

## **Immiserizing Growth in a Developing Economy Export Enclave**

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### **Abstract**

Using a general equilibrium model of a protected developing economy, we demonstrate that imperfect labor mobility may eliminate the possibility of immiserizing growth from foreign investment in an export enclave by allowing job creation to countervail losses in tariff revenue.

*Key words:* export enclaves; protection; immiserizing growth

*JEL classification:* F11; F13; F21; J60

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### **1. Introduction**

Many developing economies have established export enclaves with the objective of promoting development through the acquisition of technological capability and/or foreign direct investment. While the long-run effects of such a strategy are complex, adverse second-best complications may arise if the economy maintains protection. Beladi and Marjit (1992) present a model of an economy with an enclave, demonstrating that if a protected import-competing sector exists and the rents to foreign capital are repatriated, immiserizing growth occurs when the enclave expands. Their result extends the classic analyses of Johnson (1967) and Brecher and Diaz-Alejandro (1977). Beladi et al. (1998) further show that urban unemployment, typical in developing economies, does not alter the case for immiserization.

Several recent papers provide interesting challenges to this line of argument. All consider second-best features that can countervail the tariff revenue losses that drive immiserization. Marjit et al. (1997) consider multi-level production, Dehejia and Weichenreider (2001) domestic capital taxes, and Gilbert and Tower (2002) imperfect labor mobility. The latter is particularly important in some developing economies and may reflect variations in the geographic distribution of the population, the psychic costs of migration, or direct intervention. A compelling example of the latter is provided by China, which has maintained a policy of

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restricting labor movement out of rural areas (Zhao, 1999), has been active in setting up “special economic zones” (Ge, 1999; Wei, 2000), and has been a major recipient of foreign direct investment (Zhao, 2001).

This paper introduces imperfect labor mobility to a model of a developing economy with an export enclave following the basic structure of Beladi and Marjit (1992) in terms of specification of the enclave and Gilbert and Tower (2002) in terms of the developing economy features. The results suggest that the occurrence of immiserization in this context is directly related to the ability of labor to move out of rural activities. Most strikingly, restricting labor movement out of rural employment entirely eliminates the possibility of immiserizing growth arising from foreign investment into an enclave, irrespective of whether or not rents are repatriated.

## 2. The Model

Consider a small, protected, developing economy producing three goods in two regions. Let  $X$  be an agricultural good produced in the rural region. Let  $Y$  represent an import-competing manufactured good produced in the urban region. Finally, let  $Z$  be an urban export enclave. The production functions are twice continuously differentiable, strictly concave, and linearly homogeneous. This production structure follows Beladi and Marjit (1992). The distinction between urban and rural regions follows Harris and Todaro (1970) in that labor in  $X$  earns a competitive wage but in  $Y$  and  $Z$  earns an institutionally fixed wage, a consequence of which is unemployment. A distinction is made between the capital used in  $X$  and  $Y$  and that used in the enclave, again following Beladi and Marjit (1992). The latter is qualitatively different and wholly owned by foreign interests. Following Corden and Findlay (1975), domestic capital is mobile between  $X$  and  $Y$ , equating the domestic rent. Rents to foreign capital are repatriated. The model can be expressed as follows:

$$c_x(w, r) = p_x = 1 \quad (1)$$

$$c_y(\bar{w}, r) = p_y \quad (2)$$

$$c_z(\bar{w}, r^*) = p_z \quad (3)$$

$$a_{kz}Z = K^* \quad (4)$$

$$a_{kx}X + a_{ky}Y = K \quad (5)$$

$$\pi a_{lx}X + a_{ly}Y + a_{lz}Z = \pi L \quad (6)$$

$$w = \pi \bar{w} - \rho \quad (7)$$

$$\varepsilon = [(1 - \beta)(\hat{a}_{ly} + \hat{Y}) + \beta(\hat{a}_{lz} + \hat{Z}) - \hat{\pi}] / \hat{\rho}. \quad (8)$$

