Trade reform in a corrupt economy : A note

Biswajit Mandal

Visva-Bharati University, Santiniketan, India

July 2009

Trade Reform in a Corrupt Economy - A Note

Biswajit Mandal

Visva-Bharati University, Santiniketan,

India

ABSTRACT

We construct a general equilibrium model and analyze the effectiveness of trade reform in a distorted economy where distortion exists in form of bureaucratic corruption that arises because of trade protection at the border. In this kleptocratic set up, intermediaries are employed in order to run off from paying a part of import tariff. We use HOSV kind of framework to prove that whether trade liberalization necessarily helps reducing corruption activities and to check what happens to the production of commodities.

Key words: Corruption, International Trade, Tariff Reform, General Equilibrium
JEL classification: D73, F1, F11, D5

Corresponding Author
Biswajit Mandal
Department of Economics & Politics
Visva-Bharati University
Santiniketan, India
731235

Telephone: (+91) 03463262751-56 Extn. 405
E-mail: biswajiteco@gmail.com, biswajit.mandal@visva-bharati.ac.in

---

* Acknowledgement: Insightful comments from Rick Bond on an earlier draft of this paper are gratefully acknowledged. However, the usual disclaimer applies.

Trade Reform in a Corrupt Economy - A Note

1. Introduction

The debate over free-trade versus restricted-trade dates back to the origin of economic science itself. It still remains a pulsating area of research since sometimes trade reform ends up with undesired or counterintuitive outcome. Historically, almost all countries have implemented restrictive trade polices at some points in their history. What the supporters of protectionist policies claim, barring imported goods will save jobs, providing domestic industries to recuperate and prosper and trim down trade deficits. However, the associated costs of protectionism are less money for buying other things; price of goods increases unnecessarily; forces us to pay more taxes directly and indirectly as government recruits more bureaucrats who need to be paid. Therefore, trade protection more often than not hurts the protecting country is one of the oldest but still most astounding insights (Bhagwati, 1988). Nevertheless, one might call attention to two situations where protection can raise welfare. One is when country is capable of using the threat of protection to reduce the protection against its exports. Other is when a country has monopoly power over a good (Helpman and Krugman, 1989).

One significant distinctiveness of recent economic environment has been the extent of trade liberalization in developing countries. The reason is the conviction: liberalization is conductive for growth (Dixon, 1998). Protection has declined considerably over the past three decades. Some deserving references are Krueger (1998), Anderson and Wincoop (2001), Greenaway et al (1998), Wacziarg and Welch (2003) etc.

Furthermore, in a very recent Oxford University Press volume Marjit (2008) has provided some pertinent theoretical papers on protectionism and liberalization issues.

In this paper we try to explore the effectiveness of trade policy reform in a competitive but corruption affected economy. Essentially our paper is a case of multiple distortions, unlike Bhagwati's case (Bhagwati, 1988) of immiserizing growth. The conventional belief regarding economic reform and liberalization per se is that it helps reforming nations to specialize according to comparative advantage and procuring relatively dearer commodities from others. At the same time it facilitates reducing bureaucratic complications related corruption at the borders. This implies, a reduction in tariff should not only push the economy towards "free trade", it should also reduce the degree of distortion, if not the absolute amount, in the corrupt sector which is a by-product of trade restriction. We start from this benign conventional wisdom and try to posit an interesting theoretical issue. In our work lessening protection contracts the input producing sector and hence frees up some labor. These freed labor along with those unshackled from corrupt sector flow out and should help augmenting labor-intensive commodity production and contracting the capital-intensive one. However, it is very much possible that size of the corruption sector may, in fact, go up in spite of a reduction in the degree of protection which is presumably responsible for intermediation related corrupt practices. Here it is important to note that we are not trying to model corruption in our paper, rather our endeavour is to theorize the effectiveness of trade reform in presence of tariff related corruption.

In section 2 we describe the model with intuitive solutions and basic results. Last section provides some concluding remarks.

