GRT

ALTERNATIVE TRADE POLICIES AND EXPORT PROCESSING ZONES: A TRADE THEORETIC ANALYSIS

Tonmoy Chatterjee

Department of Economics, Sidho-Kanho-Birsha University,
Purulia, West Bengal, India.

Abstract : In this paper, we construct a three sector static general equilibrium model of a small open economy with special consideration to the EPZs. The paper examines the impact of FDI on the output levels of different sectors and also on the incidence of employment in the EPZs. Here we have shown the possibility of expansion of EPZ as well as level of employment in that sector. Finally we have shown that social welfare of our small open economy may improve.

Keywords: General equilibrium, Foreign capital, Export processing zone

INTRODUCTION

Less developed countries are characterized by poor economic growth and broadly we can say that they are in a very low trajectory of their desirable economic development path. Thus issues like high growth rate along with economic development are gaining more importance among the policy makers of most of the less developed economies (hereafter LDCs). FDI[1] as a policy measure to overcome the situation, that is, low economic growth rate along with proper economic development, deserves high weight among the other policy measures. FDI has grown spectacularly since1945 and the bulk of it has taken place within the developed economies, though the pattern is beginning to change with the rapid growth in the countries of South and East Asia. Over the next ten years the current ranking of the world's top economies is projected to undergo substantial changes. In 2020 - assuming the countries grows at the rates projected by the World Bank – new set will be: China, USA, Japan and India etc. According to World Bank FDI flow to LDCs increased from US$ 35 billion (1991) to US$ 80 billion (1996). China is by far the largest recipient of FDI. China contain an upward bias due to substantial recycling of domestic funds through Hong Kong and Macao port in order to take advantage of concessions given to the foreign investors to invest their funds in the local Export Processing Zones. Thus the policy guidelines of these economies should be written in such a form which attracts FDI in their economic zone. Among the several alternatives the term 'Export Processing Zone' (hereafter EPZ) is becoming more important for many LDCs, like India. Though India was the first in Asia to recognize the effectiveness of the EPZ in promoting exports, with Asia's first EPZ set up in Kandla, but till now we are not becoming the top recipient of FDI flow through EPZs, simply speaking they are not working in the right way. Hence the question arises regarding the fact that India should use concession policy for promoting EPZs and attracting FDI flow. To answer this question, here we have developed a model through which we can examine the effectiveness of the concession policy regarding the EPZs.

The main motivation behind this work has been generated from the fact that though there exist a large number of theoretical works related to the issues foreign capital inflow and EPZs but perhaps no theoretical work in a general equilibrium framework has integrated the issues FDI, EPZ and tax concession to the EPZ. In this context we have considered Beladi-Marjit (1992)[2] as the benchmark model and further we have extended this famous model by inserting the tax concession term.

This paper is organized in the following manner. Section 2 considers the model. Sections 3, 4 and 5 have considered Trade Policy, Sectoral Effects and factor prices, Impact of trade liberalization on the profit and employment level of the EPZ, Effects of Reduction in Tax Concession on Social Welfare respectively. Finally, the concluding remarks are made in section 6.

---

[1] FDI, that is, foreign direct investment is long term movement of not only physical capital but also of investible funds.
[2] Beladi and Marjit (1992) have considered export processing zone as third sector of the economy.

_____

THE MODEL

We consider a small open economy consisting of three sectors in a Heckscher-Ohlin-Samuelson framework. Actually our model is based on Beladi-Marjit (1992), and hence we can refer our model as modified Beladi-Marjit type of framework. Out of the three sectors, one is an agricultural sector(A)[3], which produces its output using labour(L) and domestic capital (K), the second sector is a manufacturing sector(M), which produces output by using labour and domestic capital. This third sector is the import competing sector while the first sector, that is, sector A, is the export sector of the economy. K is perfectly mobile between sectors A and M. The third sector is the formal sector[4]. Foreign capital (N_F) has been considered as specific to the formal sector (Z). This sector also uses the labour input(L) to produce output of the third sector. All these four sectors[5] use labour which is perfectly mobile among them.