Equations (1)–(3) are the zero profit conditions, expressed in terms of the unit cost functions  $c_i$ . Given output prices ( $p_i$ ) and the urban wage ( $\bar{w}$ ), the returns to rural labor, domestic, and foreign capital ( $w$ ,  $r$ , and  $r^*$ , respectively) are determined uniquely by (1)–(3). We choose  $p_x$  as the numéraire. Once factor prices are known, the per unit factor demands ( $a_{ji}$ ) follow from the derivative properties of the unit

cost functions (hence  $a_{LX} = \partial c_x / \partial w$ , and so on). Equations (4)–(6) then define the resource constraints, where  $L$  represents the total labor endowment,  $K$  represents the capital endowment (an asterisk distinguishes domestic and foreign capital), and  $\pi$  is the rate of urban employment (the ratio of labor employed in  $Y$  and  $Z$  to total labor in the urban region).

Equation (7) is the labor market equilibrium condition, which equates the rural wage to the urban wage deflated by the urban employment rate, less the cost of migration for the marginal worker ( $\rho$ ). In other words, (7) states that workers move from rural to urban until the expected wage in the urban region, less their cost of relocation, is equal to the actual wage in the rural region. This is the same as the traditional Harris-Todaro (1970) specification, with the addition of the migration cost which represents a wedge between rural and expected urban returns. In our model, however, this wedge arises endogenously as a consequence of imperfect labor mobility. That is, labor is not necessarily perfectly free to move from region to region in response to changes in the expected wage differential, but rather this movement is “sticky,” reflecting factors as discussed in Section 1. Our specification follows Gilbert and Tower (2002) with Equation (8) specifying the degree of labor stickiness using a migration elasticity ( $\varepsilon$ ), which is defined as the proportional change in total urban labor ( $L_u = (a_{LY}Y + a_{LZ}Z) / \pi$ ) induced per proportional change in the expected wage differential. A circumflex denotes a proportional change (e.g.,  $\hat{Y} = dY/Y$ ) and  $\beta$  denotes the share of total urban employed labor in the enclave sector  $Z$ .

As  $\varepsilon \rightarrow \infty$ , the supply of urban workers approaches perfect elasticity, and the wage differential is fixed. Hence, in the limit, our model reverts to a standard neoclassical Harris-Todaro variant with an enclave sector and a wage differential. As  $\varepsilon \rightarrow 0$ , the supply of urban workers approaches perfect inelasticity, and all changes in demand must be reflected in the wage differential. For intermediate values of  $\varepsilon$ , we have an upward sloping supply of urban labor. Following Gilbert and Tower (1992), we assume for simplicity that migration costs take the form of a bribe to an official, who charges the marginal migrant their reservation price and spends the revenue collected in the same way as the aggregate household (so consumption out of the bribe contributes to economic welfare just as does consumption out of other forms of income). Given endowments, (4) determines  $Z$ , while (5)–(8) determine  $X$ ,  $Y$ ,  $\rho$ , and  $\pi$ , completing the model.

### 3. Results

Before examining the comparative statics of the model, we derive an expression for welfare changes. We assume that the minimum wage and the tariff remain binding throughout the analysis. From the balance of trade condition, the value of consumption at world prices ( $p_i^*$ ) must equal the value of production at world prices, less repatriated earnings. That is:

$$C_x + p_y^* C_y + p_z^* C_z = X + p_y^* Y + p_z^* Z - r^* K^* . \quad (9)$$

Totally differentiating (9) with world prices held constant by the small country assumption yields:

$$[1 - mt/(1+t)]d\Omega = dX + p_y^*dY + p_z^*dZ - r^*dK^*, \quad (10)$$

where  $d\Omega = dC_x + p_y dC_y + p_z dC_z$ ,  $t$  is the ad valorem tariff on  $Y$  imports, and the marginal propensity to import is  $m = p_y dC_y/d\Omega$ . The term  $1 - mt/(1+t)$  is the shadow price of foreign exchange (Tower and Pursell, 1987) and is positive for stability. The interpretation of (10) is that for growth to increase welfare in the presence of a tariff, the value of output evaluated at world prices, net of repatriated earnings, must increase.