2. The Model and Basic Results

Home economy is considered to be a perfectly competitive small country producing two tradeable goods, capital-intensive good X and labor-intensive good Y and there is another sector which produces intermediate input M. Production of M requires labor and a specific factor, land. Hence Y is the exportable and X is the importable for a labor-abundant economy. Production of Y requires capital, labor and the intermediate input, M. Producers have two sources for M. One is domestic market and the other is international market where the price is internationally determined and given. This intermediate input is subject to tariff. However, M can also be procured from the domestic market but domestic supply is insufficient. Note that intermediate input is relatively cheaper in international market. In order to protect the domestic intermediate input industry government imposes a tariff on the imports of M. Hence, domestic price of M is exactly equal to the tariff inclusive price of imported M. Producers of Y needs to either pay tariff and or pay tariff inclusive price so that the effective price is same in both the cases. However, no producer is willing to pay honestly as this may result in some form of incentive such as an increase in the factor return(s). Thus our economy is characterized by kleptocracy. The amount of advalorem tariff associated with import is t. Producers pay β fraction of t of which a part goes to government coffer and other part goes to the custom officers as premium over their stipulated salary. Despite the fact that the second part does not constitute tariff revenue, this payment is made by the importers. To them it does not matter where it goes. Therefore, we consider it as part of cost of production. Nevertheless, for doing this intermediation a fraction, how much small it may be, of labor force need to be employed. Though a major chunk of the total labor force is absorbed in the production of *X*, *Y* and *M*, but others get employment due to institutional complexities involved in import. These institutional complexities give rise to corruption activity represented by sector Z. Let us assume, L_z laborers are used to solve these complexities. This service is not free of cost. We assume competitive market for corruption to be consistent with the otherwise standard specifications of the competitive general equilibrium model. Note that the structure of our model has some resemblance with Heckscher-Ohlin (H-O) nugget (Jones and Marjit, 1992), where there is a complementarity in production among commodities. In that sense it is an amalgamation of H-O and specific factor model of trade.

Perfect competition prevails in all markets and production functions for *X*, Y and M are assumed to exhibit constant returns to scale and diminishing returns to factor inputs.

The symbols and basic equations are in tune with Jones (1965, 1971). In this paper we intimately follow the framework used by Marjit and Mandal (2008).

To build the system of equations, we need to use the following notations:

P_i = Price of ith good, $i = X, Y, M$

w = Return to labor

r = Return to capital, K

R = Return to land, T

a_{ij} = Technological co-efficient

$\overline{K}$ = Total supply of capital

$\overline{L}$ = Total supply of labor

$\overline{T}$ = Total supply of land

L_z = Labor engaged in corruption activities

t = amount of advalorem tariff on import of M

Therefore, the general equilibrium structure is like the following one:

$$(1-\beta)tP^*_M.M^* = wL_z \tag{1}$$

Where, $0<\beta<1$, and $a_{MY}.Y$ - M^S=M*, which is essentially the demand-supply equilibrium for intermediate input. Here, M* implies imported input and M^S stands for domestic production.

Note that one may effortlessly disagree if $(1-\beta)tP^*_M.M^*$ is not greater than the spending for doing intermediation, then why should one be corrupt. The point is, if this is the case, the corruption sector would be able to produce supernormal profit and more producers will also be instigated to do with this dishonest process. But this is not the way how factual world works. On the other hand when wLz > $(1-\beta)tP^*_M.M^*$, no producer will find it economical or even rational to be involved in this sort of intermediation. Moreover, under this circumstances labor will flock into corruption sector and hence the viability of the economy will be at stake. In both the above cases the main essence of competitive framework is lost. Therefore, the only condition consistent with competitive general equilibrium framework is what we have written in (1). On the other hand, for the survival of domestic input producing sector this equality has to hold good. Precisely that is why the cost of procuring intermediate input either from domestic or international market is the same. However, one could have thought of a punishment cost or anticipated punishment cost associated with bureaucratic intermediation, if we had tried to model corruption. But that is not our focus here.

