FDI and Credit Market Reform in a Developing Economy: Could these be Alternative Policies?

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Abstract: This paper examines the welfare consequences of foreign direct investment (FDI) flows and credit market reform in a small open developing economy using a 2×2 general equilibrium model both in the presence and in absence of unemployment. Both the input markets, labour and capital, are distorted, as observed in the developing countries. Besides, there is a tariff on the import-competing sector, which creates commodity market distortion. First, we have considered a full-employment case. Then the basic model has been extended to include the Harris-Todaro (1970) type unemployment of labour. The possibility of welfare improvement due to FDI has been found in the full-employment case although this possibility decreases with labour market reform. On the other hand, the policy of credit market reform might also be desirable from the perspective of social welfare. On the contrary, FDI not only worsens welfare but also aggravates the urban unemployment problem. Nevertheless, credit market reform unequivocally improves welfare and mitigates the unemployment problem. These results are also valid in a 2×3 specific factor Harris-Todaro structure. Considering all the three cases, credit market reform seems to be a superior policy option relative to the liberalized investment policy. The results could be important for policymaking in the developing countries like India.

Keywords: FDI; Credit Market Reform; Factor Market Distortion; Urban unemployment; Social welfare; Developing countries; General equilibrium.

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1. Introduction

Capital scarcity has been considered to be one of the root causes for underdevelopment in the developing countries. Because of capital scarcity the magnitude of capital formation is low that is responsible for slow growth rate in these countries. Although the attitude towards foreign capital was negative in the developing countries, the view changed dramatically in the post-reform period. The theoretical foundation of the cynical attitude towards foreign capital was provided by the famous "Brecher-Alejandro (1977) proposition". According to this proposition in the presence of a tariff on the capital-intensive import-competing sector in an otherwise Hechscher-Ohlin-Samuelson (HOS) system, FDI flows with full repatriation of foreign capital income lead to deterioration of national welfare. Here welfare is measured as a positive function the national income. However, in a developing economy like India, one comes across different types of imperfection prevailing in the both factor and commodity markets. Hence, these countries are denied the first-best i.e. the Pareto optimal equilibrium. In such a situation, any policy change designed to improve social welfare may fail to produce the expected outcome.

In the literature, the Brecher-Alejandro proposition has also been re-examined in terms of three-sector models. The third sector may either be an exports sector as in the works of Beladi and Marjit (1992a, 1992b) or it may be an urban informal sector as in the works of Grinols (1991) and Chandra and Khan (1993). The work of Beladi and Marjit (1992a) is a simple three-sector extension of the Heckscher-Ohlin-Samuelson framework where the third sector, an exports sector, uses sector-specific capital that is foreign owned. They have shown that with full-repatriation of foreign capital income, foreign direct invest (FDI) flows may lead to immiserizing growth in the presence of tariff-distortion even if the foreign capital is employed in the exports sector. This generalizes the main result in the existing literature, which primarily focuses on foreign capital inflows in the protected sector of the economy.

Beladi and Marjit (1992b) in terms of a three-sector, four-input model have depicted an interesting scenario where immiserizing growth may take place even without tariff distortion. In this model, this occurs due to an increase in unemployment of unskilled labour arising out of the

government's minimum wage legislation. Consequently, unskilled employment and thus aggregate wage income and welfare may fall due to FDI. They have also derived the specific conditions subject to which FDI lowers welfare even in the absence of an import tariff.

As the developing countries are plagued with rural-urban migration and labour market distortion, some attempts have been made to examine the welfare consequence of FDI flows inflow using a Harris-Todaro (1970) framework. For example, Khan (1982) has considered a generalized mobile-capital Harris-Todaro model with urban unemployment. A third sector, called an urban informal sector, has been introduced in the work of Chandra and Khan (1993). The immiserizing result of FDI flows in the presence of a tariff has been found to be valid in general despite the presence of an additional sector.[1]

On the other hand, Gupta (1997) has re-examined the Chandra and Khan (1993) model under various types of migration equilibrium conditions and has shown that the Brecher-Alejandro Proposition may lose its validity under some sufficient conditions. Chaudhuri (2005) has shown that in a 2x2 decomposable production structure with labour market distortion, the conventional immiserizing effect of FDI might be violated and welfare might improve under some reasonable conditions. Chaudhuri (2003, 2007, 2014) and Marjit and Beladi (1996) are some of the other important works in this area.

The first question that comes to mind is how this standard result of "immiserizing growth" with FDI would change in the context of a developing economy that is plagued with different types of distortion. These deviations are by no means limited to only a handful of sectors: they are structural and economy-wide, covering both product markets as well as factor markets. In our paper, we concentrate on three types of distortion, labour market, capital market and commodity market distortions.

Not only the labour market but also the capital (working capital) market are distorted. Although the production units in the formal manufacturing sector have access to the organized credit

[1] Grinols (1991) is, of course, a notable exception. Grinols (1991) in terms of a three-sector specific factor indecomposable system with an urban informal sector and Harris-Todaro setting has argued that FDI flows in the presence of a capital-intensive and tariff-protected import-competing sector is not necessarily immiserizing. This is because of an increase in the return to the sector-specific input, which may outweigh the increased cost of tariff protection resulting from an expansion of the protected sector.

market and borrow funds at the competitive interest rate, from the empirical studies like that of Sarap (1991) it is evident that the small and marginal farmers in the agricultural sector (informal sector) face credit constraint in the formal credit market.[2] , [3] Consequently, they have to rely heavily on the informal credit market, comprising of traditional moneylenders, landlords, traders etc. who charge exorbitantly high interest rates consisting of both explicit and implicit charges.

Unfortunately, none of the theoretical works discussed above have taken into account all of the three distortions i.e. labour market distortion, capital market distortion and commodity market distortion together to examine the welfare consequence of FDI. Besides, these papers also do not study the outcome of the credit market reform that lowers capital market (working capital) imperfection on social welfare in the presence of trade and labour market distortions. Furthermore, how the results differ in situations with or without involuntary unemployment of labour. In the present work, we have attempted to fill up these vacuums in the theoretical literature with the help of three two-sector general equilibrium models both in the presence and absence of unemployment of labour where all of the above types of distortions coexist. Besides, we have examined the consequences of credit market reform both on welfare and unemployment problem in the two models with unemployment. We have found that credit market reform is a better policy option to the government relative to the policy of promoting economic growth through FDI from the perspectives of both social welfare and unemployment problem. The analysis leads to a couple of interesting results, which have important policy implications in the context of the developing economies.