Here sector A produces its output X_A, sectors M and Z produce output X_M and X_Z respectively. We assume that the agricultural sector is more labour-intensive compared to the manufacturing sector. The agricultural product is considered as the numeraire its price is set equal to unity. We assume that foreign capital income is fully repatriated. Production functions of each sector exhibit constant returns to scale with diminishing marginal productivity for each factor. The following notations are used in this model.

The following notations are used in this model.
X_i = product produced by the ith sector, i = A,M,Z
P_i = world price of the ith commodity, i = A,M,Z
P_Z^* = effective price of sector Z
β = concession rate
L = fixed number of workers in the economy
N_F = N = foreign capital stock of the economy
K = domestic capital stock of the economy
a_{ji} = quantity of the jth factor for producing one unit of output in the ith sector,   j=L,K,N and i =A,M,Z

θ_{ji} = distributive share of the jth input in the ith sector
λ_{ji} = proportion of the jth factor used in the production of the ith sector
W = competitive wage rate
r = rate of return to domestic capital
R = rate of return to foreign capital
D_i = consumption demand for the ith final commodity, i = A,M,Z
Y = national income at domestic price
U = social utility
$m_M = (P_M \, \delta D_M/\delta Y)$ marginal propensity to consume for commodity M,
here, $0 < m_M < 1$
^ = proportional change
The equational structure of the model is as follows.
The competitive equilibrium conditions in the product market for the three sectors give us the following equations.

$$a_{LA}(W,r)W + a_{KA}(W,r)\, r = 1 \tag{1}$$
$$a_{LM}(W,r)W + a_{KM}(W,r)r = P_M \tag{2}$$
$$a_{LZ}(W,R)W + a_{NZ}(W,R)R = P_Z - \beta = P_Z^* \tag{3}$$
Sector specificity of service sector is given by the following equation
$$a_{NZ}(W,R)X_Z = N \tag{4}$$
Perfect mobility of domestic capital between sectors A and M can be expressed as
$$a_{KA}(W,r)X_A + a_{KM}(W,r)X_M = K \tag{5}$$

_____

[3] We can treat the agricultural sector as an informal sector.
[4] This sector is referred to as the EPZ of the economy.
[5] All the four sectors produce final commodities in this model.

_____

_____

Full employment of labour implies the following equation

$$a_{LA}(W,r)X_A + a_{LM}(W,r)X_M + a_{LZ}(W,R)X_Z = L \qquad (6)$$

The national income of the economy at domestic prices is given by

$$Y = X_A + P_M X_M + P_Z^* X_Z - RN \qquad (7.1)$$

or

$$Y = WL + RN + rK + \beta X_Z \qquad (7.2).$$

The working of the model is as follows. There are seven endogenous variables in the system: W, r, R, X_A, X_M, X_Z and Y. Here we have seven independent equations (equations (1) to (7)) to solve for seven unknowns. We can find out the value of W, r and R from equations (1) and (2). Thus it is a decomposable structure[6]. Once the factor prices are determined, the variable factor coefficients can also be determined. Thus the output composition can be determined from the endowment equations (4)-(6). Thus as the output composition of different sectors are known, Y can also be determined from equations (7).

The demand side of the model is represented by a social utility function. Let U be the social utility function and it is shown as,

$$U = U(D_A, D_M, D_Z) \qquad (8)$$

With $U_A > 0$, $U_M > 0$, $U_Z > 0$, $U_{AA} < 0$, $U_{MM} < 0$, $U_{ZZ} < 0$

The balance of trade equilibrium requires that

$$D_A + P_M D_M + P_Z^* D_Z = X_A + P_M X_M + P_Z^* X_Z - RN \qquad (9)$$

TRADE POLICY, SECTORAL EFFECTS AND FACTOR PRICES

We are now interested to analyze the impact of fall in tax concession to the EPZ[7] on the factor prices, and on the output levels of different sectors. To do so at first we are differentiating equation (3) and obtain[8]