Competitive price conditions imply:

$$w.a_{LX} + r.a_{KX} = P_X \tag{2}$$

$$w.a_{LY} + r.a_{KY} + [P^*_M.(1+\beta t) + P^*_M(1-\beta)t]a_{MY} = P_Y$$

Or, $$w.a_{LY} + r.a_{KY} + P^*_M.(1+t)a_{MY} = P_Y \tag{3}$$

Though importers of M are paying only β fraction of tariff t, they have spent out the entire saved amount for intermediation. Thus, whatever be the source of input, domestic or international, cost be the same and it would be $P^*_M.(1+t)$. Hence,

$$wa_{LM} + Ra_{TM} = P^*_M.(1+t) \tag{4}$$

Implications of full employment conditions are:

$$a_{LX}.X + a_{LY}.Y + a_{LM}.\mathrm{M}^S = \bar{L} - Lz \tag{5}$$

$$a_{KX}.X + a_{KY}.Y = \bar{K} \tag{6}$$

$$a_{TM}.M^S = \bar{T} \tag{7}$$

This completes the structure of our model. Now for given β, P_X, P_Y and t we can determine the values of w, r and R from (2), (3) and (4) since P^*_M is given from the international market. Hence all a_{ij}s are determined through CRS assumption from w, r and R. Since T is fixed M^S is calculated from (7). Presence of tariff implies positive amount of Lz to start with. Let us assume any Lz such that Lz>0 and $(\bar{L} - Lz) > 0$. Thus for $\bar{L}, \bar{K}, \bar{T}$ and a given Lz, we can solve for X, Y and domestically produced M^S from (5), (6) and (7). Note that for any given positive t and w, r, Y we can easily solve for Lz from equation (1). RHS of (1) is increasing in Lz as w is already determined. As Lz goes up Y should fall due to the factor intensity assumption. Therefore demand for intermediate input, M^D $(= a_{MY}.Y)$ falls keeping domestic supply constant at a level determined from (7). Therefore, LHS of (1) must be a decreasing function of Lz. This is portrayed in figure -1.

2.1. Reform and Outputs

Differentiating equation (2) and (3) and assuming P^*_M, a_{MY} as constant and setting $\hat{P}_X = \hat{P}_Y = 0$ we get (a circumflex on a variable is used to denote the proportional change),

$$\hat{w} = \frac{\hat{t}\,\theta_{KX}}{|\theta|}\Delta \tag{8}$$

and $\hat{r} = (-)\dfrac{\hat{t}.\theta_{LX}}{|\theta|}\Delta$ (9)

Where, $\theta ji \Rightarrow$ value share of j in i[th] commodity, i = X, Y; j = L, K, M

and $|\theta| = (\theta_{LX} - \theta_{LY}) = (\theta_{KY} - \theta_{KX}) < 0$ and $\Delta = \dfrac{P^*_M a_{MY}.t}{P_Y}$

From equation (4), substituting $\hat{w}$ we get,

$$\hat{R} = \hat{t}\,\frac{P^*_M}{P^*_M(1+t)}\,\frac{1}{\theta_{TM}} - \frac{\Delta\hat{t}\,\theta_{KX}}{|\theta|}\,\frac{\theta_{LM}}{\theta_{TM}} \tag{10}$$

Note that $|\theta| < 0$ since X is assumed to be capital-intensive.

Thus consequent upon trade liberalization $\hat{w} > 0$ and $\hat{r} < 0$ and $\hat{R} < 0$, since $\hat{t} < 0$ and $|\theta| < 0$ and $\Delta > 0$.

For given β, P_X and P_Y if t falls w increases and r falls because return to the intensive factor in the production of Y should rise and that of X should fall following

Stolper-Samuelson argument. A closer look at equation (4) reveals RHS falls owing to a decrease in t and w has already risen from (2) and (3). Therefore R should definitely fall. This result is quite obvious since T is specific to M while labor is the mobile factor. However, the value of $\hat{R}$ essentially depends on the value share of other factors. We have shown it in (10). Hence $\frac{w}{r}$ and $\frac{w}{R}$ changes and consequent upon this there will be changes in the input requirement of production because everyone tries to minimize cost of production. So, aij s will be altered.

Note that in our system of equations all X, Y, M^S and Lz are interdependent. This interdependence forces us to simultaneously solve the equilibrium values of these variables.

