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1.   INTRODUCTION

Globalization, in its multiple interpretations, is seen by many people as a great possibility of improving living standards in developing countries. Trade and financial integration can encourage competition, technology transfers and specialization according to comparative advantage principles. Indeed, after decades of protectionism with very poor results, many countries have actively opened their economies to global competition in search for such great opportunities. Although in many cases the results are encouraging, for a vast group of countries the last two or three decades have been years of turmoil, stagnation and financial crises. These complications have enhanced the criticisms across the world to the process of global integration (Stiglitz (2002)).

This paper argues that many of these costs follow from governments' policies aimed to limit or restrict the scope of integration of countries with the rest of the world. In the presence of international technology differences, limited or restricted integration may generate wage and employment adjustments that could be avoided if countries were to embrace globalization without restrictions. I present a very stylized model where financial integration leads to specialization. In this setting, countries that avoid specialization through trade distortions have much greater downward pressures on wages than countries that do specialize. Moreover, if non-tradable prices are downward rigid and there are some limits to the current account deficits countries can run, employment costs may arise. The model shows that these costs may be greater with a limited-globalization strategy than with a *laissez-faire* policy.

2.   A SIMPLE MODEL

The world is comprised by many countries. There are two tradable goods, x and y, and a non-tradable good n. Commodity x is capital-intensive, while n is labor-intensive ($(K/L)_x > (K/L)_y > (K/L)_n$). Each good is produced with CRS fixed-proportions technology[1], and two factors of production: labor L and capital K. Product and factor markets are perfectly competitive.

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[1]   This assumption is not harmless. Some of the results hinge upon the assumption of no substitution between labor and capital within-industries. However, the results hold if there are short-run restrictions to the substitutability of factors.

Countries are price takers. Nevertheless, domestic prices are affected by tariffs imposed in each country. Regarding factor markets, labor is completely mobile across sectors within a country but immobile internationally. Capital is mobile across borders, but the return to capital is not completely equalized because there are some restrictions for capital flows. In particular, the international return to capital faced by a country is r*, that is set in a big foreign country denoted hereafter with a *. However, the domestic return to capital r is only a fraction of r* due to restrictions to capital movements: $r = \lambda r^*$ where $\lambda \in (0,1]$ is a policy variable that reflects the degree of international financial integration. The zero-profit condition in sector i = x, y, n in country c is given by[2]

(1) $p_i^c = a_{Li}^c w^c + a_{Ki}^c \lambda^c r^*$

where p_i^c is the domestic price of good i (p_n in the case of the non-tradable good and $p_i^w (1+\tau_i^c)$ for x and y where p_i^w is the world price of good i and τ_i^c is the tariff in industry i). a_{Fi}^c is the technology parameter that measures the requirement of factor F=L, K to produce one unit of good i. Finally, w^c and $\lambda^c r^*$ are domestic wages and return to capital. I also assume that there exist sector-specific hicks-neutral international technology differences. Algebraically, $a_{Li}^c = (1+\delta_i^c) a_{Li}^*$ and $a_{Ki}^c = (1+\delta_i^c) a_{Ki}^*$ with $\delta_i^c \geq 0$. The rationale for this assumption is the following. An analysis of the wage and employment implications of global integration in developing countries must take into account cross-country wage differences. Trefler (1993) provides evidence that international wage differences are related to international technology differences. Lucas (1990) also stresses the role of some form of technology differences to explain why the return to capital is not higher in labor-abundant countries.

For tradable sectors, equation (1) can be rewritten as (hereafter, I eliminate the superscript c unless required for presentation purposes)

(2) $p_i^w (1+\tau_i) = (1+\delta_i)(a_{Li}^* w + a_{Ki}^* \lambda r^*)$

In the initial equilibrium, I assume that λ, τ_x and τ_y are such that both tradable goods are produced. In other words, (2) holds for x and y. International wage differences are given by

(3) $\dfrac{w}{w^*} = \dfrac{1}{\theta_{Li}^* (1+\delta_i)} \dfrac{(1+\tau_i)}{(1+\tau_i^*)} - \dfrac{\theta_{Ki}^*}{\theta_{Li}^*} \lambda$

where θ_{Fi}^* is the share of factor F = L, K in value-added in sector i = x, y. Relative wages w/w* are decreasing on δ_i and λ. Tariffs also affect nominal wage

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[2]   Jones (1961) presents a simple derivation of this type of model.

differences, but their impact on real wages is ambiguous due to their effect on average consumer prices.