2. The Model

We consider a two-sector-two factor full-employment model for a small open developing economy with both capital (K) and labour (L) markets distortion. Sector 1 is the informal sector that produces the exports good (an agricultural commodity) while sector 2, is the formal

[2] See Basu (1984, 1998). Also, see All India Debt and Investment Survey, Various Issues. Website: **https://rbi.org.in/Scripts/BS_SpeechesView.aspx?Id=990.**

[3] In the present work, no distinction has been made between working capital and physical capital are indistinguishable. The former can be costlessly converted into the latter.

sector which produces the imports good (a manufacturing commodity) and is protected by an import tariff, t. Owing to the small open economy assumption, the prices of both the commodities are determined internationally. We assume that sector 2 is more capital-intensive vis-à-vis sector 1 in value terms. There exists distortion in both labour and capital markets. Labour in sector 2 earns a unionized wage, W^* while the remaining workers employed in sector 1 earn the low competitive wage, W. Both the sectors use the same type of capital but the rate of return to capital in sector 1 is R which higher than the rate of return to capital in sector 2, r. Production functions exhibit constant returns to scale with diminishing marginal productivity to each factor. The factors of production, labour and capital are fully employed.

The following symbols will be used in the formal presentation of the model: a_{ji} is the amount of j th input required to produce one unit of output of the i th sector with $i = 1, 2$; and, $j = L, K$ P_i is the world price of the i th commodity; t is the ad-valorem rate of tariff on the import of commodity 2. $\bar{K}_D$ and K_F denote the (exogenously given) domestic capital stock and foreign capital stock, respectively. K is the aggregate capital stock of the economy. We assume that domestic capital and foreign capital are perfect substitutes so that $K = (\bar{K}_D + K_F)$. Due to foreign direct investment (FDI), K_F and hence K would increase. Because commodity prices are internationally given we use national income at domestic prices, Y as the measure of social welfare. Commodity 1 is taken to be the numeraire.

The general equilibrium model is represented by the following set of equations:

$$a_{L1}W + a_{K1}R = 1 \qquad (1)$$

$$a_{L2}W^* + a_{K2}r = P_2(1+t) \qquad (2)$$

$$a_{L1}X_1 + a_{L2}X_2 = L \qquad (3)$$

$$a_{K1}X_1 + a_{K2}X_2 = \bar{K}_D + K_F = K \qquad (4)$$

Equations (1) and (2) are the zero- profit conditions of sectors 1 and 2 respectively. Equations (3) and (4) are the two full employment conditions for labour and capital respectively.

While the producers in sector 1 faces an imperfect capital and borrows capital (working capital) at the high informal interest rate, R, the producers in the formal sector (sector 2) receive credit from the organized credit market at the low market interest rate, r. The two interest rate, R and r are related by the following equation.

$$R = \beta r, \text{ with } \beta > 1 \qquad (5)$$

$\beta > 1$ signifies the existence of credit market imperfection.[4] On the other hand, workers employed in the formal sector (sector 2) receive a higher institutionally fixed wage, W^* which is higher than what their compatriots receive in the informal sector (sector 1), W. This suggest that that sector 2 faces an imperfect labour market. Finally, the presence of an import tariff on the imports of commodity 2 signifies commodity market distortion. Hence, in all in this model there are three types of distortion: labour market, capital market and product market distortions. $\bar{K}_D$ and K_F respectively denote domestic capital stock (exogenously given) and foreign capital stock and domestic capital and foreign capital are perfect substitutes.

There are five endogenous variables W, R, r, X_1, X_2 along with five equations.

Using equation (5) equation (1) may be re- written as follows:

$$a_{L1}W + a_{K1}\beta r = 1 \qquad (1.1)$$

Since W^*, P_2 and t are given, r is determined from equation (2). R is obtained from equation (5). W can be found from equation (1.1). Then the a_{ji}s are determined as these are functions of the input price ratios. Finally, X_1 and X_2 are simultaneously obtained from equations (3) and (4). This completes the working of the model.

It is assumed that the import-competing sector (sector 2) is more capital-intensive vis-à-vis the exports sector (sector 1) in both value and physical senses. This implies that

[4] This is a very simplified way of introducing capital market imperfection in a general equilibrium model. Marjit and Acharya (2003) and Chaudhuri (2003) etc. have used this simple technique in their works. However, for a rigorous technique of informal interest rate determination starting from the optimizing behavior of the informal sector lender in a general equilibrium setting see Chaudhuri and Gupta (2014).

$\frac{\theta_{K2}}{\theta_{L2}} > \frac{\theta_{K1}}{\theta_{L1}}$ and $\frac{\lambda_{K2}}{\lambda_{L2}} > \frac{\lambda_{K1}}{\lambda_{L1}}$. Here θ_{ji} and λ_{ji} denote the distributive and the allocative shares of the j th input in the i th sector, respectively with $j = L, K$ and $i = 1, 2$.

National income at domestic prices is given by [5]

$$Y = X_1 + P_2^* X_2 + tP_2 M - rK_F \tag{6}$$

Foreign capital income, rK_F is assumed to be fully repatriated. tP_2M measures the tariff revenue which is collected by the governments and is transferred to the consumers in a lump sum fashion.

The volume of imports of commodity 2, denoted M is given by the following.

$$M = \underset{(-)}{((1+t)P_2, Y)} - \underset{(+)}{X_2} \tag{7}$$

2.1 Welfare consequence of FDI

We are now going to analyze the consequence of FDI flows on the welfare of our economy that plagued with three types of distortion.

Differentiating equations (1.1), (2) – (4) and (6) and simplifying we can derive the following expression.[6]

$$(\frac{dY}{dK}) = V\left[a_{L1}\{(W^* - W)a_{L2} - tP_2\} - (R - r)a_{L2}a_{K1}\right]\underset{(+)}{(\frac{X_1 X_2}{|\lambda| KL})} \tag{8}$$

[5] National Income at domestic prices is considered in various studies as a measure of social welfare in a small open economy when, of course, there are no changes in the level of tariff and/or world prices of the two commodities. See Chaudhuri and Mukhopadhyay (2014) in this context.