Totally differentiating the full employment conditions and equation (1) we get,

$$\hat{X}\lambda_{LX} + \hat{Y}\lambda_{LY} + \widehat{M^S}\lambda_{LM} = -\widehat{L_Z}\lambda_{LZ} - \widehat{a_{LX}}\lambda_{LX} - \widehat{a_{LY}}\lambda_{LY} - \widehat{a_{LM}}\lambda_{LM} \tag{11}$$

$$\hat{X}\lambda_{KX} + \hat{Y}\lambda_{KY} = -\widehat{a_{KX}}\lambda_{KX} - \widehat{a_{KY}}\lambda_{KY} \tag{12}$$

$$\hat{Y}\frac{M^D}{M^*} - \widehat{M^S}\frac{M^S}{M^*} = \widehat{L_Z} - \hat{t} + \hat{w} \tag{13}$$

$$\widehat{M^S}\lambda_{TM} = -\widehat{a_{TM}}\lambda_{TM} \tag{14}$$

Using the zero profit conditions and the concept of elasticity of substitution between labor and capital in X and Y and between labor and land in M and manipulating (11) through (14) we have,

$$\hat{X}\lambda_{LX} + \hat{Y}\lambda_{LY} + \widehat{M^S}\lambda_{LM} - \widehat{L_Z}\lambda_{LZ} = \lambda_{LM}\sigma_M^S(\hat{w} - \hat{R})\theta_{TM} + (\hat{w} - \hat{r})\delta_L \tag{15}$$

$$\hat{X}\lambda_{KX} + \hat{Y}\lambda_{KY} = -(\hat{w} - \hat{r})\delta_K \tag{16}$$

$$\hat{Y}\frac{M^D}{M^*} - \widehat{M^S}\frac{M^S}{M^*} - \widehat{L_Z} = \hat{w} - \hat{t} \tag{17}$$

$$\widehat{M^S}\lambda_{TM} = -\lambda_{TM}\sigma_M^S(\hat{w}-\hat{R})\theta_{LM} \tag{18}$$

where, $\delta_L = [\sigma_X\lambda_{LX}\theta_{KX} + \sigma_Y\lambda_{LY}\theta_{KY}]$, $\quad \delta_K = [\sigma_X\lambda_{KX}\theta_{LX} + \sigma_Y\lambda_{KY}\theta_{LY}]$

and $\quad \sigma_X = \dfrac{\hat{a}_{KX} - \hat{a}_{LX}}{\hat{w}-\hat{r}}$, $\sigma_Y = \dfrac{\hat{a}_{KY} - \hat{a}_{LY}}{\hat{w}-\hat{r}}$, $\sigma_M = \dfrac{\hat{a}_{TM} - \hat{a}_{LM}}{\hat{w}-\hat{R}}$, $\hat{M} = (-)\hat{a}_{TM}$

In matrix form we can represent the equations as follows:

$$\begin{pmatrix} \lambda_{LX} & \lambda_{LY} & \lambda_{LM} & \lambda_{LZ} \\ \lambda_{KX} & \lambda_{KY} & 0 & 0 \\ 0 & M^D/M^* & -M^S/M^* & -1 \\ 0 & 0 & \lambda_{TM} & 0 \end{pmatrix} \begin{pmatrix} \hat{X} \\ \hat{Y} \\ \widehat{M^S} \\ \widehat{L_Z} \end{pmatrix} = \begin{pmatrix} \lambda_{LM}\sigma_M^S(\hat{w}-\hat{R})\theta_{TM} + (\hat{w}-\hat{r})\delta_L \\ -(\hat{w}-\hat{r})\delta_K \\ \hat{w}-\hat{t} \\ -\lambda_{TM}\sigma_M^S(\hat{w}-\hat{R})\theta_{LM} \end{pmatrix}$$

Using the Cramer's rule we can solve for $\hat{X}$, $\hat{Y}$, $\widehat{M^S}$ and $\widehat{L_Z}$.

$$\hat{X} = \frac{1}{|A|}\Big[\lambda_{KY}\lambda_{TM}\sigma_M^S(\hat{w}-\hat{R})\Big\{\lambda_{LM} - \lambda_{LZ}\theta_{LM}\frac{M^S}{M^*}\Big\} + \lambda_{TM}(\hat{w}-\hat{r})\Big\{\lambda_{LY}\,\delta_K + \lambda_{LZ}\frac{M^D}{M^*}\delta_K + \lambda_{KY}\,\delta_L\Big\} + \lambda_{KY}\,\lambda_{TM}\lambda_{LZ}(\hat{w}-\hat{t}\,)\Big] \tag{19}$$

Note that, $|A| = -\lambda_{TM}\Big[\frac{M^D}{M^*}\lambda_{KX}\lambda_{LZ} - \lambda_{LX}\lambda_{KY} + \lambda_{KX}\lambda_{LY}\Big]$; $|A| < 0$ as we assumed X to be capital intensive i.e, $\frac{\lambda_{KX}}{\lambda_{LX}} > \frac{\lambda_{KY}}{\lambda_{LY}}$.