2.1.   Globalization under flexible prices

Consider that globalization is a process of increasing integration in goods and capital markets. In terms of the model, this implies a fall in average tariffs and a rise in λ^c.[3] Consider first the case of a rise in λ. Given τ_x and τ_y, capital-intensive sector x becomes non-competitive. This is evident from estimating the fall in wages consistent with each zero-profit condition in (2), that is given by $\partial w_i / \partial \lambda = -\theta^*_{Ki} / \theta^*_{Li} \bullet w^*$. This expression is smaller in x. The new equilibrium wage rate is determined by the zero profit condition in the labor-intensive sector y. This implies that

$$(4) \qquad \Delta \frac{w}{w^*} = - \frac{\theta^*_{Ky}}{\theta^*_{Ly}} \Delta \lambda$$

where Δz refers to the change in z. The effect on the non-tradable product price is

$$(5) \qquad \Delta p_n = \left[\frac{\theta^*_{Ly} r^* a_{Kn} - \theta^*_{Ky} w^* a_{Ln}}{\theta^*_{Ly}} \right] \Delta \lambda$$

These results are intuitive. Greater capital-market integration implies a rise in the cost of capital in the domestic country, bringing the capital-intensive sector out of business. A fall in wages is required to keep competitive the labor-intensive sector, and the size of the adjustment depends on the relative factor-intensity in that sector. This implies a fall in the price of the non-tradable good –a depreciation of the real exchange rate. For a labor-abundant country ($\overline{K}/\overline{L} < Ky/Ly$), the expansion of sector n and specialization in labor-intensive y implies an improvement in the current account. Compared to the pre-integration equilibrium, a fall in capital inflows or an increase in capital outflows takes place. I denote this case as unlimited globalization.

What happens if this country wants to avoid the disappearance of the capital-intensive sector? In order to keep a diversified production structure of tradable goods, governments adjust their tariff structures rising relative protection for sector x at the expense of falling protection for industry y (see Claro (2003a) for evidence regarding changes in tariff structures). For any given average tariff level $\overline{\tau}$, sectorial tariffs change in order to keep both tradable sectors competitive.[4] The

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[3]   In Claro (2003b) I endogenize the relationship between trade policy and financial integration. In this model, they represent independent policy choices.

[4]   Average tariffs are given by $\overline{\tau} = \sum_{i=x,y} \gamma_i (1 + \tau_i)$.

equilibrium change in domestic wages results from solving the following three equilibrium conditions

$$\frac{p_x^w}{(1+\delta_x)}\Delta(1+\tau_x) = a_{Lx}^* \Delta w + a_{Kx}^* r^* \Delta\lambda$$

$$\frac{p_y^w}{(1+\delta_y)}\Delta(1+\tau_y) = a_{Ly}^* \Delta w + a_{Ky}^* r^* \Delta\lambda$$

$$\gamma_x \Delta(1+\tau_x) + \gamma_x \Delta(1+\tau_x) = \Delta\bar{\tau}$$

For $\gamma_x = \gamma_y = \gamma$, the effect on international wage differences is given by

(6) $$\Delta\frac{w}{w^*} = \frac{1}{\gamma\Sigma_i\theta_{Li}^*(1+\delta_i)}\Delta\bar{\tau} - \frac{\Sigma_i\theta_{Ki}^*(1+\delta_i)}{\Sigma_i\theta_{Li}^*(1+\delta_i)}\Delta\lambda$$

Consider first that $\Delta\bar{\tau}=0$. The fall in domestic wages is greater than in (4). This is consistent with the required increase in protection to industry x. The fall in wages is even greater if average tariffs fall; $\Delta\bar{\tau} \leq 0$. This result reveals that a diversified production structure is sustained with greater distortions in relative prices, pressuring wages downward. The effect on p_n is

