQUATIONS :

Since the domestic capital is mobile among the UFS, UIS and RS the three price equations become :

$$P_u = C_u (\bar{W}_u, R) \dots\dots\dots (8a);$$

$$P_i = C_i (V_i, R) \dots\dots\dots (9a) ; \text{ and}$$

$$P_r = C_r (W_r, R) \dots\dots\dots (10c).$$

The optimum capital intensities for the three domestic capital using sectors become :

$$k_u = k_u (\bar{W}_u/R) \dots\dots\dots (12') ;$$

$$k_i = k_i (W_i/R) \dots\dots\dots (13'); \text{ and}$$

$$k_r = k_r (W_r/R) \dots\dots\dots (14').$$

The three capital endowment equations (17), (18) and (19) become :

$$K_u L_u + k_i L_i + k_r L_r = K_D \dots\dots\dots (17').$$

The demand for the goods produced in the UIS is given by :

$$D_i = D_i (P_i) , D_i' < 0$$

Thus, the market equilibrium for the UIS's product is given by :

$$X_i = D_i (P_i) \dots\dots\dots (23)$$

The domestic factor income will be :

$$Y = W_i L + R K_D \dots\dots\dots (22')$$

### 5.3. WORKING OF THE MODEL :

The equilibrium values of  $W_i$ ,  $V_i$  and  $h$  are obtained from equations (5), (6), (7). All the factor prices  $R$ ,  $W_r$  &  $R_F$  can be determined from equations (8') and (10') and (11), given  $\overline{W}_u$ . Thus, we get optimum capital intensities  $k_u$ ,  $k_i$ ,  $k_r$  and  $k_F$  from equations (12') to (14') and (15). Now, equation (11) yields equilibrium  $P_i$ , given  $V_i$  and  $R$ . We get equilibrium  $L_i$  from equation (20) and  $L_F$  from equation (23).

Now, equilibrium  $L_u$  and  $L_r$  can be determined from equations (16) and (17'). This is shown in figure -3. The MM curve is obtained from equation (16). Its slope is given by  $(dL_r/dL_u)_{MM} = -(\overline{W}_u/W_r)$ . Thus, the MM curve is negatively sloped and it shifts when  $W_u$ ,  $W_r$ ,  $L$ ,  $L_F$ ,  $W_i$  &  $L_i$  are changed. Equation (17') gives the NN curve, whose slope is given by  $(dL_r/dL_u)_{NN} = -(k_u/k_r)$ . This is also negatively sloped and shifts when  $K_D$ ,  $K_i$ ,  $L$ ,  $L_i$  are changed. The NN curve is steeper than the MM curve as we assume that the UFS is more capital intensive than the RS in value terms<sup>12</sup>. The intersection of the two curves determines equilibrium  $(L_u^*, L_r^*)$ .

Now, the equilibrium level of urban unemployment is obtained from equation (21). The level of output  $X_u$ ,  $X_r$ ,  $X_F$  are obtained from equations (1) to (3) and (4). Finally,  $Y$  is determined from equation (22').

### 5.4. COMPARATIVE STATIC EFFECTS ;

#### 5.4.1. CHANGE IN $P_F$ :

Output subsidization to the foreign enclave raises  $P_F$ . As a result,  $R_F$  rises, given  $W_r$  (See equation (11)). Thus,  $(W_r/R_F)$  falls and so also  $k_F$ . Equation (20) shows that  $L_F$  rises, given  $K_F$ . Thus, the MM curve shifts downward. This leads to a rise in  $L_u$  and fall in  $L_r$ . (See the appendix A.3) Now, equation (16) implies that  $U$  must rise when  $L_u$  rises, given  $\overline{W}_u$ ,  $W_i$ ,  $L_i$  &  $W_r$ .

Equation (22') shows that there is no effect on  $Y$  since rise in  $P_F$  does not affect  $W_r$  and  $R$ .

The above result leads to the following proposition :

**PROPOSITION 5 :** Expansion of the foreign enclave thru output subsidy leads to a rise in urban unemployment. However, its effects on domestic factor income is nil.