If $\frac{\lambda_{LM}}{\lambda_{LZ}} > \theta_{LM}\frac{M^S}{M^*}$, $\hat{X}$ must be negative.

This result is quite conventional as reduction in trade restriction leads to contraction of domestic importable production. However, it should be carefully looked at that X is never distorted by tariff. Conventional wisdom states a decrease in output subsequent upon reform if that is beset with tariff. If the above condition is not satisfied, X output might even increase due to reform depending upon the relative strength of negative and positive effects.

Economic argument is very simple. Due to a tariff slash w goes up whereas r falls leading to more binding capital-constraint and less binding labor-constraint which must result in X to fall and Y to rise (we shall check if it happens here!). Following this argument we can propose that,

PROPOSITION I: The conventional output effect on importable production is not compelling in a corrupt economy. The sufficient condition for X to fall should read as $\frac{\lambda_{LM}}{\lambda_{LZ}} > \theta_{LM}\frac{M^S}{M^*}$.

What is going to happen to the output of Y that is also very interesting because what traditional argument emphasizes is an increase but that is true only for a so-called fair economy. In our model change in Y is symbolized as follows:

$$\hat{Y} = \frac{1}{|A|}\Big[\lambda_{KX}\lambda_{TM}\sigma_M^S(\hat{w}-\hat{R})\Big\{\lambda_{LZ}\theta_{LM}\frac{M^S}{M^*}-\lambda_{LM}\Big\} - \lambda_{TM}(\hat{w}-\hat{r})\{\lambda_{LX}\,\delta_K + \lambda_{KX}\,\delta_L\} + \lambda_{KX}\,\lambda_{TM}\lambda_{LZ}(\hat{w}-\hat{t}\,)\Big] \quad (20)$$

Under the same condition for which $\hat{X} < 0$, first term within the third bracket of the RHS of (20) is negative, second term is negative while only the third one is positive. Therefore the eventual effect on Y is not unambiguous. $\hat{Y} \gtrless 0$ iff

$$\left|\lambda_{KX}\sigma_M^S(\hat{w}-\hat{R})\left\{\lambda_{LZ}\theta_{LM}\frac{M^S}{M^*}-\lambda_{LM}\right\} - (\hat{w}-\hat{r})\{\lambda_{LX}\,\delta_K + \lambda_{KX}\,\delta_L\}\right| \gtrless |\lambda_{KX}\,\lambda_{TM}\lambda_{LZ}(\hat{w}-\hat{t}\,)|$$

Ambiguity in Y comes from the nature of production function as it also requires a tradeable intermediate input, M apart from labor and capital.

PROPOSITION II: Even if the production of importable falls exportable output may not increase.

Now we shall turn to check the effect on domestic importable production.

$$\widehat{M^S} = \frac{1}{|A|}\left[\lambda_{TM}\sigma_M^S\left(\widehat{w} - \widehat{R}\right)\theta_{LM}\left\{\frac{M^D}{M^*} + \lambda_{KX}\lambda_{LY} - \lambda_{LX}\lambda_{KY}\right\}\right] \tag{21}$$

When X happens to be the capital intensive $\widehat{M^S}$ is unambiguously negative. This outcome goes with the conventional wisdom. However what would happen to the actual import of intermediate input, M* that is not clear yet because of ambiguity in the effect on Y. Nonetheless, if Y goes up and M^S falls, M* should invariably increase. We will come to this issue later.

Effect on the size of corruption sector is also ambiguous. Positive effect on Lz comes from the import demand for input whereas the negative effect is generated through reduction in tariff. That is why we need to check as to which effect dominates what. This claim can be corroborated further by the following expression:

$$\widehat{L_Z} = \frac{1}{|A|}\Big[-\lambda_{TM}(\widehat{w} - \hat{r})\frac{M^D}{M^*}\{\delta_K + \delta_L\} + \lambda_{TM}(\lambda_{KX}\lambda_{LY} - \lambda_{LX}\lambda_{KY})(\widehat{w} - \hat{t}\,) -$$

$$\lambda_{TM}\sigma_M^S\left(\widehat{w} - \widehat{R}\right)\theta_{LM}\left\{2\frac{M^D}{M^*}\lambda_{KX}\,\lambda_{LM} + \frac{M^S}{M^*}(\lambda_{KX}\lambda_{LY} - \lambda_{LX}\lambda_{KY})\right\}\Big] \tag{22}$$