(7) $$\Delta p_n = \frac{a_{Ln} w^*}{\gamma\Sigma_i\theta_{Li}^*(1+\delta_i)}\Delta\bar{\tau} + \left[r^* a_{Kn} - w^* a_{Ln}\frac{\Sigma_i\theta_{Ki}^*(1+\delta_i)}{\Sigma_i\theta_{Li}^*(1+\delta_i)}\right]\Delta\lambda$$

Consistent with the evolution of wages, the equilibrium depreciation of the real exchange rate is greater than in the case of unlimited globalization. The term in square brackets in (7) is greater (in absolute terms) than the corresponding term in equation (5). Again, it is not clear whether the new equilibrium implies capital inflows or outflows, but an improvement in the current account compared to the initial equilibrium is expected.[5]

2.2. Globalization under sticky prices

In this section I analyze the impact of sticky nominal non-tradable prices, and therefore demand determined non-tradable production, on the evolution of

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[5] Compared to the post-integration equilibrium with specialization, it is not clear the effect on capital flows of an interventionist policy. The non-interventionist scenario implies a smaller non-tradable sector, and therefore greater capital inflows to reach the factor requirements in the labor-intensive industry. However, the interventionist equilibrium encourages the production of the capital-intensive good, attracting foreign capital.

wages and employment. Unlike the previous case, unemployment may arise if restrictions to the size of the current account deficit exist. For simplicity, I assume that wages are not sticky. This asymmetry between nominal wages and non-tradable prices assures that at least one tradable sector remains productive.

As before, financial integration generates downward pressures on domestic wages and non-tradable prices. However, $\Delta p_n = 0$. Non-tradable output and factor usage (L_n and K_n) will depend on the evolution of demand, in particular, on nominal income. Assuming that individuals have identical log-linear utility functions, non-tradable consumption is a constant share of income: $p_n c_n = \alpha(wL + rK)$. For a constant p_n, non-tradable factor usage is determined by the following two equations

$$(8) \qquad \frac{a_{Kn}}{a_{Ln}} = \frac{K_n}{L_n} = k_n$$

$$(9) \qquad \alpha\left[w_1 L_e + r_1 \overline{K}\right] = Q_n(L_n, K_n) \bullet p_{n0}$$

where w_0 and w_1 are the wage rate before and after the change in λ. Similar for r. $\overline{K}$ is the domestic stock of capital, while L_e is the aggregate level of employment. Under full employment, $L_e = \overline{L}$. Equation (8) is self explanatory. The right-hand-side of (9) represents final non-tradable production valued at initial non-tradable prices. The left-hand-side of (9) represents non-tradable demand, that depends on nominal income. The effects of changes in λ on nominal income are twofold. First, it affects relative factor prices, but this is a second order effect. Second, changes in λ affect income depending on aggregate labor and capital usage. Under full employment, there is no effect on income and non-tradable demand. Therefore, at constant p_n there is no change in L_n and K_n. In this scenario, production of the labor-intensive tradable is either consistent with capital inflows or capital outflows, depending on the size of the non-tradable sector in the initial equilibrium. This can be seen by writing factor intensity in industry y as

$$(10) \qquad \frac{a_{Ky}}{a_{Ly}} = \frac{K_y}{L_y} = k_y = \frac{\overline{K} - K_n + \Delta K}{\overline{L} - L_n} Z$$

If $k_y > (\overline{K} - K_n)/(\overline{L} - L_n)$, the initial equilibrium (with x and y being produced) was supported with capital inflows ($\Delta K > 0$).[6] If the increase in λ does not affect factor usage in the non-tradable sector, positive but smaller capital inflows must take place in order to keep full employment and positive production in sector y. This is evident in figure 1 that depicts the traditional Lerner-Pearce

[6]   For sake of presentation, I only focus on the case with capital inflows in the initial equilibrium. The other cases are similar.

