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Foreign Capital, Unemployment, Worker's Efficiency and Fair Wage

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ABSTRACT

A Two sector fair wage model has been considered. It is shown that an exogenous inflow of foreign capital has no effect on unemployment; and the Brecher-Ale jandro (1977) proposition remains valid in its original form when the efficiency function is similar to that of Aell and Lundbrg (1992, 1995). However, results may be different in the following cases: (*i*) the efficiency depends negatively on the ratio of foreign capital to domestic capital; (*ii*) there is intersectoral distortion in the capital market; (*iii*) one of the two sectors produces an unhealthy good and worsens efficiency; and (*iv*) the foreign capital inflow leads to technological advancement in the economy.

JEL Classification : F21

1. INTRODUCTION

There exists substantial works on the effect of foreign capital inflow on the social welfare in a small open economy. Brecher and Ale jandro (1977) have considered a two sector neoclassical model with capital mobility and full employment; and have shown that , if the import competing sector is capital intensive, then the foreign capital inflow lowers (does not affect) social welfare in the presence (absence) of tariff provided that the entire foreign capital income is repatriated. This result is well known as 'Brecher-Ale jandro Proposition' (hereafter called BAP) in the theory of international trade and economic development. The validity of BAP has been reexamined by various authors in the presence of unemployment. This includes the works of Khan (1982), Belaid and Marjit (1992), Grinols (1991), Ghandra and Khan (1983), Gupta (1994,1995) etc. All these papers have adopted a Harris-Todaro (1970) framework which explains urban unemployment as a migration-equilibriun phenomenon.

'Efficiency-Wage Hypothesis' (IEWH) has often been used to explain the involuntary unemployment in less development in less developed countries. The works of Leibenstein

1. It is the wage which minimizes the unit cost of Labour (in efficiency unit).

(1957), Mirrless (1975), Stiiglitz (1976), Bliss and Stern (1978) etc. have adopted a partial equilibrium framework. The recent works of Brecher (1991), Agell and Lundborg (1992,1995) ect. have introduced the EWH in an otherwise two sector mobile capital model and have shown the existence of involuntary unemployment in the presence of efficiency wage.[1] In Agell and Lundborg (1992, 1995), the concept of fair wage has been introduced and the efficiency function has been derived from a function of the effort norm of the worker which is sensitive to the functional distribution of income. It is the optimal effort function of the utility maximizing worker. In Brecher (1991) and in Agell and Lundborg (1995), many of the positive and normative properties of trade theory have been reanalysed in the presence of the endogenous efficiency function and unemployment. However, no attempt has been made so far to examine the validity of the BAP in the two sector model with the endogenous efficiency function and fair wage. The objective of the present note is to analyses the effect of foreign capital inflow on unemployment and social welfare in such a Fair-Wage model.

The basic model similar to that of Agell and lundborg (1992, 1995) is described in section 2; and the effects of foreign capital inflow on unemployment and national income are studied in section 3. In section 4, we consider and extension of the basic model with a modified efficiency function sensitive to the ratio of foreign capital to domestic capital, In section 5, we introduce intersectoral distortion in the capital market keeping the efficiency function same as in Agell and Lundborg (1992, 1995). In section 6, we consider a case where one of the two sectors produces and unhealthy good and hence negatively affects the work morale and effort norms. The case of technology transfer through foreign capital inflow is considered in the section 7. The concluding remarks are made in section 8. Our analysis shows that the increase in the foreign capital stock does not affect the unemployment and the domestic factor income in our dasic model with the efficiency function of Agell and Lundborg (1992, 1995); and hence the Brecher-Alejandro (1977) proposition remains valid in this case. However, the domestic factor income may be reduced with increase in foreign capital when the effort norm depends negatively on the ratio of foreign capital to domestic capital; and hence the statement of the BAP needs to be modified. Similarly, the BAP may not be valid in its original form when there is intersectoral distortion in the capital market or when the production of the unhealthy good negatively affects the work morale and the effort norms or when foreign capital inflow leads to technological advancement. This is because the increase in foreign capital may alter the domestic factor income in all these three cases; and the Rybczynski effects may also be reversed.