Hence, $\widehat{L_Z} \gtrless 0$ iff

$$\left|-(\widehat{w} - \hat{r})\frac{M^D}{M^*}\{\delta_K + \delta_L\} - \sigma_M^S\left(\widehat{w} - \widehat{R}\right)\theta_{LM}\left\{2\frac{M^D}{M^*}\lambda_{KX}\,\lambda_{LM} + \frac{M^S}{M^*}(\lambda_{KX}\lambda_{LY} - \lambda_{LX}\lambda_{KY})\right\}\right|$$

$$\gtrless |(\lambda_{KX}\lambda_{LY} - \lambda_{LX}\lambda_{KY})(\widehat{w} - \hat{t}\,)|$$

Note that a fall in Lz imply an increase in Y production and a fall in X production following Rybczynski effect. On the other hand the implication of an increase in Lz is that labor will go out of productive sector affecting most the labor-intensive commodity Y. Thus production of Y will decrease and that of X will rise.

Now the question is what actually happens to the relative size and value share of corruption activities due to tariff slash? The size of the corruption sector is defined by:

$$\frac{wLz}{w\overline{L}+r\overline{K}+R\overline{T}} = \frac{Lz}{\overline{L}+\frac{r}{w}\overline{K}+\frac{R}{w}\overline{T}} \tag{23}$$

As t falls all terms in the denominator goes down except $\overline{L}$. Thus if Lz remains constant or increases, the size of the corruption sector must increase. When Lz falls corruption activity may even increase if the denominator falls faster than the numerator. Thus the following proposition is immediate:

<u>Proposition III:</u> *The size of intermediation related corrupt activity certainly increases even when the trade restriction at the border is reduced, on the condition that:*

$$\left|-(\widehat{w}-\hat{r})\frac{M^D}{M^*}\{\delta_K+\delta_L\}-\sigma_M^S(\widehat{w}-\widehat{R})\theta_{LM}\left\{2\frac{M^D}{M^*}\lambda_{KX}\,\lambda_{LM}+\frac{M^S}{M^*}(\lambda_{KX}\lambda_{LY}-\lambda_{LX}\lambda_{KY})\right\}\right|$$

$$\geqq |(\lambda_{KX}\lambda_{LY}-\lambda_{LX}\lambda_{KY})(\widehat{w}-\hat{t})|$$

QED

This expression is a bit complicated. However, the economic intuition behind this outcome can easily be interpreted from (13). It can be rewritten as,

$$\widehat{L_Z} = \hat{Y}\frac{M^D}{M^*}-\widehat{M^S}\frac{M^S}{M^*}+\hat{t}-\widehat{w}$$

An increase in w leads to a fall in Lz because productive employment goes up and as protection at the borders reduces through a fall in t, requirement for intermediators, Lz falls. On the other side of the story, as domestic supply of M^S decreases, it leads to an increase in import and hence Lz. And also note that the ambiguity in Y makes the consequential effect on Lz uncertain. Here it is important to note that this analysis must fail if t goes down to zero since that will totally eliminate the corrupt activity.

Now lets go back to the effect on actual import, M*. We know that $a_{MY}.Y$ - M^S=M*. Therefore, $\widehat{M^*} = \hat{Y}\frac{M^D}{M^*} - \widehat{M^S}\frac{M^S}{M^*}$ (24)

We already know that under certain condition $\widehat{M^S} < 0$ and this is likely to hold true. However the effect on Y is not certain. In this circumstance if Y goes up actual import of input must rise due to tariff cut. The underlying argument is not tough to tackle with. Y is exportable and it's production requires the intermediate input. When Y rises the demand for input must rise. Coupled with this as domestic production of input decreases, import of intermediate input must go up. Nevertheless when Y falls we need to weigh as to whether the negative effect on M* because of lower demand is greater or less than the positive effect on M* due to lower domestic supply. Therefore we may write the following proposition:

Proposition IV: *Liberalization may not lead to a rise in the import of intermediate input. It may even decrease in a corruption ridden economy.*