[6] This has been derived in the Appendix 1.

Here $|\lambda| = (\lambda_{K2}\lambda_{L1} - \lambda_{K1}\lambda_{L2}) > 0$ because sector 2 is more capital-intensive relative to sector 1 is physical sense. $V = \frac{1+t}{1+t(1-m)}; 1 > m > 0$; and, m is the marginal propensity to consume commodity 2 out of national income i.e. $m = P_2^* \frac{\partial D_2}{\partial Y} > 0$

From (8) the following proposition readily follows.

Proposition 1: Welfare of the economy improves owing to foreign capital in the presence of tariff iff $[a_{L1}tP_2 + (R-r)a_{L2}a_{K1}] < [(W^* - W)a_{L1}a_{L2}]$.

Proposition 1 can be intuitively explained in the following manner. FDI flows lead to an expansion of the formal sector (sector 2) and a contraction of the informal sector (sector 1) due to Rybczynski effect. Because the import-competing sector expands, the volume of imports decreases that in turn lowers the tariff revenue. We call this the *tariff revenue effect*. On the other hand, as the higher wage paying sector (formal sector) expands at the cost of lower wage paying sector (informal sector) the aggregate wage income rises. This positive effect on welfare is known as *labour reallocation effect.*

The presence of capital market distortion exerts a negative effect on social welfare. This is due to the existence of interest rate differential between the two sectors: as the higher rental-generating sector contracts, national welfare falls. This we call the *capital reallocation effect.* Thus, in the presence of all the distortions the level of social welfare deteriorates due to FDI only if the sum of the magnitudes of *capital reallocation effect and tariff revenue effect* dominate over the *labour market reallocation effect.*

2.2 Credit market reform and welfare

In this model due to the existence of credit market imperfection, farms in sector 1 face a higher cost of credit, R than what the firms in sector 2 face, r. Both the rental rates are interconnected

$R = \beta r \quad ; \quad \beta > 1$

by the relationship, about which we discussed earlier. If the government undertakes a policy of credit market reform e.g. through supplying credit to the farms at a subsidized rate, the monopoly power of the informal sector lender falls that could captured through a reduction in the value of β.

For examining the welfare consequence of the credit market reform, after differentiating equations (1a), (2) – (4) and (6) the following expression can be derived.[7]

$$(\frac{dY}{d\beta}) = V[\{(W^* - W)a_{L2} - tP_2\} - (R - r)a_{K2}](\frac{X_2\lambda_{L1}\lambda_{K1}B}{\beta|\lambda|}) \qquad (9)$$

(+)

From (9) it follows that $(\frac{dY}{d\beta}) < 0$ iff $\{(W^* - W)a_{L2} - tP_2\} < (R - r)a_{K2}$ (10)

From (9) the following two results also follow.

(i) $(\frac{dY}{d\beta}) < 0$ if $(W^* - W)a_{L2} \le (R - r)a_{K2}$ (11)

(ii) $(\frac{dY}{d\beta}) < 0$ if $(W^* - W)a_{L2} \le tP_2$ (12)

This leads to the following proposition.

***Proposition 2*:** The policy of credit market reform improves social welfare iff $\{(W^* - W)a_{L2} - tP_2\} < (R - r)a_{K2}$. Welfare also improves either if $(W^* - W)a_{L2} \le (R - r)a_{K2}$ or if $(W^* - W)a_{L2} \le tP_2$.

Let us explain proposition 2 in the following fashion.

[7] For detailed derivation, see the Appendix 1.

The policy of credit market reform directly lowers the informal interest rate, R. Consequently, the informal sector wage rate, W rises although it does not affect the formal interest rate, r. Producers in sector 1 would substitute labour by cheaper capital. Consequently, the production technique becomes more capital-intensive resulting in a decrease in a_{L1} and an increase in a_{K1}. At given X_1 and X_2 there would occur am excess supply of labour that would lead to a Rybczynski type effect. Hence, sector 1 expands while sector 2 contracts both in terms of output and employment of labour.[8] Since labour now moves from the higher wage-paying sector 2 to the lower wage-paying sector 1, the aggregate wage income must falls. This is the labour reallocation effect that works negatively on welfare. It is to be noted that as $R > r$, the aggregate rental income increases. This is our capital reallocation and in this case that works favourably on social welfare. Finally, because the tariff-protected import-competing sector (sector 2) contracts, the volume of imports increase resulting in an increase in the aggregate tariff revenue that the consumers receive as transfer payments. Hence, the tariff revenue also works positively on welfare. Now if the sum of capital reallocation effect and the tariff revenue effect dominates over the negative labour reallocation effect social welfare improves. Now, it should be noted that if either the capital reallocation effect or the tariff revenue effect of its own outweighs the labour reallocation effect national welfare increases.

If we now compare between propositions 1 and 2 we find that in the case of FDI flows, the labour reallocation effect produces a favourable impact on national welfare while the capital reallocation effect and/or the tariff revenue effect produces a negative effect. However, in the case of credit market reform both the capital reallocation effect and the tariff revenue effect generate upward pressure on social welfare while the labour reallocation effect works unfavourably.

3. The extended model with Harris-Todaro type unemployment

We now intend to examine the robustness of the results obtained in the full-employment case in the presence of Harris-Todaro (HT henceforth) type unemployment. Let us consider the 2×2 mobile capital version Harris-Todaro model, which is known as the Corden and Findlay (1975) model.

[8] See the Appendix 1.