Holding labor and domestic capital stocks constant, we can denote the change in the value of output at domestic prices as the change in the sum of factor incomes. That is:

$$dX + p_y dY + p_z dZ = w dL_x + \bar{w}(dL_y + dL_z) + rdK + r^*dK^*. \quad (11)$$

Simplifying (11) using Equations (6), (7), and (10) then yields:

$$[1 - mt/(1+t)]d\Omega = \bar{w}L_u d\pi + \rho dL_u - tp_y^*dY. \quad (12)$$

This alternative expression states that for growth to increase welfare, changes in the urban wage bill must offset decreases in tariff revenue.

Our interest is in the effect of an increase in foreign capital. Since the economy is small, output prices are given, and hence factor prices and factor proportions are fixed. We therefore focus on Equations (4)–(8). From total differentiation of (4),  $\hat{Z} = \hat{K}^*$ . This indicates that an injection of foreign capital increases the output of the enclave sector, independent of the issue of labor mobility. Totally differentiating (5)–(7) holding domestic labor and capital endowments constant and substituting (7) into (8) to eliminate  $\hat{\rho}$ , we obtain the system:

$$\begin{bmatrix} \lambda_{kx} & \lambda_{ky} & 0 \\ \pi\lambda_{lx} & \lambda_{ly} & -(\lambda_{ly} + \lambda_{lz}) \\ 0 & \rho(\beta-1) & \varepsilon\pi\bar{w} + \rho \end{bmatrix} \begin{bmatrix} \hat{X} \\ \hat{Y} \\ \hat{\pi} \end{bmatrix} = \begin{bmatrix} 0 \\ -\lambda_{ly}\hat{K}^* \\ \rho\beta\hat{K}^* \end{bmatrix}, \quad (13)$$

where the  $\lambda_{ji}$  are factor use shares (e.g.,  $\lambda_{kx} = a_{kx}X/L$ ). The solutions of (13) are:

$$|D|\hat{X} = \varepsilon\pi\bar{w}\lambda_{ky}\lambda_{ly}\hat{K}^* \quad (14)$$

$$|D|\hat{Y} = -\varepsilon\pi\bar{w}\lambda_{kx}\lambda_{ly}\hat{K}^* \quad (15)$$

$$|D|\hat{\pi} = -\rho\beta\pi\lambda_{lx}\lambda_{ky}\hat{K}^*, \quad (16)$$

where  $|D| = -\pi(\varepsilon\bar{w}|\lambda| + \rho\lambda_{lx}\lambda_{ky})$  and  $|\lambda| = \pi\lambda_{lx}\lambda_{ky} - \lambda_{ly}\lambda_{kx}$ . Assuming  $Y$  is capital intensive relative to  $X$ ,  $|\lambda| > 0$  implying  $|D| < 0$ . Equations (14) and (15) therefore

state that foreign investment will expand output of  $Y$  and contract output of  $X$ , provided labor is mobile to some degree ( $\varepsilon \neq 0$ ). Most importantly, (16) implies that  $\hat{\pi} > 0$  when  $\varepsilon < \infty$ . In other words, foreign investment into the enclave has a positive effect on the rate of urban employment, provided that labor is less than perfectly mobile. This fact enables us to derive a new welfare proposition regarding the implications of foreign investment in the enclave sector of a protected developing economy.

**Proposition 1:** If labor is less than perfectly mobile, investment in an export enclave sector need not be immiserizing, even if profits from foreign investment are fully repatriated.

**Proof:** With foreign rents repatriated and the stock of domestic capital held constant, using (12), (15), and (16) and simplifying we have:

$$[1 - mt/(1+t)]d\Omega = [tp_Y^*Y\varepsilon\lambda_{kx}\lambda_{Lz} - L_U\rho\beta\pi\lambda_{Lx}\lambda_{ky}(1+\varepsilon)]\bar{\pi}\bar{w}\hat{K}^*|D|^{-1}, \quad (17)$$

which implies  $d\Omega < 0 \Leftrightarrow tp_Y^*Y\varepsilon\lambda_{kx}\lambda_{Lz} > L_U\rho\beta\pi\lambda_{Lx}\lambda_{ky}(1+\varepsilon)$ . This further reduces to the condition:

$$\frac{t}{(1+t)} > \frac{\rho}{w} \left(1 + \frac{1}{\varepsilon}\right) \frac{\theta_{ky}\theta_{Lx}}{\theta_{kx}}, \quad (18)$$

where the  $\theta_{ji}$  are industry cost shares (e.g.,  $\theta_{kx} = a_{kx}r/p_x$ ). Equation (18) describes the conditions under which an inflow of foreign investment leads to a decline in economic welfare. The crucial implication is that, unlike in standard models of tariff-jumping investment into developed or developing economies, immiserization is not a necessary outcome. Immiserization is more likely the higher the tariff and the lower the cost of migration. Of critical importance, however, is the role of the labor mobility parameter. *Ceteris paribus*, the lower the level of mobility, the lower the likelihood of immiserization.

