

REGIONAL INTEGRATION AND THE (RE)DISTRIBUTION OF FOREIGN DIRECT
INVESTMENT BETWEEN ASYMMETRIC HOSTS

Denise Eby Konan*
University of Hawaii

Jeff Heinrich
University of Wisconsin at Whitewater

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ABSTRACT

We analyze the impact of economic integration on the activities of multinational enterprises in a general equilibrium model with asymmetric countries. Foreign direct investment (FDI) inflows are likely only to the extent that multinationals have not already shifted production to the integrating region. Integration could lead to industry rationalization that reduces FDI if tariff-jumping is prevalent before liberalization. We find a magnification effect of the level of external protection on both multinational entry and exit. Low-protection countries will have greater MNE entry than high-protection countries due to wage differences.

JEL Codes: F12, F15, F23

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* Corresponding author. Professor, Department of Economics, University of Hawaii at Manoa, Honolulu, Hawaii 96822. Telephone: (808) 956-6310; Fax: (808) 956-4347; email: konan@hawaii.edu.

1. Introduction

A phenomenon of the recent decade has been the willingness of developing countries to participate in preferential trading arrangements (PTAs) and regional economic integration. Economic cooperation among developing economies is evident in the formation of the Common Market for East and Southern Africa (COMESA) in 2001, the Southern Cone Common Market (MERCOSUR) customs union between Argentina, Brazil, Paraguay, and Uruguay in 1995, the Greater Arab Free Trade Agreement (GAFTA) in 1997, the Unified Economic Agreement of the Gulf Cooperation Council (UEA—GCC) of 2001, and the strengthening ties in the Association of South-East Asian Nations (ASEAN). Arguably, the primary purpose of these agreements is to support regional efforts to liberalize trade. Another goal, however, is to attract inflows of foreign direct investment (FDI) to the integrating region by enhancing market access and creating a more vibrant, stable, and competitive regional economic climate. In the long run, it is hoped that FDI inflows will be accompanied by foreign technology transfers that will, in turn, contribute to economic productivity and growth. While the causal channels of these spillovers is in dispute, available studies surveyed by Lim (2001) suggest FDI brings positive spillovers to host countries, or at least to those hosts with some absorptive capacity (Borensztein, et al, 1998). Yet, even if the desirability of FDI is taken as given, the mechanisms by which regional integration will influence regional FDI are not well understood. The goal of this paper is to provide a framework for analysis and preliminary insights concerning FDI inflows and their distribution among members when host countries engage in regional integration agreements.

Stylized facts support the view that regional integration influences regional FDI inflows.¹ Yet the direction of these effects is far from evident as several layers of economic distortion are involved.

Regional integration agreements (RIAs) are inherently second-best. While they do expand market size

¹ From the inception of the European Common Market to the mid-1980's, a period distinguished by reduced tariffs on intra-European trade, US FDI into the EC increased significantly. Blomström and Kokko (1997) examine the impact of other regional integration agreements (CUSFTA, NAFTA, and MERCOSUR) on FDI inflows and note that it is difficult to get precise empirical results as FDI may react to integration in a temporally asynchronous fashion. Using survey data, Bannister, Primo Braga and Petry (1994) find that the formation of MERCOSUR

and liberalize trade between participating countries, they also discriminate against non-members in rather complicated ways. FDI tends to arise in imperfectly competitive markets in order to internalize economic distortions. Often, multinational firms are exploiting the services of a firm-specific asset that is non-rival in production across plants within a given firm. This asset, which is typically intangible, can be moved relatively easily across borders and so such a firm will have an incentive to jump tariff walls. In this way FDI can substitute for trade as local production supplants imports, though FDI can complement trade as well via increased imports of intermediate inputs.

Yet, the literature has only relatively recently considered the possibility of multinational production in the context of regional integration. As illustrated by Horstmann and Markusen (1992) and Markusen and Venables (1998) pointed out, failing to account for the endogeneity of production locations inherent in multinationality may lead to erroneous predictions. A few commentators contemplated FDI insofar as it might affect the choice of whether or not to engage in regional integration and generally found that FDI can facilitate regional integration (Ethier, 1998), perhaps even in preference to multilateral free trade (Ludema, 2002) given that FDI allows for the avoidance of trade costs.