2. THE MODEL

The model developed in this section is similar to that in Agell and Lundborg (1992, 1995). This is an otherwise two sector mobile capital Heckscher-Ohlin-Samuelson (HOS) model of a small open economy with only one departure, Labour is measured in efficiency unit; and this efficiency is determined endogenously in the model being function of wage, interest rate and unemployment.[2] The notations used in this model are the following:

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2. See the works of Brecher (1991) and Agell and Lundborg (1992, 1995).

j = 1, 2.
X_j = Level of output in the sector j .
L_j = "employment in the sector j (expressed in efficiency unit).
K_j = Capital-labour ratio in the sector j .
N_j = Number of workers employed in the sector j .
E = Efficiency per worker.
W = Wage Rate Per worker.
r = Interest rate.
P_j = Price of the jth sector's product.
C_j = Average cost of production in the jth sector.
t = Rate of protective tariff in the import competing sector.
U = Number of unemployed workers.
N = Total number of workers in the economy.
K_D = Stock of domestic capital in the economy.
K_F = Stock of foreign capital in the economy.
F_j = Intensive production function in the sector j.
Y = Domestic factor income of the economy.
Z = Natinal income of the economy.

At this stage, we should mention that here k_j is the capital stock in the jth sector per unit of labour (expressed in efficiency unit). It is not the capital stock per worker. This is because in this model, labour is expressed in efficiency unit, ie., $L_j = eN_j$.

Now we describe the equational structure of the model. Production function in the jth sector satisfies all the standard neo-classical properties including CRS; and the intensive production function can be expressed as follows:

$$X_j = f_j (K_j)\, L_j \text{ for } j = 1, 2, \qquad (1) \text{ and } (2)$$

Foreign capital and domestic capital are assumed to be perfect substitutes and additive; and the entire capital stock, $(K_D + K_F)$, is fully utilised. Hence,

$$K_1 L_1 + K_2 L_2 = K_D + K_F \qquad (3)$$

$(N - U)$ workers are employed in the economy; and hence,

$$L_1 + L_2 = e.\ (N - U) \qquad (4)$$

because $e.\ (n - U)$ is the total labour employed (in efficiency unit).

All the markets are assumed to be perfectly competitive. So, in equilibrium, price of a product is equal to the average cost. As CRS is assumed, average cost is the function of the factor prices only, Hence, we have the following equations:

$$P_j = C_j \ (\ (W_o / e \ ), \ r \ ) \text{ for } j = 1 \text{ and } 2 \qquad (5) \text{ and } (6).$$

Here (W/e) is the effective wage rate when labour is expressed in efficiency unit.

With , $e = 1$ and $U = 0$, these equations describe a two sector HOS model. However, in this two sector model, with endogenous efficiency of the worker, there are additional equations involving the relationship among efficiency (e), unemployment (U) and the factor prices. We assume the efficiency function to be identical accross the sectors; and consider the following functional relationship:

$$e = e = (W, \ r, \ U) \qquad (7)$$

It satisfies the following mathematical restrictions:

$$(\partial e / \partial W) > 0; \quad (\partial e / \partial r) < 0 \quad \text{and} \quad (\partial e / \partial U) < 0.^3$$

Agell and Lundborg (1992, 1995) have shown that the efficiency function (7) is the optimal effort function of the utility maximizing representative worker when the effort norms depend (*i*) positively on the wage in the firm relative to the average wage-level in the economy; (*ii*) on the nature of the functional distribution of income between wage and profit in that sector; and (*iii*) positively on the unemployment rate makes the workers more grateful to be employed which improves the work morale and effort norms. With perfect mobility of homogenous labour and capital between the two sectors and with identical effort norms in all the sectors, we obtain an efficiency function common to all the sectors.

The effective wage rate, (W/e) is minimized with respect to W. From the first order condition of minimization we have

$$(\partial e / \partial W) \ (W/e) = 1 \qquad (8)$$

i.e., the wage elasticity of efficiency is equal to unity. This condition implies that the equilibrium wage is independent[4] of r and U.