The equational structure of the model is as follows.

$$Wa_{L1} + \beta r a_{K1} = 1 \quad (13)$$

$$a_{L2}W^* + r a_{K2} = P_2(1+t) \quad (14)$$

$$a_{L1}X_1 + a_{L2}X_2 + L_U = L \quad (15)$$

$$a_{K1}X_1 + a_{K2}X_2 = \bar{K}_D + K_F = K \quad (16)$$

Here equations (13) and (14) are the two zero-profit conditions for the two sectors: rural and urban. The rural sector faces an imperfect capital market where the interest rate is βr with $\beta > 1$. The wage in the urban sector is exogenously fixed at W^* while the rural wage rate is W with $W^* > W$. Because of the existence of intersectoral wage differential migration of labour from the rural sector to the urban sector takes place. The urban sector (sector 2) is assumed to be more capital-intensive relative to the rural sector (sector 1) in value sense. Capital is fully utilized (equation 16). On the other hand, there is unemployment of labour in the urban sector that we denote by L_U. The labour endowment equation is given by equation (15). Finally, the HT migration equilibrium condition is given by the following.

$$W^*\left(\frac{a_{L2}X_2}{a_{L2}X_2 + L_U}\right) = W \quad (17)$$

Using (15) the above HT migration equilibrium condition is rewritten as follows.

$$a_{L1}X_1 + \left(\frac{W^*}{W}\right)a_{L2}X_2 = L \quad (17.1)$$

The expression for national income at domestic prices and the volume of imports of commodity 2 are once more given by equations (6) and (7), respectively.

$$Y = X_1 + P_2^* X_2 + tP_2 M - rK_F \quad (6)$$

$$M = \underset{(-)}{((1+t)P_2, Y)} - \underset{(+)}{X_2} \quad (7)$$

This system satisfies the decomposition property. r is obtained from (14) because W^* is given. Then, W is found from equation (13). Hence, factor prices depend only on commodity prices. Once factor prices are known the input-coefficient, a_{ji}s are also known. The levels of

production of the two commodities, X_1 and X_2 are solved simultaneously from (16) and (17.1). Finally, the urban unemployment level, L_U is found from equation (15).

It is important to mention that any HT structure satisfies a special property, called 'envelope property'. As per this property the average wage of all of the workers in an HT economy is equal to the rural sector wage, W. In other words, the aggregate wage income is equal to WL. It can be easily proved from equation (17.1).[9] Hence, the aggregate wage income of all workers in an HT economy, WL does not change unless the rural sector wage, W changes.

3.1 Policy Effects on Social Welfare and Urban Unemployment

Differentiating equations (13), (14), (16), (17.1), (6) and (7) the following propositions can easily be proved.[10]

Proposition 3: FDI flows unambiguously worsen social welfare while credit market reform improves welfare unequivocally.

Proposition 4: The magnitude of urban unemployment of labour definitely rises (falls) following FDI flows (credit market reform).

We explain proposition 3 and proposition 4 as follows. FDI flows cannot affect the factor prices because of the decomposition property of the production structure. The capital-intensive sector 2 expands while the labour-intensive sector 1 contracts due to the Rybczynski effect. Both labour and capital reallocations take place. But, despite labour reallocation the aggregate wage income does not change because the rural sector wage does not change.[11] On the contrary, because sector 1 contracts while sector 2 expands, capital moves out from the sector where the

[9] A simple manipulation of equation (17.1) yields that $(Wa_{L1}X_1 + W * a_{L2}X_2) = WL$.

[10] See Appendix 2.

[11] We recall that an HT structure satisfies the 'envelope property' that states that the average wage of all workers in an HT economy is equal to the rural sector wage. Hence, the aggregate wage income cannot change unless the rural sector wage, W changes.

interest rate is higher to the sector where the interest rate is lower. Hence, because of capital reallocation the aggregate domestic capital income falls. This is the negative capital reallocation effect (CRE) that lowers social welfare, measured in terms of national income at domestic prices. On the other hand, because the import-competing sector (sector 2) expands, the volume of imports and hence the tariff revenue that the consumers receive as transfer payments would fall. This is the tariff-revenue effect (TRE) that also works unfavourably on welfare. Hence, national welfare unambiguously worsens because of FDI flows.

On the other hand, credit market reform lowers the informal interest rate, βr although it does not affect the formal interest rate, r. This raises the rural sector wage, W (see equation 13) and hence the aggregate wage income of the workers in the economy. This is the labour reallocation effect that works favourably on welfare. The wage-rental ratio rises in the rural sector that leads to substitution of labour by capital. Hence, labour-output ratio, a_{L1} falls while the capital-output ratio, a_{K1} rises. At the initial levels of outputs i.e. X_1 and X_2 there arises a shortage of capital. This would lead to a Rybczynski type effect. Consequently, sector 2 contracts while sector 1 expands. The aggregate capital income definitely rises.[12] Hence, capital reallocation effect also exerts an upward pressure on national welfare. Finally, since the tariff-protected import-competing sector (sector 2) contracts, the volume of imports of commodity 2 rises that in turn raises the tariff revenue. Therefore, the consumers receive a higher amount of transfer income. This is the tariff revenue effect that also works on social welfare positively. Hence all the three effects, the LRE, the CRE and the TRE work in the same direction thereby improving social welfare unambiguously.

The effects on urban unemployment (proposition 4) can be intuitively explained as follows. FDI expands the urban sector both in terms of output and employment.[13] This increases the expected income of each worker in the urban sector. Because the rural sector wage, W has not changed, the expected urban wage rises above the rural wage which in turn causes a migration from the rural sector to the urban sector. Because the number of workers leaving the rural sector is

[12] See Appendix 2.

[13] Note that the input-coefficients in sector 2 i.e. a_{L2} and a_{K2} do not change because FDI cannot affect factor prices. Hence, the level of employment in sector 2, $a_{L2}X_2$ as sector 2 contracts.

greater than the number of posts created in the urban sector, the level of urban unemployment rises. On the other hand, credit market reform raises W but contracts the urban sector both in output and employment. The urban unemployment situation unambiguously improves following exodus of workers from the urban sector.

Hence, in the two-sector, two-factor mobile capital version of the HT model (Corden and Finday 1975 structure) we find that credit market reform is strictly preferable to the liberalized investment policy from the perspectives of both welfare and unemployment problem.

4 The Beladi and Naqvi (1988) type HT Structure

The applicability of the Corden and Findlay (1975) structure to the field of trade and development is restricted due to two undesirable properties of this structure. It is easy to check from the previous production structure that a growth in capital (labour) endowment worsens (improves) the urban unemployment problem of labour following the Rybczynski effect and the consequent impact on the expected urban wage although capital scarcity (overpopulation problem) is conventionally held responsible for the existence of involuntary unemployment in the developing countries.