Diagram with unit-value isoquants for x, y and n. Initially, domestic factor prices are w_0 and r_0. The economy's endowment vector is V, and factor usage in sector n is V-A. Capital inflows are AA_2.[7] The increase in λ generates a shift in the unit-cost curve consistent with the new cost of capital r_1. Under full employment and sticky prices, no change in non-tradable demand and factor usage takes place. Therefore, the new equilibrium with specialization in y implies capital inflows of $AA_1 < AA_2$. With flexible prices, the increase in non-tradable supply generates a rise in factor usage. Graphically, the factor endowment available for tradable production is B, and capital inflows are BB_1, smaller than under sticky prices.

FIGURE 1
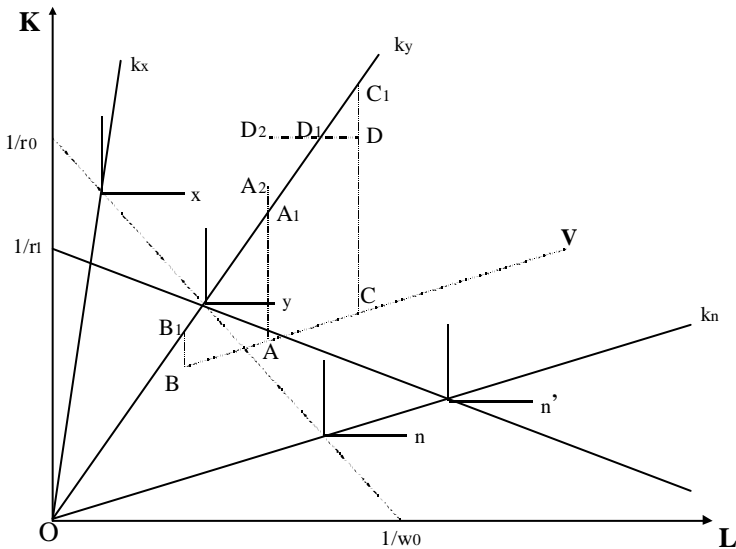
If the capital account is completely open in the sense that there are no restrictions to the size of the current account deficit a country can run, the full-employment equilibrium is the unique equilibrium, independent of the size of the non-tradable sector. Price stickiness does not introduce employment costs. It only limits the size of the non-tradable sector to its demand-determined level. The remaining factors are either employed in sector y or internationally traded, in the case of capital.

However, if there are some restrictions to the size of the current account deficit a country can run, new equilibria are possible. For example, suppose the supply of funds is totally elastic up to some level $\Delta K^M > 0$, and inelastic thereafter.

[7]   Strictly speaking, production of x and y require capital inflows of $AA_1 + \varepsilon$.

It is possible to find an equilibrium where $L_e < \overline{L}$ is validated with a lower demand for the non-tradable good. In particular, a lower employment level generates a fall in income and non-tradable production. In terms of figure 1, C represents the availability of factors for tradable production after factor usage in sector n. Capital inflows required to produce labor-intensive y are CC_1. If $CC_1 < \Delta K^M$, an equilibrium with unemployment is not possible. However, if $CC_1 > \Delta K^M = CD$, capital inflows of ΔK^M take place and unemployment is DD_1. This is an equilibrium as long as $L_e = \overline{L} - DD_1$ is consistent with the demand for n implicit in C. In general, an equilibrium with aggregate employment L_e is attainable if $k_y = (\overline{K} + \Delta K^M - K_n(L_e))/(L_e - L_n(L_e))$ and $L_e < \overline{L}$. The full employment equilibrium is always possible. The model does not provide any element to pin down which equilibrium will prevail.

With limited globalization, unemployment may also arise. However, in this case, capital inflows required to sustain a diversified product mix are greater than those under specialization in y. In terms of figure 1, if the endowment vector for tradable production is C, and $\Delta K^M = CD$, aggregate unemployment is $DD_2 > DD_1$.[8] It is possible to show that $\partial L_e / \partial w_1 < 0$, revealing that the level of aggregate employment consistent with equilibrium unemployment is lower with an interventionist policy that pushes wages down. Moreover, a diversified strategy may generate unemployment in a scenario where *laissez-faire* leads to full employment.

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[8]   Strictly speaking, an unemployment level of $DD_1 + \varepsilon$ is consistent with production of both sectors. In practice, it will depend on the "targeted" level of capital-intensive x production.