It is clear that our result hinges on the assumption of imperfect labor mobility. In the limit as  $\varepsilon \rightarrow \infty$  we have  $|D| \rightarrow -\infty$ , and (16) therefore implies that  $\hat{\pi}/\hat{K}^* \rightarrow 0$ . Equation (17) states that welfare rises if there is an increase in the rate of employment that, along with the expenditure of the bribe, is sufficient to offset the negative effect of increased production of  $Y$  across an existing tariff barrier. If labor is perfectly mobile, then an increase in urban employment at constant prices is matched by a proportional increase in the total number of urban residents. This leaves the total wage bill unchanged, and with the increase in the rental bill repatriated, we have only the expenditure of the bribes to offset the decline in tariff revenue. If the cost of migration is zero as in a standard model or is dissipated rather than forming part of a bribe as assumed here, then immiserization must occur. Hence, it is the presence of imperfect labor mobility along with unemployment that reverses the standard result seen in Beladi and Marjit (1992).

**Proposition 2:** Even if immiserization does not occur, income distribution may deteriorate as a consequence of foreign investment due to an increase in the number of unemployed.

**Proof:** Letting  $U$  represent the number of unemployed, we can define:

$$U = (1/\pi - 1)(a_{LY}Y + a_{LZ}Z). \quad (19)$$

Total differentiation of (19) yields:

$$\lambda_U \hat{U} = (1/\pi - 1)(\lambda_{LY} \hat{Y} + \lambda_{LZ} \hat{Z}) - \lambda_{LU} \hat{\pi}, \quad (20)$$

where  $\lambda_U$  is the share of unemployed labor in the total stock and  $\lambda_{LU}$  is the share of total urban labor. Using (15) and (16), and noting again that  $\hat{Z} = \hat{K}^*$ , we have:

$$|D|\hat{U} = (\lambda_{KY} \lambda_{LX} \lambda_{LZ} / \lambda_U)[(\pi - 1)(\varepsilon \bar{w} + \rho) + \rho] \hat{K}^*. \quad (21)$$

Equation (21) implies  $\hat{U}/\hat{K}^* < 0 \Leftrightarrow \varepsilon < \rho/\bar{w}(1 - \pi)$ , defining a critical value of the migration elasticity. Since (18) involves the tariff and (21) does not, a situation may arise where growth is not immiserizing and yet the number of unemployed rises. Alternatively, if the elasticity is sufficiently small, then an inflow of capital will reduce the number unemployed.

Once again the role of the imperfect labor mobility is critical to our results. If perfect labor mobility is assumed, it is immediate that the condition  $\varepsilon < \rho/\bar{w}(1 - \pi)$ , implied by (21), cannot hold. In other words, the number of unemployed must rise with an inflow of capital (even as (7) implies that the rate of unemployment remains fixed). This is a standard “paradox” of the neoclassical Harris-Todaro structure and was first noted by Corden and Findlay (1975). Part of our contribution is to show how this paradox is dependent on the assumption of the perfectly free movement of labor.

**Corollary:** Perfect labor immobility negates both the possibility of immiserizing growth due to foreign capital accumulation, even with rents repatriated, and the possibility that the number of unemployed may rise.

This result follows immediately from (18) and (21) by letting  $\varepsilon$  approach zero and clarifies the intuition underlying the two propositions. Perfect labor immobility between the rural and urban regions implies that the allocation of labor to  $X$  is given. With factor proportions fixed by the small country assumption (since prices and therefore factor prices are fixed), the allocation of domestic capital to both  $X$  and  $Y$  cannot change. Therefore, again, because factor proportions are fixed,  $Y$  output cannot change. Hence no reduction in tariff revenue can occur, and this is the source of the welfare loss term in (12). However, output of  $Z$  must rise independent of labor mobility. This means labor must be drawn from the pool of urban unemployed, increasing the total number employed and raising labor income at domestic prices.