#### 5.4.2. CHANGE IN $K_F$

If foreign capital stock is increased,  $K_F$  will rise. This raises  $L_F$ , given  $k_F$ . Thus, we get the same effect on unemployment and on  $Y$ , as obtained in proposition 5.

#### 6. CONCLUSION.

This paper presents a model with special emphasis on foreign enclave, informal sector and urban unemployment. The simultaneous existence of the urban informal sector and urban unemployment is explained in terms of the efficiency wage theory. Like, Young-Miyagiwa (1987), we assume a rural foreign enclave, implying this as a labour supplying sector. This paper examines the impact of expansion of foreign enclave on urban unemployment and domestic factor income. Our model differs from the existing models on foreign enclave in two respects : here, foreign enclave expands either through the output subsidy given to this sector or through the enlargement of foreign capital ; and different types of capital mobility among the sectors are assumed in this paper.

The comparative static analysis shows that if foreign enclave expands either through the price subsidy or through the increase in the stock of foreign capital, urban unemployment falls when capital is purely non-shiftable and it rises if capital is shiftable perfectly or imperfectly. This is opposite to that of YM (1987). We get the same result in Dutta Chowdhury (1993) and Gupta (1994). However, our model differs from them with respect to the mode of expansion of foreign enclave and nature of capital mobility. The paper also shows that domestic factor income does not change even if foreign enclave expands when capital is perfectly or imperfectly mobile. Only when capital is purely non-shiftable, such expansion has expansionary effect on domestic factor income.

## Foot Notes :

This is related to the research work of the Author who is registered for Ph.D. Degree in the University of Calcutta.

1. Fields (1987) explains urban unemployment in a framework where unemployed are more efficient in job search than those employed in the urban informal sector. Gupta (1993) explains this in a frame work where price is fixed and quantity adjusts to clear the market for RS's product.
2. Young-Miyagiwa (1987) also consider the non-shiftable capital among the UFS, Rs and Foreign enclave.
3. Gupta (1997) considers this type of capital mobility.
4. Grinols (1991) considers this type of capital mobility.
5. Chandra & Khan (1993) have considered this type of capital mobility.
6. Both Y-M (1987) an Tamal Dutta Chowdhury(1989) consider rural Foreign enclave, whereas Gupta (1994) considers urban Foreign enclave.
7. Chandra & Khan (1993), Grinols (1991) and Gupta (1997) have made this type of assmption.
8. The efficiency-wage theory implies that physical unit of labour differs from efficiency unit of labour.
9. Dutta Chowdhury and Adhikari (1989) have introduced the supply function of foreign capital.
10. If entire foreign capital income is repatriated, domestic factor income does not include the rental income on foreign capital.
11. This implies that  $W_i k_r > W_r k_i$ .
12. This implies that  $W_r k_u > \bar{W}_u k_r$ .

## References

- Bandyopadhyay , M. and M. R. Gupta, 1995a , “Development policies in the presence of an informal sector : A note” , Journal of economics, 61, 301 – 315.
- Bandyopadhyay, M. and M. R. Gupta, 1995b, “Capital mobility, informal sector and development policies : A dynamic analysis of a three-sector small open economy”, Working paper, Jadavpur University.
- Basu, K. C. , 1980 , “Optimal policies in a Dual Economy”, Quarterly Journal of Economics, 95,187-196.
- Beladi, H. and S. Marjit, 1992, “ Foreign Capital and protectionism”, Canadian Journal of Economics, 25, 233-238.
- Chandra, V. and M. A. Khan, 1993, “Foreign investment in the presence of informal sector” , *Economica* , 60, 79-103.
- Cole, W. E. and R. D. Sandera, 1985, “Internal Migration and Urban employment in the Third World “, *American Economic Review*, 75, No. 3,481-494.
- Corden, W. M. and R. Findlay, 1975, “Urban unemployment, intersectoral capital mobility and development policy”, *Economica*, 42, 59-78.
- Datta Chaudhri, T., 1989, “A theoretical analysis of the informal sector” , *World Development*, 187, 351-355.
- Datta Chaudhri, T., and Smita Adhikari, 1993, “Free trade zones with Harris-Todaro unemployment : A note on Young-Miyagiwa”, *Journal of Development Economics*, 41, 157-162.
- Fields, G., 1975, “Rural-urban migration, urban unemployment and underemployment and job search activity in LDCs” , *Journal of Development Economics*, 2, No. 2, 165-187.
- , 1989, “on-the -job search in a labour market model, ex-ante choices and ex post outcomes”, *Journal of Development Economics*, 30, 159-178.
- Grinols, E. L., 1991, “Unemployment and foreign capital : the relative opportunity cost of domestic labour and welfare”, *Economics*, 57 : 107-121.
- Gupta, M. R., 1993, “Rural-Urban migration, informal sector and development policies : a theoretical analysis” , *Journal of Development Economics*, 41, 137-151.
- , 1994, “Duty-free zone, Unemployment and Welfare : A Note” , *Journal of Economics*, 59, No. 2, 217-236.
- , 1994, “Foreign capital, income inequality and welfare in a Harris-Todaro model”, *Journal of Development Economics*, 45, 404-414.



