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How can Trade Unionism affect Welfare Consequences of Trade and Investment Reforms in a Developing Economy?*

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(September 2014)

ABSTRACT: This paper explains the existence of intersectoral wage differential in a developing economy in terms of trade union behavior in the formal sector industry and analyzes its role in predicting the outcomes of trade and investment reforms on welfare. It provides theoretical explanations of certain real life phenomena e.g. why the developing countries are yearning for foreign capital despite the standard immiserizing result and why these countries are not reducing the tariff rates beyond certain levels although they have chosen free trade as their development strategy.

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1. Introduction

The developing economies are plagued with different kinds of distortion like imperfections in the factor markets and product market and presence of non-traded goods, both intermediate and final. Several works have examined the aspect of welfare gains of trade policy and growth amidst domestic distortions. This includes works of Kemp and Negishi (1970), Ohyama (1972), Panagariya and Eaton (1979, 1982), Pravin and Panagariya (2000). The importance of such works has increased considerably in the liberalized economic regime because the developing countries have been advised by the WTO and the IMF to choose free trade as their development strategy.

However, it has been observed that some of the developing economies, notably the non-OECD countries, have not implemented tariff reforms to any significant extent although they are vigorously executing liberalized investment policies and in fact been able to attract a huge amount of foreign direct investment (FDI) in the liberalized era.¹ It is also important to mention that the attitude towards FDI in these economies was extremely opposite up to early 1980s the theoretical foundation of which was provided by the so-called ‘Brecher-Alejandro proposition’.²

¹ The growth rate in absorbing FDI in the developing economies has been so fast during the recent years that in 2012, they have attracted more FDI flows than the developed nations accounting for 52 per cent of global FDI flows (World Investment Report, 2013, UNCTAD).

² Brecher and Alejandro (1977) have analyzed the welfare effects of foreign capital inflow in a two-commodity, two-factor full employment model. The important result is as follows: inflow of foreign capital with full repatriation of its earnings is necessarily immiserizing (i.e. welfare worsening) if the import-competing sector is capital-intensive and is protected by a tariff. The Brecher-Alejandro proposition has subsequently been re-examined in terms of three-sector models, both with or without unemployment, in works like Beladi and Marjit (1992a, 1992b), Khan (1982), Chandra and Khan (1993), but the immiserizing result of foreign capital in the presence of a tariff protected import-competing sector has been found to be valid in general. Hence, FDI was then viewed as an instrument of appropriation of economic resources of the developing economies on the part of foreign capitalists.

Two pertinent questions at this juncture are: (i) why are these countries taking different measures to woo foreign capitalists to investment in them given the standard ‘immiserizing result’. To put it differently, why these economies have changed their attitude towards FDI in the liberalized era; and, (ii) why are they not lowering their tariff rates beyond certain levels although they have chosen free trade as their development strategy?

The present paper purports to provide answers to the above questions in terms of a two-sector full employment general equilibrium model with labour market distortion and an import tariff. Sector 1 (the informal sector) produces the export commodity with the help of two homogenous inputs, labour (L) and capital (K) while sector 2 (the formal sector) produces the import good by means of the same two inputs. There is imperfection in the labour market in sector 2 where workers receive a high wage, W^* while their counterparts in sector 1 receive the competitive wage, W with $W^* > W$.

The existence of high wage in the formal sector can be explained in different ways. However, in the literature on trade and development it has most commonly been explained either in terms of strict implementation of the minimum wage law of the government or collective bargaining on the part of labour unions with their employers or in terms of efficiency wage considerations of the employers in this sector. While Harris-Todaro (1970), Bhagwati and Srinivasan (1971, 1974) have considered high wage in the formal sector as a consequence of government fiat, Stiglitz (1976) has explained it in terms of efficiency wage considerations. On the other hand, Calvo (1978), Quibria (1988) and Chau and Khan (2001) in the Harris-Todaro setting with urban unemployment have explicated that the high wage in the urban sector (formal sector) is the outcome of trade union behavior. It has also been found empirically that trade unionism by no means is an inconsequential source of wage differentials in developing countries.³