2.2. Welfare Implications

However, the welfare implications of trade reform in a corrupt economy is something straightforward but quite interesting. The standard welfare measure at a given world price is denoted by:

$P_X^*X_D + P_Y^*Y_D = P_X^*X + P_Y^*Y - P_M^*M^*(1+t) + P_M^*M^*t$

Here D stands for consumption demand and we should not include P_M and M separately as it is already included in P_Y. Further it is important to note that, in our model β fraction of tariff actually goes to government's coffer and to customs officers as bribe whereas the remaining fraction (1-β) is spent out for intermediaries. It does not matter where it is going as long as this constitutes a part of total consumption demand from domestic nationals. Therefore, given the endowments of all factors of production setting, P^*_Y as the numeraire we can express change in welfare as

$$d\Omega = P_X * dX_D + dY_D$$

Therefore, $$\frac{d\Omega}{dt} = P^*_X \frac{dX}{dt} + \frac{dY}{dt} - P^*_M \frac{dM^*}{dt}$$

Using (24) $$\frac{d\Omega}{dt} = P^*_X \frac{dX}{dt} + \frac{dY}{dt} - P^*_M \left(\frac{\hat{Y}\ M^D - \widehat{M^S}\ M^S}{dt} \right)$$

Since t falls, an increase in welfare means $d\Omega/_{dt} < 0$. The change in generated demand for M coming from Y and that of supply of M from domestic sector is captured by dM^*, change in total import demand that actually implies a leakage. This leakage is not for original importable commodity, X but to produce more of exportable Y. This is precisely why an augmentation in welfare is simultaneously countered by this import expenditure. When t decreases X falls along with M^S. However, $\hat{Y}$ may take any value. In both the situations welfare effect is unclear.

When $\hat{Y}>0$: $\frac{d\Omega}{dt} \lesseqgtr 0$ iff $\left| \frac{dY}{dt} - P^*_M \left(\frac{\hat{Y}\ M^D - \widehat{M^S}\ M^S}{dt} \right) \right| \gtreqless \left| P^*_X \frac{dX}{dt} \right|$

And

When $\hat{Y}<0$: $\frac{d\Omega}{dt} \lesseqgtr 0$ iff $\left|-P_M^* \frac{\hat{Y}\ M^D}{dt}\right| \gtreqless \left|P_X^* \frac{dX}{dt} + \frac{dY}{dt} + P_M^* \frac{\widehat{M^S}\ M^S}{dt}\right|$

3. Conclusion

We developed a simple trade model for a small open economy producing three goods out of which one commodity is used as the intermediate input in the export producing sector and the rest one is importable. However, intermediate input can also be imported. Importation of intermediate input is beset with tariff. Hence, the inherent tendency of the producer is to get rid of this extra payment. Thus they employ people to work for intermediation between custom officials and producers. That is how corruption enters into the framework. A reduction in tariff conventionally reduces the domestic production of input and also the production of importable final good. However, the effect on imported intermediate input using exportable final commodity and actual import of input are ambiguous. As corruption is associated with tariff restriction, a fall in tariff should reduce corrupt practice. But this may not be the case under certain condition. In this paper we derived the precise condition and focused on the mechanism for this unconventional outcome. Moreover in the welfare front the implication is very much uncertain.

References

Anderson, James E and E. V. Wincoop , (2001), Borders, Trade and Welfare, *Brooking Trade Forum 2001 on Globalization: Issues and Implications.*

Bhagwati, J , (1988), *Protectionism*, Ohlin Lecture, (MIT Press, Cambridge).

Dixon, H , (1998), Trade Liberalization and Growth: An Introduction, *The Economic Journal,* 108, 450, 1511-1512.

Greenaway, D., W. Morgan and P. Wright, (1998), Trade reform Adjustments and Growth: What Does Evidence Tells Us?, *The Economic Journal*, 108, 450, 1547-1561.

Helpman, E. and P. Krugman, (1989), *Trade Policy and Market Structure*, (MIT Press, Cambridge, MA).

Jones, R.W. , (1965), The Structure of Simple General Equilibrium Models- *Journal of Political Economy*,73, 557-572.

Jones, R.W. , (1971), A three-factor model in theory , trade and history –Bhagwati, J et al (Eds), *Trade, Balance of Payments and Growth*, (North- Holland, Amsterdam),3-21.