$$(\hat{R}/\hat{P_Z^*}) = 1/\theta_{NZ} > 0 \qquad (3.1)$$

From equation (3.1) we can argue that R and P_Z^* are positively related. Thus a decrease in β implies a rise in $(P_Z - \beta)$, that is, an increase in the effective price level of EPZ (P_Z^*). From equation (3.1) we can say that rise in P_Z^* leads to an increase in R. Given W increase in R implies a reduction in (W/R). A reduction in relative wage rate leads to an increase a_{LZ} and a decrease in a_{NZ}. From equation (4) one can say that for given N a decrease in a_{NZ} implies a reduction in the LHS of equation (4), thus for maintaining equilibrium in the foreign capital market X_Z must increase and hence an increase in $a_{LZ}X_Z$. Given the stock of foreign capital, Thus $(L - a_{LZ}X_Z)$ will decline, that is from equation (6) we can say, labour available to sectors A and M will fall. It creates a *Rybczynski effect,* resulting in contraction of sector A and expansion of sector M. This is because A is more labour intensive relative to sector M (by assumption). Thus the following proposition is now immediate.

Proposition1: *Trade liberalization in the form of reduction in the tax concession to the EPZ leads to: (i) an increase in the return to foreign capital, (ii) an increase in the output levels of sectors M, Z(EPZ) and decrease in the output levels of sector A.*

IMPACT OF TRADE LIBERALIZATION ON THE PROFIT AND EMPLOYMENT LEVEL OF THE EPZ

From the above it is very clear that a fall in β leads to an increase in R and for given N we can state that RN will definitely improve. Thus the profit of our EPZ has also increased due to the perfect competition assumption. It is to be noted that increase in $a_{LZ}X_Z$ due to trade liberalization implies an increase in the demand for labour in Z sector and it causes an increase in the employment level in EPZ. Thus the following proposition can now be established.

_____

[6] If the factor prices are determined independently of factor endowments we refer to the structure as a decomposable structure.

[7] Here we consider trade liberalizaition in the form of reduction in tax concesion .

[8] As $dW = 0$ (as W is already known from (1) and (2)) and $Wda_{LZ} + Rd_{NZ} = 0$ (by using envelop condition).

_____

_____

Proposition 2: *A reduction in the tax concession to the EPZ leads to: (i) an increase in the profit of the Z sector; (ii) an improvement in the employment scenario of the EPZ.*

EFFECTS OF REDUCTION IN TAX CONCESSION ON SOCIAL WELFARE

We now consider the impact of trade liberalization on the social welfare. In case of a small open economy, in the absence of tariffs national income or factor income is considered as a measure of social welfare[9], thus we have considered the impact of reduction in tax concession on the national income of our moderate economy to consider the impact of tax concession on social welfare.

Differentiation of equation (7.2) with respect to β we obtain

$$dY/d\beta = N\ dR/d\beta + dX_Z/d\beta + 1 \tag{10}$$

A reduction in tax concession on EPZ produces two effects on welfare. First, reduction in tax concession leads to an increase in the rate of return to foreign capital, since return to foreign capital and price of EPZ good has a positive relationship between them. An increase in return to foreign capital implies more repatriation of foreign capital, which deprives national income as well as social welfare. We call it input return effect. Secondly, reduction in tax concession leads to an increase in X_Z, which affect national income negatively and thus the social welfare will again decline. We call it output effect due to reduction in tax concession to EPZ. Thus we can conclude that the social welfare may improve under the sufficient condition that $(N\ dR/d\beta + dX_Z/d\beta) < 1$, which implies that welfare will increase if and only if the combined effects of factor price effect due to repatriation and output effect due to reduction in tax concession is less than one.