With foreign prices unchanged, the economy must move outward along its income consumption line. This result contrasts with Gilbert and Tower (2002), who show that immiserization remains a possibility when profits are repatriated within the classic two-sector model of Corden and Findlay (1975), even as labor mobility approaches zero. In that sense, the presence of an export enclave strengthens the imperfect labor mobility case for attracting foreign investment, even if protection cannot be removed.

#### 4. Concluding Comments

We show that foreign investment into a developing economy export enclave sector need not be immiserizing even when there is full repatriation of foreign capital rents. This is because the employment effect from higher investment can outweigh the expansion of deadweight losses arising from increases in import-competing production, provided that the flow of labor out of agriculture is less than perfect. Moreover, immiserization becomes impossible if labor is perfectly immobile. We emphasize that this is a second-best argument—optimal policy will of course require free trade and the elimination of or countervailing impacts on the labor market distortions, both in terms of mobility and urban wage rigidity. We also emphasize that it is a welfare result hinging on an increase in the average effective wage, and as such does not exclude the possibility that the number of unemployed may increase. Nonetheless, in many developing economies the second-best situation is the most relevant, and our results lend some support to the notion that welfare improvements may arise even in a protected economy if an export enclave is able to attract foreign capital. Since imperfect labor mobility is a feature of some developing economies, our model may partially explain a rationale for export processing zones that has hitherto seemed inconsistent with existing results in the literature.

#### References

- Beladi, H. and S. Marjit, (1992), "Foreign Capital and Protectionism," *Canadian Journal of Economics*, 25, 233-238.
- Beladi, H., S. Margit, and R. Frasca, (1998), "Foreign Capital Accumulation and National Income: Does Unemployment Matter?" *Keio Economic Studies*, 35, 19-27.
- Brecher, R. A. and C. F. Diaz-Alejandro, (1977), "Tariffs, Foreign Capital and Immiserizing Growth," *Journal of International Economics*, 7, 317-322.
- Corden, W. M. and R. Findlay, (1975), "Urban Unemployment, Intersectoral Capital Mobility and Development Policy," *Economica*, 42(165), 59-78.
- Dehejia, V. H. and A. J. Weichenreider, (2001), "Tariff Jumping Foreign Investment and Capital Taxation," *Journal of International Economics*, 53, 223-230.

- Ge, W., (1999), "Special Economic Zones and the Opening of the Chinese Economy: Some Lessons for Economic Liberalization," *World Development*, 27, 1267-1285.
- Gilbert, J. and E. Tower, (2002), "Protectionism, Labor Mobility, and Immiserizing Growth in Developing Economies," *Economics Letters*, 75, 135-140.
- Harris, J. R. and M. P. Todaro, (1970), "Migration, Unemployment and Development: A Two-Sector Analysis," *American Economic Review*, 60, 126-142.
- Johnson, H. J., (1967), "The Possibility of Income Losses from Increased Efficiency or Factor Accumulation in the Presence of Tariffs," *Economic Journal*, 77, 151-154.
- Marjit, S., U. Broll, and S. Mitra, (1997), "Targeting Sectors for Foreign Capital Inflow in a Small Developing Economy," *Review of International Economics*, 5, 101-106.
- Tower, E. and G. G. Pursell, (1987), "On Shadow Pricing Foreign Exchange, Non-Traded Goods and Labor in a Simple General Equilibrium Model," *Oxford Economic Papers*, 39, 318-332.
- Wei, X., (2000), "Acquisition of Technological Capability through Special Economic Zones (SEZs): The Case of Shenzhen SEZ," *Industry and Innovation*, 7, 199-221.
- Zhao, Y., (1999), "Labor Migration and Earnings Differences: The Case of Rural China," *Economic Development and Cultural Change*, 47, 767-782.
- Zhao, Y., (2001), "Foreign Direct Investment and Relative Wages: The Case of China," *China Economic Review*, 12, 40-57.