- \_\_\_\_\_, 1994, "duty-free zone in a Harris-Todaro Economy : A note", *Keio Economics Studies*, XXXI, 63-75.
- \_\_\_\_\_, 1995. "Tax on foreign capital income and wage subsidy to the urban sector in the Harris-Todaro model", *Journal of Development Economics*, 47, 469-479.
- \_\_\_\_\_, 1997, "Informal sector and informal capital market in a small open less-developed economy", *Journal of Development Economics*, 52, 409-428.
- \_\_\_\_\_, 1997, "Foreign capital and the informal sector : Comments on Chandra and Khan", *Economica*, 64, 353-363.
- \_\_\_\_\_, 1998, "Foreign Enclaves and Economic Development : A theoretical Analysis", *Journal of Economics*, 67, 317-336.
- Hamada, K., 1974, " An Economic Analysis of the Duty-free Zone" , *Journal of International Economics*, 4, 225-241.
- Hamilton, C. and L.O. Sevansson, 1982, " On the Welfare Effects of a Duty Free Zone " , *Journal of International Economics* , 13, 45-64.
- Harris , J. R. and M. P. Todaro, 1970, "Migration, Unemployment and Development : a Two-sector Analysis" , *American Economic Review*, 60, 126-142.
- Jones , R. W., 1965, "The Structure of Simple General Equilibrium Models" , *Journal of Political Economy* , 73, 551-572.
- \_\_\_\_\_, 1971, " A Three-factor Model in Theory, Trade and History", In *Trade Balance of Payments and Growth*, edited by J. Bhagwati, R. W., Jones , R., Mundell and J. Vanek, Amsterdam, North-Holland.
- \_\_\_\_\_, and Easton, S. t., 1983, "Factor Intensities and Factor Substitution in General Equilibrium" , *Journal of International Economics*, 15, 65-69.
- Khan, M. A., 1980, " The Harris-todaro Hypothesis and the Heckscher-Oblin-Samuelson Trade Model : a synthesis" , *Journal of International Economics*, 10, 527-547.
- \_\_\_\_\_, 1982, "Tariffs, Foreign Capital and Immiserating Growth with Urban Unemployment and Specific Factors of Production", *Journal of Development Economics*, 10, 245-265.
- \_\_\_\_\_, 1992, "Trade and Development in the Presence of an informal sector : A four-sector model", in K. Basu et al . eds ., *Capital, investment and development* (Basil Blackwell, Oxford).

\_\_\_\_\_, and Naqvi, S. N. H., 1983, "Capital markets and urban unemployment", *Journal of International Economics*, 15, 367-385.

Lundborg, P., 1990, "Rural-urban Migration and the Transition from Traditional to Modern Agriculture", *Journal of Development Economics*, 33, 287-207.

Majumdar, D., 1975, "The Urban Informal Sector", IBRD Staff Working Paper, 211, Washington.

Marjit, S., 1991, "Agro-based Industry and rural-Urban Migration : a case for an Urban Employment Subsidy", *Journal of Development Economics*, 35, 393-398

\_\_\_\_\_, 1990, "A Simple Production Model in Trade and its Applications", *Economic Letters*, 32, 257-260.