Beladi and Naqvi (1988) by introducing a specific factor, (say, land) in the rural sector could solve the problem at least partially.[14] Let us now examine the robustness the results of our previous models even using their production structure, which is as follows.[15]

$$Wa_{L1} + R^* a_{N1} + \beta r a_{K1} = 1 \qquad (18)$$

$$a_{L2} W^* + r a_{K2} = P_2(1+t) \qquad (14)$$

$$a_{L1} X_1 + a_{L2} X_2 + L_U = L \qquad (15)$$

$$a_{K1} X_1 + a_{K2} X_2 = \bar{K}_D + K_F = K \qquad (16)$$

[14] In Beladi and Naqvi (1988), the effects of factor accumulation on the absolute level of urban unemployment remain ambiguous although the rate of urban unemployment decreases (increases) following capital accumulation (growth in workforce).

[15] Note that following is the Beladi and Naqvi (1988) structure with both capital market imperfection and foreign capital.

$$a_{N1}X_1 = N \tag{19}$$

$$a_{L1}X_1 + (\frac{W^*}{W})a_{L2}X_2 = L \tag{17.1}$$

$$Y = X_1 + P_2^* X_2 + tP_2 M - rK_F \tag{6}$$

$$M = ((1+t)P_2, Y) - X_2 \tag{7}$$
$$\quad (-) \quad (+)$$

Here let us make a simplifying assumption that the capital-output ratio in sector 1, a_{K1} is technologically given.[16] All other standard assumptions including the one of constant returns to scale technologies of production continue to hold.[17]

Equation (18) is the new zero-profit condition for the rural sector (sector 1). Here a_{N1} and R^*, respectively denote the land-output ratio and the return to land. Equation (19) is the full-employment condition for the sector-specific input, land. The other equations of the previous model remain unaffected and hence do not require any further explanations.

This structure does not satisfy the decomposition property. r is once more found from (14). W, R^*, X_1 and X_2 are simultaneously obtained from equations (18), (16), (19) and (17.1). Hence, although r does not depend on factor endowments, the other two factor prices, W and R^* depend on both commodity prices and factor endowments. Sector 2 is more capital-intensive vis-à-vis sector 1 in value sense.

Let us now examine the policy effects on national welfare and the level of urban unemployment of labour.

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16 Although this is a simplifying assumption it is not completely without any basis. After the advent of the new seed-fertilizer technology in many of the developing economies including India, agriculture requires inputs e.g. HYV seeds, fertilizers, pesticides etc. that are to be used in recommended doses. Because these inputs are bought from the markets using working capital the assumption of fixed capital-output ratio seems to be justified.

17 The capital-output ratio in the rural sector (a_{K1}) has been assumed to be technologically given. However, the other two inputs, labour and land, exhibit CRS between themselves.

Differentiating equations (6), (7), (16), (19) and (17.1) the following expression can be derived.[18]

$$dY = V[(L - L_1)dW + (R - r)a_{K1}dX_1 - tP_2dX_2] \tag{20}$$

From (20) the following two results are imminent.

$$(\frac{dY}{dK}) = V[(L - L_1)(\frac{dW}{dK}) + (R - r)a_{K1}(\frac{dX_1}{dK}) - tP_2(\frac{dX_2}{dK})] \tag{21}$$
$$(+) \qquad (-) \qquad (+)$$

$$(\frac{dY}{d\beta}) = V[(L - L_1)(\frac{dW}{d\beta}) + (R - r)a_{K1}(\frac{dX_1}{d\beta}) - tP_2(\frac{dX_2}{d\beta})] < 0 \tag{22}$$
$$(-) \qquad (-) \qquad (+)$$

Following FDI flows, the return to capital in either of the two sectors does not change. Nevertheless, sector 2 expands while sector 1 contracts due to Rybczynski effect. The demand for the sector specific input, land decreases which lowers its return, $R*$. The demand for labour also decreases although the rural sector wage, W rises to satisfy the zero-profit condition in this sector (see equation 18).[19] That $R*$ decreases while W increases can be intuitively proved in another way. Sector 1 can contract only if the land-output ratio, a_{N1} increases because $(X_1 = \frac{N}{a_{N1}})$. Now, a_{N1} increases only if producers substitute labour by land which would be the case only when $R*$ falls and W increases. Hence, the aggregate wage income of the workers rises. This is the LRE that raises welfare. On the contrary, the aggregate income from domestic capital decreases because capital moves out of the sector (sector 1) where the interest rate is higher to the sector (sector 2) where this input price is lower. This is the CRE that works unfavourably on welfare. Finally, because the tariff-protected sector 2 expands, the volume of imports decreases which lowers the aggregate tariff revenue and hence the transfer payments to the consumers. This we call the TRE that also works negatively on social welfare. The net effect

[18] Interested readers can easily derive this expression following the techniques as provided in Appendix 1 and Appendix 2.

[19] Note that a lesser amount of labour is employed with the same amount of land that raises the value of marginal product of labour.

could be a welfare gain if the LRE is stronger than the combined effect of the CRE and the TRE.

On the other hand, credit market reform lowers the informal interest, βr in sector 1. Because the average cost of production falls, ceteris paribus, sector 1 must expand. This raises the demand for land (the sector-specific input) which in turn leads to an increase in the return to land, R^*. The demand for labour also rises that raises the rural sector wage, W. However, the rate of increase in R^* must be greater than that in W so that the $(\frac{R^*}{W})$ ratio must increase and a_{N1} falls. The LRE, thus, improves welfare. The aggregate income from domestic capital must also increase. This would be clear if we look at the second term in the right-hand side of (22). Therefore, the CRE would also be positive. Finally, sector 2 must contract because capital moves out of sector 2 and goes to the expanding sector 1. Note that the capital-output ratio in sector 1, a_{K1} is technologically fixed. Hence, the volume of imports rises. This raises the tariff revenue and hence the amount of transfer payments. Thus, the TRE also pushes up the national income at domestic prices. The result would be an unambiguous increase in national welfare.

Let us now explain the policy effects on urban unemployment. In the case of FDI flows, sector 2 expands both in terms of output and employment. This raises the expected urban wage. On the other hand, the rural sector wage, W has increased. Hence, there are two opposite effects and their relative strengths would ultimately determine the final outcome on urban unemployment, L_U. On the contrary, credit market reform leads to a contraction of sector 2 both in terms of output and employment which in turn would lower the expected urban wage. On the other hand, the rural sector wage, W has gone up. Therefore, both the effects work in the same direction and lead to an unambiguous decrease in L_U.