So, with the two additional equations (7) and (8), the equilibrium values of e and U and determined in the model with the other variables, W, r, L_j, X_j etc. So the two sector HOS model will appear as a special case of this model if, in equilibrium, $e = 1$ and $U = 0$.

This working of the model can be described as follows. The equations (5) and (6) determine the values of r and (W/e). Then, from the equations (7) and (8), we get the values of U and W. Then the value of e can also be determined from the already

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3. Mathematical derivation of the efficiency function (from the rational behavior of the worker) and the explanations of the mathematical restrictions on the partial derivatives are available in Agell and Lundbor (1992, 1995).

4. This is true if this elasticity is independent of r and U.

determined values of (W/e) and W. Once the factor prices are determined, capital-labour ratios-k_1 and k_2- are also determined. Then equations (3) and (4) determine L_1 and L_2 ; and the equations (1) and (2) determine X_1 and X_2.

3. EFFECT OF FOREIGN CAPITAL INFLOW

3.1 *Effect on Unemployment*

One important argument often put forward in favour of the strategy of growth through foreign capital inflow is that this creates additional employment opportunities in the economies suffering from unemployment. However, this is not true in the Agell and Lundborg (1995) version of the efficiency wage model.

In this model, equilibrium values of U, e, W and r are determined by the equations (5), (6), (7) and (8). Since neither of these four equations include K_F as and argument, the equilibrium value of U is independent of K_F. So an increase in the foreign capital inflow does not affect the level of unemployment in this model.

It should be noted that this inflow of foreign capital affects the absolute level of urban unemployment in then generalized Harris-Todaro model. Khan (1982) has shown that the additional inflow of foreign capital raises (lowers) urban sector is more (less) capital intensive than the rural sector.[5]

3.2 *Effect of National Income*

The national income of the country valued at world prices is give by

$$Z = P_1 X_1 + P_2 X_2 - r. K_F \qquad (9)^6$$

If the sector 1 is protected by tariff at the rate, t, then the equation (5) is replace by

$$P_1. (1 + t) = C_1 ((W/e), r) \qquad (5A)$$

and hence it can be easily shown that

$$Z = Y - t. P_1 X_1 \qquad (9A).$$

Here $Y = (W. (N - U) + r. KD)$ is the domestic factor income.

Note that W, r and U are determined[7] independent of the value of K_F. So the inflow

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5. Similar results are obtained in Grinols (1991) and in Chandra and Khan (1993) where the effects on the informal sector's employment are considered.

6. The entire foreign capital income, $r.KF$, is repatriated.

7. See the equations (5A), (6), (7) and (8).

of foreign capital does not affect the domestic factor income, Y, when the entire foreign capital income is repatriated.

Since the equilibrium values of k_1, k_2, e and U are determined independent of K_F and the values of K_D and N are exogenously given, it can be easily shown that an increase in K_F raises X_1 and lowers X_2 if the sector 1 is more capital intensive than the sector 2, i.e. $K_1 > K_2$.[8] Equations (3) and (4) shwon that L_1 rises and L_2 falls in this case; and hence equations (1) (2) show that X_1 rises and X_2 falls because K_1 and K_2 are given.

So if $t = 0$, $Z = Y$ remains unchanged even if X_1 rises. But if $t > 0$, a rise in X_1 implies a fall in Z when Y is given. Hence if the import competing sector is capital intensive, then as exogenous inflow of foreign capital lowers (does not affect) the national income in the presence (absence) of a tariff. This is the Brecher-Alejandro (1977) proposition[9] (BAP).

4. ANTI-FOREIGN CAPITAL SOCIAL NORMS

Effort-norms may differ form countries to countries. For example, in the more egalitarian and union-influenced economies in Europe, social norms are likely to differ from those in the United States and other less egalitarian societies. In many countries of the third world which were colonies of the Western countries a few decades back, there exist a strong nationalist sentiment and a negative attitude towards the inflow of foreign capital. Repatriation of profit of the foreign firms is often viewed as an economic drain. The unionization of the workers and the rise of the leftist thought among the union-leaders have contributed a lot to make the workers thinking profit-repatriation as unfair. India is a classic example of this case; and even in '92-93', i.e., after forty five years of independence, the policy of liberalization has not been welcome by the labour unions.