McCool, T., 1982, "Wage Subsidies and Distortionary Taxes in a Mobile Capital Harris-Todaro Model", *Economics*, 49, 69-79.

Miyagiwa, K. (1986), "A Reconsideration of the Welfare Economics of Free Trade Zone," *Journal of International Economics* 21; 337-350

Young, L. (1987) : "Intermediate goods and the Formation of Duty Free Zones," *Journal of Development Economics* 25, 369-384.

Young, L, and Miyagiwa, K. (1987) : "Unemployment and the formation of the Duty-free Zones," *Journal of Development Economics* 26, 397-405.

Parpolo, T.S., 1980, "Informal Sector :Concept and Policy", *Economic and Political Weekly*, 15, 817-824.

Quibria, M. G., 1988, "Migration, Trade Unions and the Informal Sector : a note on Calvo", *International Economic Review*, 29, 557-563.

Rauch, J. E., 1991, "Modelling the Informal Sector Formally", *Journal of development economics*, 35, 330-47.

Romatet Emmanuel, 1983, "Calcutta's Informal Sector : Theory and Reality", *EPW* 18, December 10, 2115-2128.

Sarkar, A. and M. Ghosh, 1989, "A model of the informal sector", I. S. I. Working Paper.

Sethuraman, S. V., 1981 (ed), "The Urban Informal Sector in Developing Countries : Employment, Poverty and Environment, ILO, Geneva.

Stark, O., 1982, " On Modelling the Informal Sector" , World Development, Vol. 10, No. 5, 413-416.

State Planning Board, 1990, "A Survey of the Informal Sector in CMA : A Paerspective Plan for Calcutta : 2011, Supplementary ", vol. 3, November, Govt. of West Bengal, Calcutta.

Stiglitz, J. E., 1976, " the efficiency wage hypothesis, surplus labour and the distribution of labour in LDCs, Oxford Economic Papers, 28.

Weeks, J., 1975, "Policies for Expanding Employment in the Informal Urban Sector of Developing Economics", International Labour Revies, Vol. 3, No. 1, 1-13.

## References

Bandyopadhyay , M. and M. R. Gupta, 1995a , “Development policies in the presence of an informal sector : A note” , Journal of economics, 61, 301 – 315.

Bandyopadhyay, M. and M. R. Gupta, 1995b, “Capital mobility, informal sector and development policies : A dynamic analysis of a three-sector small open economy”, Working paper, Jadavpur University.

Basu, K. C. , 1980 , “Optimal policies in a Dual Economy”, Quarterly Journal of Economics, 95,187-196.

Basu, K. , Van, P. H. (1998) “The Economics of Child Labour”, American Economic Review, 88(3), 412-427.

Basu , K. (1999) “Child Labour; Cause, consequence ,and cure, with Remarks on International Labour Standards”, Journal Economic Literature, 37(Sep), 1083-1119.

Bedi, A. S., Garg, A. (2000) “The Effectiveness of Private vs Public Schools; The case of Indonasia”, Journal of Development Economics, 61,463-494.

**Beladi, H. and S. Marjit, 1992, “ Foreign Capital and protectionism”, Canadian Journal of Economics, 25, 233-238.**

Chandra, V. and M. A. Khan, 1993, “Foreign investment in the presence of informal sector” , Economica , 60, 79-103.

Chowdhury, S, (2000) “Rural-Urban Migration, Informal Sector, Urban Unemployment and development policies.- A Theoretical Analysis”, Review of Development Economics, 4(3),353-364.

Cole, W. E. and R. D. Sanders, 1985, “Internal Migration and Urban employment in the Third World “, American Economic Review, 75, No. 3,481-494.

Corden, W. M. and R. Findlay, 1975, “Urban unemployment, intersectoral capitalmobility and development policy”, Economica, 42, 59-78.

Datta Chaudhuri, T., 1989, “A theoretical analysis of the informal sector” , World Development, 187, 351-355.

Datta Chaudhuri, T., and Smita Adhikari, 1993, “Free trade zones with HarrisTodaro unemployment : A note on Young-Miyagiwa”, Journal of Development Economics, 41, 157-162.