The above discussions lead to the following two propositions.

Proposition 5: While the welfare consequence of FDI flows is ambiguous in a Beladi and Naqvi (1988) type HT economy, credit market reform definitely improves social welfare.

Proposition 6: FDI flows might aggravate the urban unemployment situation. However, credit market reform unquestionably ameliorates the problem.

5. Concluding remarks and policy implications of results

This paper has primarily examined the welfare consequences of liberalized investment policy and credit market reform in a small open developing economy using three 2-sector general equilibrium structures with or without unemployment. There are labour market and capital market distortions. Besides, there is also a commodity market distortion in the form of tariff-protection of the import-competing sector. Farms in the agricultural sector (the informal sector) face a higher cost of credit but a lower cost of labour vis-à-vis the firms in the formal manufacturing sector. The domestic capital and foreign capital are perfect substitutes. Social welfare is measured in terms of national income at domestic prices. First, a 2×2 full-employment model has been employed. Subsequently, two different Harris-Todaro (HT) structures have been used for the analytical purpose. Apart from the welfare consequence, the policy effects on the magnitude of urban unemployment of labour have also been studied in the HT structures.

Three different effects on welfare, labour reallocation effect (LRE), capital reallocation effect (CRE) and tariff revenue effect (TRE) have been identified. The net effect on social welfare depends on the relative strengths and directions of these effects. Although in the full-employment case the welfare consequence of FDI flows (credit market reform) is ambiguous (positive), in the 2×2 mobile capital HT (Corden and Finday 1975) model welfare unquestionably worsens (improves). On the other hand, in the 2×3 HT (Beladi and Naqvi 1988) model, welfare might worsen (definitely improves) due to FDI policy (credit market reform).

The urban unemployment problem of labour unambiguously worsens (improves) owing to FDI policy (credit market reform) in the 2×2 HT model while the unemployment situation might worsen (unequivocally improves) following FDI flows (credit market reform) in the 2×3 HT model.

The results of this paper lead to some important policy implications for a small open developing economy like India. Because the production technologies in the two sectors, commodity prices, factor endowments are known to the government, it is possible for it to find out the strengths of the three effects, the LRE, the CRE and the TRE. Anyway, the most important result of this work is that credit market reform is distinctly a better policy option to the government

compared to the liberalized investment policy from the perspective of both social welfare and unemployment problem of labour.

However, the standard result is that in a small open distorted economy, the number of policy instruments and the number of distortions must be equal in order to reach the first best solution. Because there are three types of distortion in this economy, capital market, labour market and commodity market distortions, there should be three different policy instruments to tackle all types of distortion to guarantee improvement in economic efficiency and hence welfare. The credit market reform and labour market reform should be undertaken for removing imperfection in capital market and labour market, respectively. On the other hand, trade reform is resorted to deal with commodity market distortion. If all of these policies are simultaneously undertaken the country will move towards the first best solution i.e. the free trade situation which is the optimal policy for a small open economy.

Finally, it should be pointed out that it is a purely theoretical exercise because of which empirical verification of the results using rigorous econometric tools is completely beyond its scope and has, therefore been left out. Future empirical research should address these issues in detail.

Appendix 1: The Full-employment case

Totally differentiating equation (5) we get

$$\hat{R} = \hat{r} + \hat{\beta} \tag{A.1}$$

Here $\hat{r} = 0$

Differentiating equation (1) and using (A.1) we get

$$\theta_{L1}\hat{W} + \theta_{K1}\hat{R} = 0 \tag{A.2}$$

$$\hat{W} = -(\frac{\theta_{K1}}{\theta_{L1}})\hat{\beta} \tag{A.3}$$

$$\hat{a}_{L1} = S^1_{LL}\hat{W} + S^1_{LK}\hat{R} \tag{A.4}$$

$$\hat{a}_{K1} = S^1_{LK}\hat{W} + S^1_{KK}\hat{R} \qquad \text{(A.5)}$$

Here S^k_{ji} is the elasticity of the j th factor-coefficient in the k th sector with respect to the i th factor price for $k = 1, 2$ and $j, i = L, K$. For example, the elasticity of the labour-coefficient in sector 1, a_{L1} with respect to the return to capital, R denoted S^1_{LK} is $S^1_{LK} = (\frac{\partial a_{L1}}{\partial R}\frac{R}{a_{L1}})$. Similarly, the elasticity of a_{L1} with respect to the wage rate, W is $S^1_{LL} = (\frac{\partial a_{L1}}{\partial W}\frac{W}{a_{L1}})$. Because the production functions are homogenous of degree 1, the factor-coefficients are homogeneous of degree zero. Hence, we have $((S^1_{LL} + S^1_{LK}) = 0$. Also because the two factors are substitutes and because there is positive but diminishing marginal productivity of each factor we have $S^1_{LK} > 0$ and $S^1_{LL} < 0$. This also applies in the case of factor-coefficients in sector 2. Finally, '^' denotes proportional change. For example, $\hat{Z}$ means $\frac{dZ}{Z}$.

Putting the values of $\hat{W}$ and $\hat{R}$ in (A.4) and (A.5), we get

$$\hat{a}_{L1} = \hat{\beta}(\frac{S^1_{LK}}{\theta_{L1}}) \quad [\text{since } S^1_{LK} + S^1_{LL} = 0] \qquad \text{(A.6)}$$

$$\hat{a}_{K1} = -\hat{\beta}(\frac{S^1_{KL}}{\theta_{L1}}) \quad [\text{since } S^1_{KL} + S^1_{KK} = 0] \qquad \text{(A.7)}$$

Totally differentiating equation (3) we get

$$\lambda_{L1}\hat{X}_1 + \lambda_{L1}\hat{a}_{L1} + \lambda_{L2}\hat{X}_2 = 0 \qquad \text{(A.8)}$$

(Note that $\hat{W}^* = 0$ because W^* is exogenously given.)

$$\lambda_{L1}\hat{X}_1 + \lambda_{L2}\hat{X}_2 = -\lambda_{L1}\hat{a}_{L1}$$

or,

Using (A.6), we obtain

$$\lambda_{L1}\hat{X}_1 + \lambda_{L2}\hat{X}_2 = -(\frac{\lambda_{L1}S^1_{LK}}{\theta_{L1}})\hat{\beta} \qquad \text{(A.9)}$$