³ According to Freeman (2010) although labour unions and collective bargaining are less important in developing countries compared to developed ones enough unions in developing economies are engaged in collective bargaining. There are many studies, which have estimated union effects and compared outcomes between union and nonunion wages although their datasets are not quite large. Studies by Panagides and Patrinos (1994) and Fairris (2003, 2006) for Mexico; Tsafack-Nanfosso (2007) for Cameroon; Kingdon et al. (2006) for sub-Saharan African countries; Menezes-Filho et al. (2005) for Brazil; Blunch and Verner (2004) for Ghana; Bhandari (2008) for

Wage determination in the models of Calvo (1978), Quibria (1988) and Chau and Khan (2001) is based on the monopoly trade union framework as well as on the Nash bargaining framework. They have derived a unionized wage function where the unionized and non-unionized wages are positively correlated and analyzed the consequences of different development policies on urban unemployment. However, they have not discussed the welfare outcomes of FDI and trade liberalization in the developing economies and derived conditions under which these policies would necessarily be harmful or beneficial. In the developing nations that are plagued with multiple distortions any policy changes designed to correct a particular distortion are likely to increase the degree(s) of other distortions.⁴ Hence, the net outcome on welfare is ambiguous. However, conditions (sufficient and/or necessary) involving system parameters can be derived that can ensure certain specific results.

The present paper introduces endogenous labour market distortion in a 2×2 full-employment model where the formal-informal wage differential arises due to trade union activities in the formal sector industry. We have derived precise conditions for inflow of foreign capital to be welfare-improving in the presence or absence of any tariff distortion and for tariff reform to be welfare-deteriorating. Our results provide theoretical answers to certain observed phenomena in the developing countries.

2. The Model

We consider a two-sector, two-factor full-employment model for a small open developing economy with labour market imperfection in sector 2. In sector 2 (formal sector) workers receive the unionized wage, W^* , which is determined through collective bargaining between the representative firm and the representative labour union in the industry. The workers in the

India etc. have estimated that the union/nonunion wage differential ranges between 5% and 25% in these countries.

⁴ See Batra (1973) in this context.

informal sector receive a low competitive wage, W . Commodity prices, P_i s are given by the small open economy assumption. There is an import tariff at the ad-valorem rate, t on commodity 2 so that its domestic or tariff-inclusive price is P_2^* where $P_2^* = (1+t)P_2$. All other standard assumptions of the Heckscher-Ohlin-Samuelson model including CRS with positive but diminishing marginal productivity to each factor are retained. Finally, commodity 1 is chosen as the numeraire.

Since unionized wage is the source of distortion in the labour market in this model we feel the necessity to explain how it is determined.

2.1 Determination of the unionized wage

We consider a competitive formal sector industry (sector 2). Each homogeneous firm in the industry has a separate trade union and the unionized wage is determined through collective bargaining. Labour and capital are the two factors of production. The capital market facing each firm is perfect. Capital is perfectly mobile between the two sectors and its economy-wide return is r . Although capital is another input of production in the process of determination of the unionized wage labour is considered to be the only variable input of production.⁵ Here, the unionized wage is determined as solution to the Nash-bargaining game between the representative firm and the representative labour union which would be the same across firms in this sector. Let us denote it by W^* . After dropping capital the production function of the k th firm

⁵ This is in line with Agell and Lundborg (1992, 1995) where while determining the ‘fair wage’ of the workers, w , the other variable input, Q (say, capital) has been left aside on the plea that its rate of return, q , is the same in both the sectors of the economy. Chaudhuri (2003), Chaudhuri and Mukhopadhyay (2009) and Chaudhuri and Ghosh Dastidar (2014, forthcoming) also have ignored capital in the process of determination of the unionized wage on the same ground. In all the above works, the determined unionized wage function has subsequently been fitted into the general equilibrium part of their models where all endogenous variables including the unionized wage are determined as functions of system parameters.

in sector 2 is written as $Q = Q(L_{2k}), Q'(\cdot) > 0; Q''(\cdot) < 0$ where L_{2k} is the number of workers employed by the k th firm.

The representative firm's profit function is given by

$$\Pi_{2k} = P_2^* Q(L_{2k}) - W^* L_{2k} \quad (1)$$

where P_2^* is the exogenously given price of the product of the firm.

The representative labour union maximizes the aggregate wage income of its members net of their opportunity wage income i.e.

$$\Omega_k = (W^* - W)L_{2k} \quad (2)$$

where, the informal sector wage, W is the opportunity wage of the workers in sector 2.⁶ This is because any worker failing to get employment in the formal sector has to fall back upon a job in the informal sector (sector 1) offering the competitive wage, W .