Jones, R.W. and S. Marjit., (1992), International Trade and Endogenous Production Structures, W. Neuefeind and R. Riezman (eds.), *Economic Theory and International Trade:Essays in Memoriam J.Trout Rader*. (Springer-Verlag, NewYork, USA), 95-107.

Krueger, Anne O., (1998), Why Trade Liberalization is good for Growth, *The Economic Journal*, 108, 450, 1513-1522.

Marjit, S., (2008), *International Trade and Economic Development: Essays in Theory and Policy*, (OUP).

Marjit, S and B. Mandal, (2008), Corruption and Trade in General Equilibrium, Leverhulme Centre for GEP, University of Nottingham, RP No. 2008/15.

Wacziarg, R and K. H. Welch, (2003), Trade liberalization and growth: New Evidence, NBER, WP 10152.

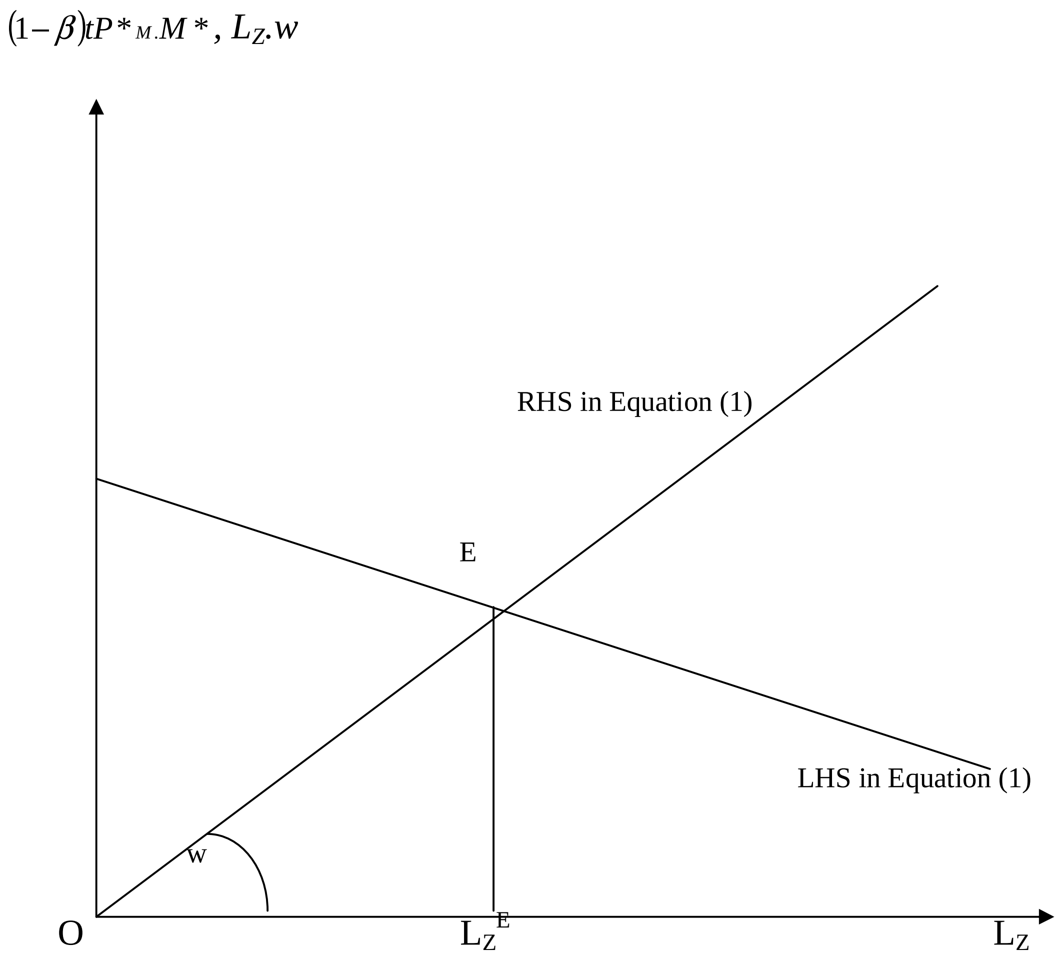

Figure -1

Determination of equilibrium Lz for given Prices and tariff