Proposition 3: *Trade liberalization in the form of reduction in the tax concession to the EPZ increases social welfare under some reasonable conditions.*

FOREIGN CAPITAL INFLOW, SECTORAL EFFECTS AND SOCIAL WELFARE

So far we have analysed the effects of trade liberalization through tax concession. In this section we want to examine the impact of trade liberalization through foreign capital inflow. Without going towards too much mathematical derivation here we focused much more on intuition. To do so at first we have to find the relationship between N_F and X_Z, which can be established by the following lemma.

Lemma 1 *Under the assumption that* $-\dfrac{\mu}{\sigma_Z}\ \hat{N}_F < \hat{R} < 0$, *where* $\mu = (N_F/N)$; *an increase in* N_F *leads to an increase in* X_Z.

Proof of lemma 1:   To prove this lemma we have to first of all show that $\hat{X}_Z > 0$, when $\hat{N}_F > 0$. Differentiation of equation (4) gives us

By definition $\sigma_H = (\hat{a}_{NZ} - \hat{a}_{LZ})/(\hat{W} - \hat{R})$

By using the envelope result $W da_{LZ} + R da_{NZ} = 0$ and by inserting $\hat{a}_{LZ} = \hat{W} = 0$ in the expression of σ_Z one obtain

$\hat{a}_{NZ} = -\hat{R}\ \sigma_Z$

Thus $\hat{X}_Z$ can be written as $\hat{X}_Z = \mu\ \hat{N}_F + \hat{R}\ \sigma_Z$

_____

[9] For the details see the works of Gupta and Gupta (2010), Gupta (1997), etc.

_____

_____

Hence we can say that $\hat{X}_Z > 0$, when $\hat{N}_F > 0$ iff $\hat{R} > -\dfrac{\mu}{\sigma_Z}\hat{N}_F$.

In fact when $\hat{N}_F > 0$, we have $\hat{R} < 0$.

Thus, $\hat{X}_Z > 0$, iff $-\dfrac{\mu}{\sigma_H}\hat{N}_F < \hat{R} < 0$.

An increase in N_F implies a fall in R[10]. A fall in R implies an increase in a_{NZ} and a fall in a_{LZ}. Again from equation (4) we can argue that there will be an increase in X_Z due to an inflow of N_F[11]. Now there exists two different cases,

Case: 1) an increase in X_Z implies an increase in $a_{LZ}X_Z$, if increase in X_Z due to an inflow of foreign capital dominates over a fall in a_{LZ} and hence a fall in $(L - a_{LZ}X_Z)$, that is, a reduction in the labour availability to sectors A and M. A fall in the labour endowment available to sectors A and M causes a Rybczynski effect as a result of which X_M increases and X_A falls; given that sector A is more labour intensive than sector M.

Case: 2) an increase in X_Z implies a decrease in $a_{LZ}X_Z$, if fall in a_{LZ} due to an inflow of foreign capital dominates over an increase in X_Z and hence an expansion in $(L - a_{LZ}X_Z)$, that is, an increase in the labour availability to sectors A and M. An increase in the labour endowment available to sectors A and M causes a Rybczynski effect as a result of which X_A increases and X_M falls, given that sector A is more labour intensive than sector M.

Differentiation of equation (7.2) with respect to N we obtain

$$dY/dN = \beta\, dX_Z/dN \qquad\qquad\qquad (10.1)$$

From the above expression we can argue that the social welfare of our small open economy is only depends upon the output level of the EPZ. Using lemma 1 we can conclude that whatever may be the situation, i.e. either case 1occur or case 2 occur, welfare will definitely improve. This leads to the following proposition.