We consider a cooperative game between the representative firm and the representative labour union that leads to simultaneous determination of the unionized wage, W^* and the level of employment, L_{2k} by the firm. If the two parties fail to reach an agreement no production will take place and the workers have to accept jobs in the informal sector. So, given the objective functions of the two parties, represented by equations (1) and (2), the disagreement pay-off vector is: $[0, 0]$.

The Nash-bargaining solution is obtained from the following optimization exercise.

⁶ This is in line with Calvo (1978), Chaudhuri (2003), Chaudhuri and Mukhopadhyay (2009). However, unlike Calvo (1978) sector 1 is here the informal sector instead of the rural sector. In the other two works, nevertheless, sector 1 is the informal sector.

$$\text{Max } J_k = [P_2^* Q(L_{2k}) - W^* L_{2k}]^{(1-U)} \times [(W^* - W)L_{2k}]^U \quad (3)$$

$$W^*, L_{2k}$$

where U is the bargaining strength of the labour union.⁷ It may be noted that if the formal sector labour market were perfect there would have been no trade unionism. In that case we would have, $U = 0$.

The first-order conditions for maximization are

$$(1-U)[(W^* - W)L_{2k}] = U[P_2^* Q(\cdot) - W^* L_{2k}] \quad (4)$$

and,

$$(1-U)(P_2^* Q'(\cdot) - W^*)L_{2k} = -U[P_2^* Q(\cdot) - W^* L_{2k}] \quad (5)$$

Using (4) and (5) one obtains

$$P_2^* Q'(\cdot) = W \quad (6)$$

From equation (6) the equilibrium employment in the k th firm is determined as follows.⁸

$$L_{2k} = L_{2k}(W, P_2^*) \quad (6.1)$$

Simplification from (5) and (6) yields

$$W^* = U \frac{P_2^* Q(L_{2k})}{L_{2k}} + (1-U)W \quad (7)$$

⁷ However, U is amenable to policy measures. If the government undertakes different labour market regulatory measures e.g. partial or complete ban on resorting to strikes by the trade unions, reformation of employment security laws to curb union power, U takes a lower value.

⁸ Each firm in industry 2 employs labour up to the point where the VMPL is exactly equal to the informal sector wage, W .

With identical firms using equation (6.1) and dropping ‘ k ’ equation (7) after generalizing is rewritten as follows.

$$W^* = W^*(P_2^*, W, U) \quad (8)$$

Differentiating (6) and (7) and simplifying one can easily show that

$$E_W = \left(\frac{\partial W^*}{\partial W} \frac{W}{W^*} \right) > 0; E_{P_2^*} = \left(\frac{\partial W^*}{\partial P_2^*} \frac{P_2^*}{W^*} \right) > 0; \quad \text{and, } E_U = \left(\frac{\partial W^*}{\partial U} \frac{U}{W^*} \right) > 0 \quad \text{where } E_W, E_{P_2^*} \text{ and}$$

E_U denote the elasticities of $W^*(.)$ with respect to W, P_2^* and U , respectively; and, $(E_W + E_{P_2^*}) = 1$.

3. The general equilibrium analysis and results

We are now going to present the general equilibrium structure of our model after fitting in the unionized wage function as given by (8) and show how it can be used to obtain certain unconventional results that explain a few observed phenomena in the developing economies which are plagued with different types of distortion. We consider two types of distortion, labour market distortion in the form of unionized wage in the formal sector and a commodity market distortion that takes the form of a tariff on the import-competing sector.

The general equilibrium set-up is given by the following set of equations.

$$Wa_{L1} + ra_{K1} = 1 \quad (9)$$

$$W^*(P_2, W, U)a_{L2} + ra_{K2} = (1+t)P_2 = P_2^* \quad (10)$$

$$a_{K1}X_1 + a_{K2}X_2 = K_D + K_F = K \quad (11)$$

$$a_{L1}X_1 + a_{L2}X_2 = L \quad (12)$$

where a_{ji} s is the requirement of the j th factor required to produce one unit of output of sector i for $j = L, K$; and, $i = 1, 2$. The aggregate capital stock of the economy, K consists of both

domestic capital (K_D) and foreign capital (K_F) and these are perfect substitutes. The entire foreign capital income, rK_F is repatriated.