Similarly, totally differentiating equation (4) and using (A.7) we get

$$\lambda_{K1}\hat{X}_1 + \lambda_{K2}\hat{X}_2 = (\frac{\lambda_{K1}S^1_{KL}}{\theta_{L1}})\hat{\beta} + \hat{K} \qquad \text{(A.10)}$$

Arranging (A.9) and (A.10) in a matrix notation we find the following.

$$\begin{bmatrix} \lambda_{L1} & \lambda_{L2} \\ \lambda_{K1} & \lambda_{K2} \end{bmatrix} \begin{bmatrix} \hat{X}_1 \\ \hat{X}_2 \end{bmatrix} = \begin{bmatrix} -(\frac{\lambda_{L1}S^1_{LK}}{\theta_{L1}})\hat{\beta} \\ (\frac{\lambda_{K1}S^1_{KL}}{\theta_{L1}})\hat{\beta} + \hat{K} \end{bmatrix} \qquad \text{(A.11)}$$

Solving (A.11) we obtain

$$\hat{X}_1 = -[\frac{(\lambda_{K2}\lambda_{L1}S^1_{LK} + \lambda_{L2}\lambda_{K1}S^1_{KL})}{\theta_{L1}|\lambda|}\hat{\beta} + (\frac{\lambda_{L2}}{|\lambda|})\hat{K}] \qquad \text{(A.12)}$$

$$\hat{X}_2 = [\frac{\lambda_{K1}\lambda_{L1}(S^1_{LK} + S^1_{KL})}{\theta_{L1}|\lambda|}]\hat{\beta} + [\frac{\lambda_{L1}}{|\lambda|}]\hat{K} \qquad \text{(A.13)}$$

where $|\lambda| = (\lambda_{K2}\lambda_{L1} - \lambda_{L2}\lambda_{K1}) > 0$ because sector 2 is more capital-intensive relative to sector 1 in both value and physical senses.

The production functions in the two sectors are given by the two equations, respectively.

$X_1 = F_1(L_1, K_1)$

$X_2 = F_2(L_2, K_2)$

where, L_i and K_i, respectively denote the amount of labour and capital employed in the ith sector for $i = 1, 2$.

Now, $K_1 = a_{K1}X_1$; and, $K_2 = a_{K2}X_2$

$\hat{K}_1 = \hat{a}_{K1} + \hat{X}_1$

Putting the values of $\hat{a}_{K1}$ and $\hat{X}_1$ we get,

$$\hat{K}_1 = -\frac{\lambda_{K2}\lambda_{L1}B}{|\lambda|}\hat{\beta} - \frac{\lambda_{L2}\hat{K}}{|\lambda|} \qquad \text{(A.14)}$$

where, $B = \dfrac{(S^1_{LK} + S^1_{KL})}{\theta_{L1}}$

Similarly, $\hat{K}_2 = (\hat{a}_{K2} + \hat{X}_2) = \hat{X}_2 \quad (\because \hat{a}_{K2} = 0)$ (A.15)

Using (A.13) from (A.15) we can write

$$\hat{K}_2 = \frac{\lambda_{K1}\lambda_{L1}B}{|\lambda|}\hat{\beta} + \frac{\lambda_{L1}\hat{K}}{|\lambda|} \tag{A.16}$$

Now totally differentiating (6) and the production functions we get the following.

$dY = (F_1^L dL_1 + F_1^K dK_1) + P_2^*(F_2^L dL_2 + F_2^K dK_2) + tP_2 dM - rdK_F$

or, $dY = (WdL_1 + RdK_1) + (W * dL_2 + rdK_2) + tP_2 dM - rdK_F$

Using the relations, $(dL_1 + dL_2 = dL = 0)$ and $(dK_1 + dK_2 = dK_F)$ in the above expression and after simplification we obtain

$dY = (W^* - W)a_{L2}dX_2 + (R - r)dK_1 + tP_2 M$

or, $dY = (W^* - W)a_{L2}dX_2 + (R - r)dK_1 + tP_2(\dfrac{dD_2}{dY}dY - dX_2)$

or, $dY\left[1 - \dfrac{tP_2 m}{P_2(1+t)}\right] = (W^* - W)\,a_{L2}\,X_2\hat{X}_2 + (R - r)K_1\hat{K}_1 - tP_2X_2\hat{X}_2$

$$dY = V[\{(W^* - W)a_{L2} - tP_2\}X_2\hat{X}_2 + (R - r)K_1\hat{K}_1] \tag{A.17}$$

where, $V = \dfrac{1+t}{1+t(1-m)}; 1 > m > 0$; and, m is the marginal propensity to consume commodity 2 out of national income i.e. $m = P_2^* \dfrac{\partial D_2}{\partial Y} > 0$

Putting the values of $\hat{K}_1$ and $\hat{X}_2$ from (A.14) and (A.14) in (A.17), we get;

$$\begin{aligned} dY = V[\{(W^* - W)a_{L2} - tP_2\}(\frac{X_2}{|\lambda|})(\lambda_{K1}\lambda_{L1}B\hat{\beta} + \lambda_{L1}\hat{K}) \\ -(R - r)(\frac{K_1}{|\lambda|})(\lambda_{K2}\lambda_{L1}B\hat{\beta} + \lambda_{L2}\hat{K})] \end{aligned} \tag{A.18}$$

For finding out the change in welfare due to FDI, we shall have to consider the case where $\hat{\beta}=0$. Putting $\hat{\beta}=0$ and $\hat{K}>0$ in (A.18) and simplifying we obtain

$$(\frac{dY}{dK})=V[a_{L1}\{(W^*-W)a_{L2}-tP_2\}-(R-r)a_{L2}a_{K1}](\frac{X_1X_2}{|\lambda|KL}) \quad (+) \qquad (9)$$

Now, for finding out the welfare consequence of credit market reform we shall have to consider the case where $\hat{K}=0$ but $\hat{\beta}\neq 0$, Putting them in (A.18) and simplifying we finally arrive at the following.

$$(\frac{dY}{d\beta})=V[\{(W^*-W)a_{L2}-tP_2\}-(R-r)a_{K2}](\frac{X_2\lambda_{L1}\lambda_{K1}B}{\beta|\lambda|}) \quad (+) \qquad (10)$$