In the light of this nationalist sentiment, we assume that an increase in the ratio of domestic capital to foreign capital improves work morale an effort norms; and hence consider a function of effort norm in which the ratio of foreign capital to domestic capital appears as an argument in addition to wage, interest rate and unemployment. Following the utility maximizing behavior of the worker as developed in Agell and Lundborg (1992, 1995), we can obtain the following efficiency function:

$$e = e\,(W,\ r,\ U,\ (KF/\ KD)\ ) \qquad (7A)$$

Here, $(\partial e / \partial\ (K_F / K_D)) < 0$; and the other three partial derivatives have the same sign as in the case of equation (7) in the section 2. for the sake of simplicity, we consider the following form:

The advantage of using equation (7A.1) is that the first-order condition of minimization of (W/e) with respect to W is independent of (K_F / K_D); and hence the equation (8) remains unaffected. All other equations of the model also remain same as in the section 2.

Equations (5) and (6) determine the values of (W/e) and r; and then equations (7.1)

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8. This is the well known Rybczynski theorem.

9. In a small open economy, prices are given. So social welfare varies positively only with national income.

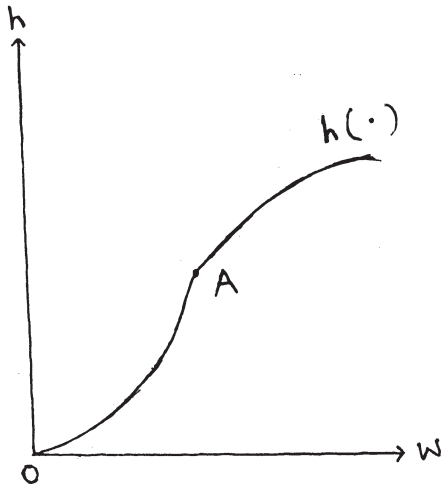

Fig 1

and (8) determine the values of W and U. We now turn to determine the effect of the change in K_F on U.

Note that (W/e) is minimized with respect to W when the wage-elasticity of efficiency is equal to unity, *i.e.* the equilibrium point is A on the efficiency curve in the figure 1; and the equation (8) actually implies this. Also (W/e) O and r are independent of the change in (K_F / K_D). So from the equation (7A), with given K_D, we have

$$(e/W)\, D\, W = (\partial e/\partial W)\, dW + (\partial e/\partial U)\, dU + (\partial e / \partial K_F)\, dK_F;$$

and then using the condition

$$(\partial e/\partial W) \,.\, (W/e) = 1,$$

we have

$$(dU / dK_F) = - (\partial e/\partial K_F) / (\partial e / \partial U)$$

Hence the increase in K_F, given K_D, should have a positive effect on U because $(\partial e / \partial K_F) < 0$ and < 0 and $(\partial e / \partial U) > 0$. However, the equilibrium values of W and e remain same. Hence the domestic factor income, given by

$$Y = W.\,(N - U) + r.K_D$$

is reduced.

The effects of an increase in K_F on U and Y are summarized in the following proposition.

Proposition 1 : The increase in foreign capital inflow raises unemployment and lowers the domestic factor income.

The increase in K_F, given K_D and N, must lead to the expansion of the capital intensive store now because total employment in efficiency unit, $e.(N- U)$, falls. So the national income is reduced when the capital intensive sector is protected by tariff. More importantly, national income which is exactly equal to domestic factor income under free trade is also reduced in this case. So the statement of the BAP needs to be modified. The rate at which social welfare will be reduced in this case is higher than the rate in Brecher and Ale jandor (1977) because the increase in foreign capital lowers the level of labour endowment and hence may cause a downward shift of the production-possibility curve.[10]

5. DISTORTION IN THE CAPITAL MARKET:

We now consider a case of imperfect capital mobility between the two sectors characterised by an exogenous interest rate differential between them. This aspect has been analysed by Khan and Naqvi (1983), Gupta (1995) and Chao and Yu (1992) in the two sector Harris-Todaro models; and the importance of analysing this aspect lies in the empirically established fact that the rate of interest in the rural credit market in the less developed countries is far higher than that in the urban credit market.