Dessy, S. E. (2000), “A Difense of Compulsive Measurs against Child Labour”, Journal of Development Economics, 62, 261-275.

Eswaran, M. (1996), "Fertility, Literacy and the Institution of Child Labour", CRESO Discussion Paper; No.36, The University of British Columbia.

Fields, G., 1975, "Rural-urban migration, urban unemployment and underemployment and job search activity in LDCs" , Journal of Development Economics, 2, No. 2, 165-187.

\_\_\_\_\_, 1989, "on-the -job search in a labour market model, ex-anti choices and ex-post outcomes", Journal of Development Economics, 30, 159-178.

Grinols, E. L., 1991, "Unemployment and foreign capital : the relative opportunity cost of domestic labour and welfare", Economics, 57 : 107-121.

Gupta, M. R., 1993, "Rural-Urban migration, informal sector and development policies : a theoretical analysis" , Journal of Development Economics, 41, 137-151.

\_\_\_\_\_, 1994, "Duty-free zone, Unemployment and Welfare : A Note" , Journal of Economics, 59, No. 2, 217-236.

\_\_\_\_\_, 1994, "Foreign capital, income inequality and welfare in a Harris-Todaro model", Journal of Development Economics, 45, 404-414.

\_\_\_\_\_, 1994, "duty-free zone in a Harris-Todaro Economy : A note" , Keio Economics Studies , XXXI, 63-75.

\_\_\_\_\_, 1995. "Tax on foreign capital income and wage subsidy to the urban sector in the Harris-Todaro model", Journal of Development Economics, 47, 469-479.

\_\_\_\_\_, 1997, "Informal sector and informal capital market in a small open less-developed economy", Journal of Development Economics, 52, 409-428.

\_\_\_\_\_, 1997, "Foreign capital and the informal sector : Comments on Chandra and Khan" , Economica, 64, 353-363.

\_\_\_\_\_, 1998, "Foreign Enclaves and Economic Development : A theoretical Analysis" , Journal of Economics, 67, 317-336.

Hamada, K., 1974, " An Economic Analysis of the Duty-free Zone" , Journal of International Economics, 4, 225-241.

Hamilton, C. and L.O. Svensson, 1982, " On the Welfare Effects of a Duty Free Zone " , Journal of International Economics , 13, 45-64.

Harris , J. R. and M. P. Todaro, 1970, "Migration, Unemployment and Development : a Two-sector Analysis" , American Economic Review, 60, 126-142.

- ILO. (1995) Child Labour in Nepal; An overview and a Proposed Plan of Action. Geneva : ILO.
- Jones , R. W., 1965, "The Structure of Simple General Equilibrium Models" , Journal of Political Economy , 73, 551-572.
- \_\_\_\_\_ , 1971, " A Three-factor Model in Theory, Trade and History", In Trade Balance of Payments and Growth, edited by J. Bhagwati, R. W., Jones , R., Mundell and J. Vanek, Amsterdam, North-Holland.
- \_\_\_\_\_ , and Easton, S. t., 1983, "Factor Intensities and Factor Substitution in General Equilibrium" , Journal of International Economics, 15, 65-69.
- Khan, M. A., 1980, " The Harris-todaro Hypothesis and the Heckscher-Ohlin-Samuelson Trade Model : a synthesis" , Journal of International Economics, 10, 527-547.
- \_\_\_\_\_ , 1982, "Tariffs, Foreign Capital and Immiserising Growth with Urban Unemployment and Specific Factors of Production", Journal of Development Economics, 10, 245-265.
- \_\_\_\_\_ , 1992, "Trade and Developmentn in the Presence of an informal sector : A four-sector modd", in K. Basu et al . eds ., Capital, investment and development (Basil Blackwell, Oxford).
- \_\_\_\_\_ , and Naqvi , S. N. H., 1983, "Capital markets and urban unemployment" , Journal of Internatrional Economics, 15, 367-385.
- Lundborg, P., 1990, "Rural-urban Migration and the Transition from Traditional to Modern Agriculture", Journal of Development Economics, 33, 287-207.
- Majumdar, D., 1975, "The Urban Informal Sector" , IBRD Staff Working Paper, 211, Washington.
- Marjit, S., 1991, "Agro-based Industry and rural-Urban Migration : a case for an Urban Employment Subsidy" , Journal of Development Economics , 35, 393-398

\_\_\_\_\_, 1990, "A Simple Production Model in Trade and its Applications", *Economic Letters*, 32, 257-260.