Proposition 4: *Trade liberalization in the form of foreign capital inflow to the EPZ, with full repatriation of its earnings, definitely improves social welfare.*

CONCLUDING REMARKS

Export Processing Zones are one of the most important parts of the social sector of any developing economy and hence social welfare of those economies also depends upon the contraction or expansion of that particular sector. In this paper we build up a model (based on H-O-S general equilibrium structure) where we use EPZ as a traded final commodity producing sector. The above mentioned sector uses a specific type of capital. In such a set up we have shown that a reduction in the tax concession to the EPZ may lead to an expansion of both formal (EPZ) and manufacturing sectors and contraction of the agricultural sector. From the above analysis we can conclude that expansion of the formal sector leads to an increase in the profit level as well as employment level of EPZs. Apart from these results we also find that trade liberalization in the form of reduction in the tax concession to the formal sector of our economy leads to an improvement in social welfare under some reasonable conditions, whereas finally we have shown that social welfare will definitely improve in case of foreign capital inflow to the formal sector.

REFERENCES

1. Beladi, H. and Marjit, S. (1992): "Foreign Capital and Protectionism", *Canadian Journal of Economics*, 25: 233-238.

_____

[10] Inflow of N implies supply of that factor is also increases and hence return from that factor(R) will be decreases due to excess supply of N. For details see Marjit and Gupta (2008) and Chatterjee and Gupta (2012).

[11] For details see lemma 1.

_____

_____

2. Bhagwati, J. N. (1958): "Immiserizing Growth: A General Note" *Review of Economic Studies*, 25: 201-205.
3. Bhagwati, J. N. (1973): "The Theory of Immiserizing Growth: Further Application", *International Trade and Money*; University of Toronto Press: 45-54.
4. Brecher, R. A. and Alejandro, C. F. D. (1977): "Tariff, Foreign Capital and Immiserising Growth", *Journal of International Economics*, 7: 317-322.
5. Caves, R. E., Frankel, J. A. and Jones, R. W. (1990): "*World Trade and Payments*" (5th edition), Scott, Foresman and Little, London: Brown Higher Education.
6. Chatterjee, T. and Gupta, K. (2012): "International Fragmentation in the Presence of Alternative Health Sector Scenario : A Theoretical Analysis", *mimeo*, Department of Economics, Rabindra Bharati University.
7. Grinols, E. L. (1991): "Unemployment and Foreign Capital: The relative opportunity cost of Domestic Labour and Welfare", *Economica*, 57: 107-122.
8. Gupta, K. and Gupta, M.R. (2010): "Foreign Capital and Economic Development: A Brief Survey", in A. Dhar, (ed), "*Some Contemporary Issues on Development and Growth Economics*", Allied Publishers; Kolkata.
9. Gupta, M. R. (1994): "Foreign capital, income inequality and welfare in a Harris-Todaro model", *Journal Development Economics*, 43: 407-414.
10. Gupta, M. R. (1997): "Foreign capital and Informal Sector: Comments on Chandra and Khan", *Economica*, 64: 353-363.
11. Harris, J. R. and Todaro, M. P. (1970): "Migration, Unemployment and Development: A Two-sector Analysis", *American Economic Review*, 60: 126-142.
12. Johnson, H. G. (1967): "The Possibility of Income Losses from Increased Efficiency of Factor Accumulation in the Presence of Tariff", *Economic Journal*, 77: 151-154.
13. Jones, R. W. (1965): "the structure of Simple General Equilibrium Models", *Journal of Political Economy*, 73: 522-557.
14. Khan, M. A. (1980): "The Harris-Todaro Hypothesis and the Heckscher-Ohlin-Samuelson Trade Model: A Synthesis", *Journal of International Economics*, 10: 527-547.
15. Khan, M. A. (1982): "Tariff, Foreign Capital and immiserizing Growth with Urban Unemployment and Specific Factors of Production", *Journal of Development Economics*, 10: 245-256.
16. Marjit, S. and Gupta, K. (2008): "International Capital Mobility and Child Labour", paper presented at 4th Annual Conference on Economic Growth and Development, *Indian Statistical Institute*, New Delhi.

Tonmoy Chatterjee
Department of Economics, Sidho-Kanho-Birsha University,Purulia, West Bengal, India.

_____