Suppose that r and $(Q + r)$ are the interest rates on capital employed in the sectors 1 and 2 respectively. Then equation (6) is modified as follows :

$$P_2 = C\ (\ (W/e),\ r = Q\ ) \qquad (6A).$$

We have already assumed in the section 3 of this paper that the sector 2 is relatively labour intensive. As the rural sector is generally more labour intensive than the urban sector in the less developed countries, we should assume that $\theta > O$.

The average interest rate in the economy is defined as follows :

$$r = \frac{r.k_1 L_1 + (r + q)\ k_2 L_2}{k_1 L_1 + k_2 L_2} \qquad (10)$$

The efficiency function should include this average interest rate as the argument; and hence, following Agell and Lundborg (1992, 1995), we have the following efficiency function :

$$e = e\ (W,\ r,\ U) \qquad (7B).$$

In equilibrium, wage elasticity of efficiency is equal to unity. So the equation (7B)

10. Rate of decrease in welfare is lower in Khan (1982), Chandra and Khan (1993) etc., i.e., in all the models where labour endowment is given.

shows r as a positive function of the level of unemployment, U, because $(\partial e / \partial r) < 0$ and $(\partial e / \partial U) > O$. Mathematically,

$$r = M(U) \text{ with } M' > 0 \qquad (7B.1).$$

Since (W/e) is already determined, than equation (8) shows that W as well as e are independent of the level of unemployment, U. So the total employment in efficiency unit, $e(N - U)$, becomes a negative function of U; and this function is denoted by $H(U)$. Then, from the equation (4), we have

$$L_1 + L_2 = H(U) \qquad (4A).$$

Also using the equation (3), (7B,1) and the definition of r as given in (10), we have

$$r.k_1 L_1 = (r + \theta) k_2 L_2 = M(U).(K_D + K_F) \qquad (10A).$$

Now from the equations (3), (4A) and (10A), we can solve for the equilibrium values of L_1, L_2 and U. The differentials of these three equations with respect to change in K_F are given by the following :

$$k_1 (dL_1 / dK_F) + k_2 . (dL_2 / dK_F) = 1;$$

$$(dL_1 / dK_F) + (dL_2 / dK_F) - H'(U).(dU / dK_F) = O;$$

and

$$rk_1 (dL_1 / dK_F) + (r + \theta) K_2 . (dL_2 / dK_F) - M'(U).(K_D + K_F).(dU / dK_F) = M(U).$$

Solving by Cramer's rule we have

$$(dU/dK_F) = \frac{\theta k_2 + (M(U) - r)(k_1 - k_2)}{H'(U) . k_1 k_2 \theta + M'(U) . (k_D + k_F) . (k_1 - k_2)} \qquad (11)$$

By assumption, $k_1 > K_2$; and the equation (7B.1) shows that $M'(U) > 0$. But $H'(U) < 0$; and the denominator of the R.H.S. of (11) may take any sign. However, we assume the denominator to be positive because it is a sufficient condition for the equilibrium to be stable.[11] Also equations (10) and (7B.1) show that M(U) is the weighted average of r and $(r + \theta)$. So when $\theta > 0$, $M(U) > r$. So the numerator is positive in sign and (dU/dKF) is positive. So the increase in foreign capital raises the level of unemployment.

If $\theta = 0$, then there is no interest rate differential, i.e., we come back to the basic model as developed in the section 2. Then $M(U) = r$; and hence the equation (11) show

11. If $H'(U) = O$, or, $q = 0$, the denominatior is positive if $k_1 > k_2$. In Neary (1978), $k_1 > k_2$ Is the stability condition in a two sector HOS model where labour endowment is given, i.e, $H'(U) = O$. Both Stolper-Samuelson effect and Rybcznski effect are consistent in this case.

that $(dU/dK_F) = 0$. We have already obtained this result in the basic model.

The domestic factor income, Y, is given by the following.