Equations (9) and (10) are the two zero-profit conditions for the two sectors while equations (11) and (12) are the full-employment conditions for capital and labour, respectively. We assume that sector 1 is more (less) labour-intensive (capital-intensive) than sector 2 in value sense i.e. $\frac{Wa_{L1}}{a_{K1}} > \frac{W^*a_{L2}}{a_{K2}}$. As $W^* > W$ it automatically implies that sector 1 is more (less) labour-intensive (capital-intensive) relative to sector 2 in physical sense.

Let us now turn to the demand side of the model.

The strictly quasi-concave social welfare function is given by

$$V = V(D_1, D_2) \quad (13)$$

where D_i denotes the aggregate demand for the i th commodity for $i=1,2$.

Trade balance requires that

$$(X_1 - D_1) = P_2(D_2 - X_2) + rK_F$$

$$\text{or, } D_1 + P_2^*D_2 = X_1 + P_2^*X_2 + tP_2(D_2 - X_2) - rK_F \quad (14)$$

where $(X_1 - D_1)$ is the amount of X_1 exported and $(D_2 - X_2)$ denotes the amount of X_2 that is imported.

National income at domestic prices is given by

$$Y = X_1 + P_2^*X_2 + tP_2M - rK_F \quad (15)$$

where, M denotes the volume of import of commodity 2 and is given by

$$M = D_2(P_2^*, Y) - X_2 \quad (16)$$

In (15), tP_2M measures the aggregate tariff revenue of the government which is transferred to consumers as lump-sum payments.⁹

3.1 Welfare consequences of foreign capital inflow and trade liberalization

Differentiating equations (9) – (16) and the production functions the following two expressions can be obtained.¹⁰

$$\left(\frac{1}{V_1} \frac{dV}{dK}\right) = \left(\frac{v\lambda_{L1}X_2}{K|\lambda|}\right)[(W^* - W)a_{L2} - tP_2] \quad (17)$$

(+)

and,

$$\left(\frac{1}{V_1} \frac{dV}{dt}\right) = \left(\frac{v}{t}\right)[(W^* - W)\left(\frac{TL_2S_{LK}^2}{|\theta|}\right)\{E_w\theta_{K1} + \theta_{L1}(1 - E_P)\}]$$

(+)

$$+ \left\{ \frac{(W^* - W)a_{L2} - tP_2}{|\lambda|} \right\} X_2 (\lambda_{L1}A_2 + \lambda_{K1}A_1) + (tP_2)^2 H$$

(+)

(+)

(-)

(18)

where: $T = (t/1+t) > 0$; $v = [(1+t)/\{1+t(1-m)\}] > 0$; $m = P_2^*(\partial D_2 / \partial Y)$ is the marginal propensity to consume commodity 2 ($1 > m > 0$); and, $H = [(\partial D_2 / \partial P_2^*) + D_2(\partial D_2 / \partial Y)] < 0$ is the Slutsky's pure substitution term.¹¹

From equations (17) and (18) the following proposition can be established.

⁹ This is the standard assumption made in the theoretical literature on international trade. See Marjit and Beladi (1996), Chaudhuri and Mukhopadhyay (2009, 2014) among others.

¹⁰ See Appendices 1 and 2 for detailed derivations.

¹¹ The expressions for A_1 and A_2 have been presented in Appendix 1.

Proposition 1: An inflow of foreign capital improves social welfare iff $(W^* - W)a_{L2} > tP_2$. On the other hand, a policy of trade liberalization that lowers the rate of tariff is welfare-worsening if $\left[\left\{ \frac{(W^* - W)a_{L2} - tP_2}{|\lambda|} \right\} X_2 (\lambda_{L1}A_2 + \lambda_{K1}A_1) + (tP_2)^2 H \right] \geq 0$. \square ¹²