Appendix 2: The Harris-Todaro (Corden and Finday 1975) case

Differentiating equations (13) and (14) and keeping W^*, P_2 and t unchanged we get

$$\hat{W}=-(\frac{\theta_{K1}}{\theta_{L1}})\hat{\beta} \qquad (A.19)$$

Now differentiating equations (17.1) and (16), using (A.19) and solving we obtain the following expression.

$$\left.\begin{aligned}\hat{X}_1&=-(\frac{1}{|\Delta|})[(C\lambda_{K2}+D\lambda^*_{L2})\hat{\beta}+\lambda^*_{L2}\hat{K}]\\ \hat{X}_2&=(\frac{1}{|\Delta|})[(C\lambda_{K1}+D\lambda_{L1})\hat{\beta}+\lambda_{L1}\hat{K}]\end{aligned}\right\} \qquad (A.20)$$

$$\left.\begin{aligned}&\text{where: } C=[\frac{\lambda^*_{L2}\theta_{K1}+\lambda_{L1}S^1_{LK}}{\theta_{L1}}]>0;\ D=(\frac{\lambda_{K1}S^1_{KL}}{\theta_{L1}})>0\\ &\lambda^*_{L2}=(\frac{W^*}{W})\lambda_{L2}\text{; and, } \Delta=(\lambda_{L1}\lambda_{K2}-\lambda_{K1}\lambda^*_{L2})>0\end{aligned}\right\} \qquad (A.21)$$

Differentiating equation (6) and (7) and the production functions and simplifying we arrive at the following.

$$dY=V[WdL_1+W^*dL_2+RdK_1+rdK_2+tP_2dM-rdK_F] \qquad (A.22)$$

We rewrite equations (16) and (17.1) as follows.

$K_1 + K_2 = \bar{K}_D + K_F$; and, (A.23)

$L_1 + (\frac{W^*}{W})L_2 = L$ (A.24)

where K_i and L_i denote the amount of capital employed and the level of employment of labour in the i th sector, respectively for $i = 1, 2$.

Differentiating equations (A.23) and (A.24) and noting that $d\bar{K}_D$, $dL = 0$ we, respectively obtain

$dK_2 = (dK_F - dK_1)$ (A.25)

$(WdL_1 + W^* dL_2) = (L - L_1)dW$ (A.26)

With the help of (A.25) and (A.26) the expression (A.22) can be rewritten as follows.

$dY = V[(L - L_1)dW + (R - r)dK_1 - tP_2 dX_2]$ (A.27)

Now, $\hat{K}_1 = (\hat{a}_{K1} + \hat{X}_1) = S^1_{KL}(\hat{W} - \hat{\beta}) + \hat{X}_1$ (A.28)

Using (A.19) – (A.21) equation (A.28) can be rewritten as follows.

$\hat{K}_1 = -[(\frac{S^1_{KL}}{\theta_{L1}}) + \frac{(C\lambda_{K2} + D\lambda^*_{L2})}{|\Delta|}]\hat{\beta} - (\frac{\lambda^*_{L2}}{|\Delta|})\hat{K}$ (A.29)

From (A.29) the following two results are obtained.

$(\frac{dK_1}{d\beta}) = -(\frac{K_1}{\beta})[(\frac{S^1_{KL}}{\theta_{L1}}) + \frac{(C\lambda_{K2} + D\lambda^*_{L2})}{|\Delta|}] < 0$

$(\frac{dK_1}{dK}) = -(\frac{K_1\lambda^*_{L2}}{K|\Delta|}) < 0$ (A.30)

From (A.19) and (A.20) we can write the following three expressions, respectively.

$$\left.\begin{aligned}
&(\frac{dW}{d\beta}) = -(\frac{W\theta_{K1}}{\beta\theta_{L1}}) < 0 \;\; ; \;\; (\frac{dW}{dK}) = 0 \\
&(\frac{dX_2}{d\beta}) = (\frac{X_2}{\beta|\Delta|})[(C\lambda_{K1} + D\lambda_{L1})] > 0 \\
&\qquad\quad (+) \qquad (+) \\
&(\frac{dX_2}{dK}) = (\frac{\lambda_{L1}X_2}{K|\Delta|}) > 0 \\
&\qquad\quad (+)
\end{aligned}\right\} \qquad \text{(A.31)}$$

Now using (A.30) and (A.31) from (A.27) we finally arrive at the following two results.

$$\left.\begin{aligned}
&(\frac{dY}{dK}) = V[(R-r)(\frac{dK_1}{dK}) - tP_2(\frac{dX_2}{dK})] < 0 \\
&\qquad\quad (-) \qquad (+) \\
&(\frac{dY}{d\beta}) = V[(L-L_1)(\frac{dW}{d\beta}) + (R-r)(\frac{dK_1}{d\beta}) - tP_2(\frac{dX_2}{d\beta})] < 0 \\
&\qquad\quad (-) \qquad (-) \qquad (+)
\end{aligned}\right\} \qquad \text{(A.32)}$$

Let us now study the policy effects on urban unemployment

Subtracting (15) from (17.1) we obtain

$$\hat{L}_U = \lambda_{LU}\hat{X}_2 - \lambda^*_{L2}\hat{W} \qquad \text{(A.33)}$$

where $\lambda_{LU} = (\frac{L_U}{L}) > 0$

Using (A.19) and (A.20) from (A.33) the following two results trivially follow.

$$\left.\begin{aligned}
&(\frac{\hat{L}_U}{\hat{K}}) = [\lambda_{LU}(\frac{\hat{X}_2}{\hat{K}}) - \lambda^*_{L2}(\frac{\hat{W}}{\hat{K}})] > 0 \\
&\qquad\quad (+) \qquad (=0) \\
&(\frac{\hat{L}_U}{\hat{\beta}}) = [\lambda_{LU}(\frac{\hat{X}_2}{\hat{\beta}}) - \lambda^*_{L2}(\frac{\hat{W}}{\hat{\beta}})] > 0 \\
&\qquad\quad (+) \qquad (-)
\end{aligned}\right\} \qquad \text{(A.34)}$$

Hence, although FDI flows worsen the urban unemployment problem, credit market reform improves the situation.

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