$Y = (W/e).\ H\ (U) + M\ (U).\ K_D$

and then

$$(dY/dK_F) = (\ (W/e\ ).\ H'\ (U\ ) + M'\ (U).\ kd\ )\ (dU/dK_F)$$

or,

$$(dY/dk_F\ ) = -\ (W - M'\ (U).K_D\ )\ (dU/\ dK_F\ ).$$

As $M'\ (U\ ) > 0$ and $(dU/dK_F) > 0$, it clearly follows that (dY/dK_F) may have any sign. So the effect of the increase in K_F on domestic factor income is indeterminate.

Now we can establish the following proposition.

Proposition 2: If the capital intensive sector faces a lower interest rate, the increase in foreign capital will raise the unemployment. However, its effect on domestic factor income is indeterminate.

However, if $\theta = 0$, then $(dU/dK_F) = 0$; and hence $(dY/dK_F) = 0$.

Also it can be shown that

$$(dL_1/dK_F) = \frac{H' + (U)\ (\ (r + \theta)\ M\ (U)\ )\ (k_2 + M'\ (U)\ .\ (k_D + K_F)}{H'\ \ (U)\ .\ k_1\ k_2\ \theta\ + M'\ (U)\ .\ (K_D + K_F)\ .\ (k_1 - k_2)}\ ;$$

and

$$(dL_2/dK_F) = \frac{H' + (U)\ (\ M\ (U) - r\ )\ (k_1 - M'\ (U)\ .\ (k_D + K_F)}{H'\ \ (U)\ .\ k_1\ k_2\ \theta\ + M'\ (U)\ .\ (K_D + K_F)\ .\ (k_1 - k_2)}\ .$$

If $\theta = 0$, then we have $(r = \theta\ ) = r = M\ (U)$; and hence we have

$(dL_1\ /\ dK_F\ ) = (1\ /\ (k_1 - k_2\ )\ )$; and

$(dL_2\ /\ dK_F\ ) = -\ (1\ /\ (k_1 - k_2\ )\ ).$

We can obtain the expressions (in the special case with $\theta = 0$), even in the basic model of the section 2, and these are the Rybczynski effects on employment allocation in the absence of capital market distortion. We obtain the same expressions even in the HOS model, The difference lies in the interpretation of k_1 and k_2. In the HOS model, k_j is the

capital worker ratio in the jth sector. But in this model, it is the capital-labour ratio when labour is expressed in efficiency unit.

However, (dL_1 / dk_F) may take and sign even with $k_1 > k_2$ when $\theta \neq 0$. The problem arises because $H'(U) < 0$; and hence, with $(r + \theta) > M(U)$ and $M'(U) > 0$, the numerator may have any sign. Hence Rybcynski effects on employment are not necessarily valid in this case. Since the increase in K_F produces ambiguous effect on Y as well as on L_1, the Brecher-Alejandro (1977) proposition is not necessarily valid in the presence of dixtortion in the capital market.

6. UNHEALTHY GOODS

Efforts and work norms may depend on the output composition of the two sectors, For example, substantial campaign against the consumption of tobacco and country liquor may produce negative effects on the work morale and the effort norms of the workers working for the production of these commodities. If one of the two commodities in our model is an unhealthy good, then its level of output may be taken as an argument in the function of the effort norm with a negative marginal contribution. Hence, following Agell and Lundborg (1992, 1995), we can obtain the following efficiency function:

$$e = \phi (W, r, u) . \psi (X_j) \qquad (7C)$$

where $\psi'(X_j) < 0$, and, X_j is the level of output of the unhealthy good.

Here also (W/e) and r are determined independent of the levees of factor endowments. However, the equilibrium values of L_1, L_2, X_1, X_2, U and e are to be obtained simultaneously solving the equations (1), (2), (3), (4), (7C) and (8).

Using equations (1) or (2), and (7*C*) we have,

In equilibrium, the elasticity of efficiency with respect to the wage rate is equal to unity. Hence, from the equation (7C.1), we have

$$(dL_j / dU) = - ((\partial e / \partial U) / \psi' (.) f_j (.)) > 0;$$

because, by assumption, $(\partial e / \partial U) > 0$ and $\theta' (.) < 0$.