We explain proposition 1 as follows. An inflow of foreign capital raises the aggregate capital stock of the economy (domestic plus foreign) and leads to a *Rybczynski effect*. Sector 2 expands and sector 1 contracts, as the former sector is capital-intensive. As the higher wage-paying sector expands, both in terms of output and employment, the aggregate wage income of the workers increase.¹³ This we call the *labour reallocation effect* that works positively on social welfare and is captured by the first term in the right-hand side of equation (17). On the other hand, an expansion of sector 2 leads to further misallocation of economic resources, lowers volumes of trade thereby exerting a downward pressure on welfare. This is the cost of the tariff protection of the supply side.¹⁴ This can alternatively be explained as follows. Because the protected sector expands the volume of import of commodity 2 falls. This lowers the aggregate tariff revenue and hence the lump-sum transfer payments to consumers. This in turn lowers national income at domestic prices and produces an adverse effect on national welfare. We call it the *tariff revenue effect* that affects welfare adversely. This effect is captured by the second term in the right-hand side of equation (17). Welfare improves if the positive *labour reallocation effect* dominates over the negative *tariff revenue effect*.¹⁵

¹² There can be other sufficient conditions under which the policy of trade liberalization might be welfare-worsening.

¹³ Note that the labour-output ratio, a_{L2} has not changed as factor prices have not changed. So, an expansion of sector 2 implies an increase in aggregate employment, $a_{L2}X_2$ in this sector.

¹⁴ As the output of the tariff-protected sector rises the deadweight loss to the society due to further misallocation of economic resources goes up thereby lowering social welfare.

¹⁵ The possibilities of welfare gain in developing economies due to FDI have also been demonstrated by Marjit and Beladi (1996) and Chaudhuri (2007, 2014) among others.

A policy of trade liberalization, on the other hand, lessens t and hence the tariff-inclusive domestic price of commodity 2, i.e. P_2^* . This lowers r and raises W and hence W^* through the *Stolper-Samuelson effect*. However, the higher wage-paying sector contracts both in terms of output and employment due to a *Rybczynski type effect* that follows the *Stolper-Samuelson effect*.¹⁶ Thus, there are two components of the *labour reallocation effect*. As the two wage rates increase the aggregate wage income increases. On the contrary, as the higher (lower) wage-paying sector contracts (expands) the aggregate wage income goes down. The net effect is, however, ambiguous. Finally, the consumers would be consuming more of commodity 2 leading to a decrease in cost of tariff protection of the demand side that works positively on welfare. Besides, as the protected sector contracts the efficiency of allocation of economic resources also improves. The cost of protection of the supply side decreases which also works favourably on welfare. If the net *labour reallocation effect* is negative and is stronger than the combined positive effect of the last two effects, welfare decreases due to trade liberalization. See equation (18).

From (7) we find that the higher the bargaining strength of the labour unions i.e. the value of U the larger would be the intersectoral wage differential, $(W^* - W)$. Then, from equations (17) and (18) it follows that the strength of the *labour reallocation effect* and hence the possibility of obtaining unconventional results increase with an increase in U .

In the absence of any labour market imperfection, there is no trade unionism in the formal sector labour market. In such a situation we have $U = 0$. Then from equation (7) it follows that $W^* = W$. Then the model boils down to the standard Heckscher-Ohlin-Samuelson (HOS) model. There is no *labour reallocation effect*. The first terms in the right-hand sides of equations (17) and (18) vanish and we get the following standard results: an inflow of foreign capital definitely

¹⁶ A *Rybczynski type effect* takes place following a *Stolper-Samuelson effect* if the technologies of production are of the variable coefficient type. This is a well-known result in the theory of international trade.

worsens welfare.¹⁷ On the other hand, a policy of trade liberalization unambiguously improves social welfare. This leads to the following proposition.

Proposition 2: In the absence of any trade unionism in the formal sector labour market, investment liberalization (trade liberalization) unequivocally worsens (improves) social welfare.

4. Concluding remarks

In this paper, we have considered a 2x2 full-employment model with labour market distortion where the intersectoral wage differential is explained in terms of collective wage bargaining in the formal sector industry with an eye to examine how the presence of labour unions can affect the welfare consequences of trade and investment reforms in the developing countries. We have demonstrated that the outcomes of these policies crucially hinge on the degree of imperfection prevailing in the labour market which is positively related to the bargaining strength of the trade unions. Our results provide theoretical answers to certain important questions like why developing countries are yearning for foreign capital despite the standard immiserizing result and why they are not reducing their tariff rates beyond certain levels even after choosing free trade as their development strategy.

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¹⁷ This is the standard Brecher-Alejandro (1977) result.

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