McCool, T., 1982, "Wage Subsidies and Distortionary Taxes in a Mobile Capital Harris-Todaro Model" , *Economics*, 49, 69-79.

Mohsin, N. (1996), "Counting and Accounting of Child Labour in Unorganised Sectors, *Labour and Development*, 1(2), Jan-Jun.

Papola , T. S., 1980, "Informal Sector :Concept and Policy", *Economic and Political Weekly* , 15, 817-824.

Quibria, M. G., 1988, "Migration, Trade Unions and the Informal Sector : a note on Calvo" , *International Economic Review*, 29, 557-563.

Rauch, J. E., 1991, "Modelling the Informal Sector Formally", *Journal of development economics*, 35, 330-47.

Ravallion, M., Wodon, Q. (1999) Does Child Labour Displace Schooling? Evidence on Behavioral Responses to an Enrollment Subsidy, paper presented at the Annual Conference of the Royal Economic Society 1999, at the University of Nottingham, England.

Romatet Emmanuel , 1983, "Calcutta's Informal Sector : Theory and Reality" , *EPW* 18, December 10, 2115-2128.

Sarkar, A. and M. Ghosh, 1989, "A model of the informal sector" , I. S. I. Working Paper.

Sethuraman, S. V., 1981 (ed), "The Urban Informal Sector in Developing Countries : Employment, Poverty and Environment, ILO, Geneva.

Stark, O., 1982, " On Modelling the Informal Sector" , *World Development*, Vol. 10, No. 5, 413-416.

State Planning Board, 1990, "A Survey of the Informal Sector in CMA : A Perspective Plan for Calcutta : 2011, Supplementary " , vol. 3, November, Govt. of West Bengal, Calcutta.

Stiglitz, J. E., 1976, "The efficiency wage hypothesis, surplus labour and the distribution of labour in LDCs", Oxford Economic Papers, 28.

Weeks, J., 1975, "Policies for Expanding Employment in the Informal Urban Sector of Developing Economics", International Labour Review, Vol. 3, No. 1, 1-13.



**APPENDIX**

A.1 The total differentials of equations (16) and (11) are given by :

$$(L - L_r - L_f) dw_r - w_r(L'_r + L'_f) dR_f = 0 \dots\dots(B. 1)$$

$$C_{FL} dw_r + C_{FK} dR_f = dP_f \dots\dots\dots (B. 2)$$

In the Matrix Form we can write,

$$\begin{bmatrix} (L - L_r - L_f) & -w_r(L'_r + L'_f) \\ C_{FL} & C_{FK} \end{bmatrix} \begin{bmatrix} dw_r \\ dR_f \end{bmatrix} = \begin{bmatrix} 0 \\ dP_f \end{bmatrix}$$

Here,  $\Delta_1 = (L - L_r - L_f)C_{FK} + w_r C_{FL} (L'_r + L'_f) > 0$  (Since,  $L'_r > 0, L'_f > 0$ )

$$dw_r = 1/\Delta [ w_r (L'_r + L'_f) dP_f ] > 0$$

$$\text{and } dR_f = 1/\Delta [(L - L_r - L_f) dP_f] > 0$$

A.2

Total differentials of equations (16) and (17a) are

$$W_i dL_i + W_r dL_r = -W_r dL_f \dots\dots\dots(B. 3)$$

$$k_i dL_i + k_r dL_r = 0 \dots\dots\dots(B. 4)$$

In the matrix form we can write,

$$\begin{bmatrix} W_i & W_r \\ k_i & k_r \end{bmatrix} \begin{bmatrix} dL_i \\ dL_r \end{bmatrix} = \begin{bmatrix} -W_r dL_f \\ 0 \end{bmatrix}$$