Suppose that $j = 1$, *i.e.*, the capital intensive sector produces the unhealthy good. Then taking the total differentials of (3) and (4*A*), we have

$$- k_1 . ((\partial e / \partial U) / \psi' (.) f_j (.)) dU + K_2 . dL_2 = dK_F$$

and

$$- [((\partial e / \partial U) / \psi' (.) f_j (.)) + \dot{H'} (U) . dU + dL_2 = 0.$$

Here,

$(dU / dK_F) = (1 / \Delta)$; where

$\Delta = - (k_1 - k_2) ((\partial e / \partial U) / \psi' (.) f_j (.)) + K_2 . H' (U)$

If $K_1 > K_2$ and If $H' (U) < O$, then Δ may take any sign. However, we assume Δ to be positive because it is a sufficient condition for the equilibrium to be stable.[12]

Hence $(dU/dK_F) > 0$; and it clearly follows that

$(dH/dK_F) = H' (U). (dU/dK_F) < 0.$

The domestic factor income is given by

$Y = (W/e) . H (U). N + r.KD$

Here (W/e), r, and K_D are independent of the change in K_F. So the increase in K_F lowers Y because $H (U)$ is reduced. Now we can state the following proposition.

Proposition 3: If the capital intensive sector produces the unhealthy good, then the increase in the foreign capital stock raises unemployment and lowers the domestic factor income.

Note that Δ is always negative if $K_1 < K_2$; and hence we should get exactly opposite results when the labour intensive sector produces the unhealthy good.

Rybczynski effect on the capital intensive sector remains valid when $H' (U) < 0$. The increase in K_F raises U and hence raises the employment in the sector producing unhealthy good if it is capital intensive. Given the capital-labour ratio, level of output is also increased there. As the total employment, $H (U)$, is reduced, the rate of expansion of the capital intensive sector in this case in higher than that in the HOS model. The employment in the our intensive sector is reduced at a higher rate too. As the domestic factor income is reduced and the level of output in the import competing sector is increased, the statement of the BAP is to be modified in this case. Social welfare (national income) will be reduced at a rate higher than the rate obtained in Brecher and Alejandro (1977).

7. TECHNOLOGY TRANSFER:

Technology transfer in the domestic sub-sectors of the economy takes place through foreign investment.[13] With the inflow of offing capital, the residents of the host country come into contact with foreign entrepreneurs who possess superior technical skills and know how. The transmission of the technology from the foreigners to the residents of the host country takes place through observation, discussion and training. This transmission is a spill over or external effect of the host country.

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12. If $H' (U) = 0$, we come back to the stability condition of Neary (1978) in a two sector HOS model.

13. See Koizumi and Kopecky (1977), Mansfield (1961) etc.

Let A_j be the level of technology in the jth sector; and we consider the following technology-transfer function.

$$A_j = A_j\,(K_F) \text{ with } A'_j > 0 \text{ for } j = 1,\ 2.$$

So the equations (5) and (6) are to be replaced as follows :

$$A_j\,.\ P_j\ =\ C_j\ (\ (W/e),\ r\ ) \text{ for } j = 1,\ 2 \qquad \text{(5C) and (6C).}$$

All other equations of the abase model in section 2 remain unchanged.

In our basic model of section 2 the increase in KF produces only the Rybczynski effect. But in the presence of technology transfer, i.e., with $A'_j > 0$, the increase in K_F also has the Stolper-Samuelson effect because the technological advancement implies an increase in the effective producer's price of the product in that sector. We have already assumed that $K_1 > K_2$. Now from the equations (5C) and (6C) we can easily show that the rise in K_F (*i*) will raise (W/e) and lower r if $A'_2 > 0$ and $A'_1 = 0$, and (*ii*) will lower (W/e) and raise r if $A_2 = 0$ and $A_1 > 0$. These changes in (W/e) and r will now lead to change in the equilibrium level of unemployment, *U*.