Here,  $\Delta_2 = W_i k_r - W_r k_i > 0$  (Assumed)

$$dL_i = -1/\Delta [ k_r W_r dL_f ] < 0$$

$$\text{and } dL_r = 1/\Delta [ W_r k_i dL_f ] > 0$$

A.3 The total differentials of equations (16) and (17a) are given by :

$$\bar{W}_u dL_u + W_r dL_r = -W_r dL_f$$

$$k_u dL_u + k_r dL_r = 0$$

Here,  $\Delta_3 = \bar{W}_u k_r - W_r k_u < 0$  (Assumed)

$$dL_u = 1/\Delta \begin{vmatrix} -W_r dL_f & W_r \\ 0 & k_r \end{vmatrix} = -1/\Delta [ k_r W_r dL_f ] > 0$$

$$dL_r = 1/\Delta \begin{vmatrix} \bar{W}_u - W_r dL_f & \\ k_r & 0 \end{vmatrix} = 1/\Delta [ W_r k_u dL_f ] < 0$$

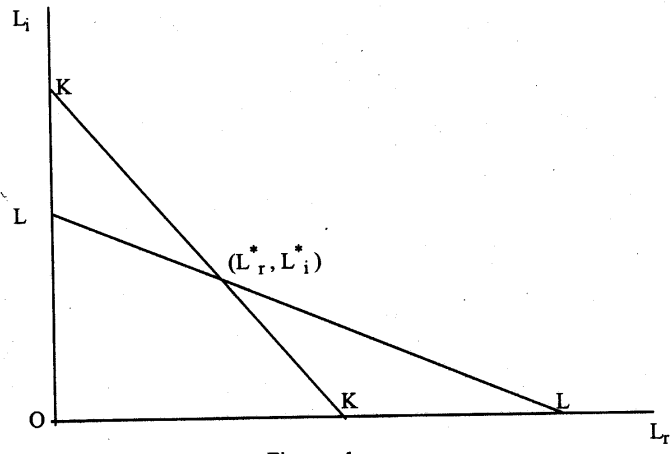


Figure - 1

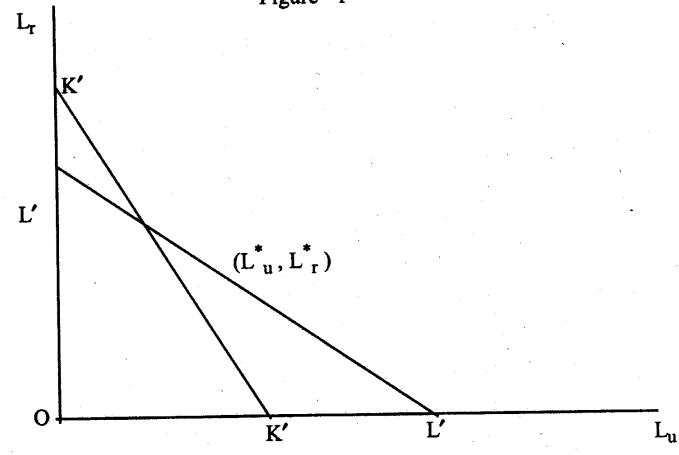


Figure - 2

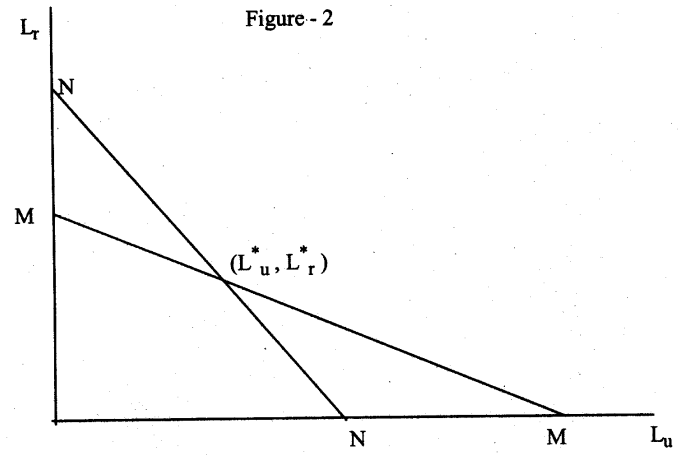


Figure - 3