Taking the total differential of equation (7) and then using equation (8), we have

$$W.d\ (e/\ W) = (\partial e\ /\ \partial r\ )\ dr + (\partial e\ /\ \partial U)\ dU\ ;$$

and hence

$$(dU/dK_F\ ) = \frac{W\ (d\ (e/W)\ /\ dK_F) - (\ \partial\ e\ /\ \partial\ r\ )\ (dr\ /\ dK_F\ )}{(\partial\ e\ /\ \partial\ U\ )}$$

Note that, in this case, $(W/e\ )$ and r always move in the opposite direction with respect to change in K_F. So if $A'_1 > 0$ and $A'_2 = 0$, *i.e.*, if the technology transfer takes place only in the capital intensive sector, then $(dr/dK_F) > 0$ and $(d\ (e/W)\ /dK_F) > 0$.

Hence $(dU/dK_F) > 0$ in this case because $(\partial\ e\ /\ \partial\ r) < 0$ and $(\partial e\ /\ \partial U) > 0$. But if $A'_1 = 0$ and $A'_2 > 0$, *i.e.*, the technological advancement takes place in the labour intensive sector, then $(dr/dK_F) < 0$ and $(d\ (e/W\ )/dK_F) < 0$; and hence $(dU/dK_F) < 0$. So the level of unemployment is increased (reduced) with the inflow of foreign capital if the technology transfer takes place in the capital (labour) intensive sector.

The domestic factor income is given by

$$Y = W.(N - U\ ) + r.KD\ ;$$

and the equation (8) implies that *W* is independent of *KF*. Hence,

$$(dY/dK_F) = K_D . (dr/dK_F) - W. (dU/dK_F).$$

Here r and U move in the same direction with respect to change in K_f. Hence (dY/dK_F) may take any sign, i.e., the effect of the increase on foreign capital on the domestic factor income is indeterminate.

So the major results can be summarized in the form of the following proposition.

Proposition 4: If the technology transfer takes place in the capital (labour) intensive sector, the increase in foreign capital raises (lobour) unemployment. However, the effects on the domestic factor income remain indeterminate.

If the technology transfer takes place in the capital intensive sector, then k_1 as well as k_2 fall. Also U rises; and hence $e.(N - U)$ may move in either direction because e rises. Rybczynski effects remain same when total employment (in efficiency unit) does not rise. In the case of technology transfer to the labour intensive sector, both k1 and k2 should rise, Here U falls. But e falls too; and hence $e.(N - U)$ may move in either direction. So once again Rybczynski effects on employment allocation are not necessarily valid. As the domestic factor income may also move in either direction, the Brecher-Alejandro (1997) proposition may not necessarily be valid in its original form.

8. CONCLUSION

In this note, we analyses the effect of the foreign capital inflow on unemployment and national income of a small open economy in a two sector fair wage model. The Brecher-Alejandro proposition which holds good in the two sector HOS model and in the two sector generalized Harris-Todaro model of Khan (1982) also remains valid in our basic model which considers and efficiency function similar to that in Agell and Lundborg (1992, 1995). However, the inflow of foreign capital does not affect unemployment in this case. But in the gteneralised Harris-Todaro model of Khan (1980) it raises (lowers) the unemployment if the urban sector is more (less) capital intensive than the rural sector.

In section 4 of this paper we have considered a modified version of the efficiency function which is based on effort norms being negatively affected by the increase in foreign capital stock. The level of unemployment is increased with the inflow of foreign capital and the domestic factor income is reduced. So the BAP is not necessarily valid in its original form.

Capital market distortion in the form of an intersectroal interest rate differential is introduced in the section 5 of this paper. The increase in capital stock affects the average interest rate and thus affects the efficiency function. Unemployment is increased with the increase in foreign capital. The validity of the BAP in its original form may be questioned because the domestic factor income may move in either direction.

Also, we have considered a case where one of the two sectors produces an unhealthy good and the efficiency varies negatively with its level of production. Neither unemployment nor domestic factor income is independent of the change in the foreign capital stock in this case; and the nature of the effect depends on the relative capital intensity of the unhealthy goods producing sector. So the statement of the BAP needs to be modified.

Lastly, we have considered the case of technology transfer to the domestic sectors of the economy, Level of unemployment is increased (reduced) with the inflow of foreign capital when the transfer of technology takes place in the capital (labour) intensive sector. However, the domestic factor income may move either way; and hence the BAP may not be valid in its original form.

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