We are more interested in the reverse, how regional integration might impact FDI flows into the integrating region. Along these lines, Motta and Norman (1996) presume a trade agreement between two of three identical countries, each with a single national firm, which eliminates intra-regional trade barriers. Regional firms tend to rationalize their FDI and switch to intra-regional exporting. This FDI is to some extent replaced by the external firm, which establishes an export platform in the region and also contributes to increased intra-regional trade. The model of Donnenfeld (2003) considers a number of symmetric countries, expanded to include the possibility of multiple trading blocs and the setting of optimal external tariffs. Integration is found to attract FDI from the external firm, though if external tariffs are set to maximize profit-shifting they will be set just below the threshold for prompting tariff-jumping FDI. Neary (2002) posits a monopolistic multinational in a model which emphasizes the

positively influenced inward investment in the region, although institutional harmonization and broader economic reforms may have been influential.

rationalization that firms may engage in, where integration in a region with multiple plants leads multinationals to reduce operations to but a single plant in the region.² The model of Raff (2004) produces non-cooperative domestic profit tax rates within an integrated region in which member countries seek to attract the subsidiary of a single, non-member, multinational firm, noting that profit-shifting taxes can possibly forestall welfare-improving FDI and that integration under a customs union rather than a free trade agreement can overcome that problem.

While these models offer rich analysis of behavior of individual firms and their interdependence, they are less useful in revealing the determinants of FDI distributional patterns within PTAs. This is partially due to the fact that the small number of firms in these models reduces the problem to a binary choice (either a country gets a foreign plant, or it doesn't), and partially because the authors make heavy use of symmetry assumptions in order to achieve analytical solutions. Markusen and Venables (MV; 1998) consider FDI in the context of monopolistically competitive market structures and two countries. Their principle finding is the 'convergence hypothesis.' As nations' incomes and endowments converge international activity is increasingly dominated by multinational, rather than national, firms. Heinrich and Konan (2000) extend the MV framework to three countries to analyze the impact of RIAs when multinational production monopolistically competitive and the number of subsidiaries endogenous. The model produces a "market expansion" effect, where integration can lead to new FDI from external firms, and a "rationalization" effect where integration can lead to the closure of redundant production facilities in the integrating region depending on the size of the integrating region and the initial level of trade barriers. In welfare terms, members benefit and the non-member is harmed by the market expansion effect of an RIA. However all countries gain from FDI rationalization.

Our present paper extends the work of Markusen and Venables (1998) and Heinrich and Konan (2000) to explore country asymmetries in a general equilibrium setting in an effort to obtain insights on

² Both Neary (2002) in an extension with multiple national firms and Motta and Norman (1996) uncover the interesting possibility that partial tariff reductions in the integrating area might give the internal firms sufficient strategic advantage, and limit sufficiently the access to the rest of the region from a single plant within it, to drive out external firms entirely.

how RIA formation might impact the relative distribution of FDI into, or out of, the RIA. By employing a general equilibrium model solved using computational methods, we are able to account for income and factor price changes that result from the RIA and interact with FDI flows. Our approach also demonstrates how asymmetries among countries, in terms of endowments, technologies, and government policy impact the intra-regional distribution of FDI inflows and subsidiary sales upon the formation of an RIA. We analyze both a customs union and a free trade agreement.

Section 2 presents the basic model. FDI is modeled in a general-equilibrium framework with three countries where wages are determined in a competitive, numeraire industry. The remainder of production is by national and multinational firms in an increasing-returns-to-scale, monopolistically-competitive sector. Headquarter activities of national and multinational firms are concentrated outside the integrating region while two integrating countries serve as hosts to multinational subsidiaries. Section 3 provides general equilibrium insights that emerge. RIAs are neither clearly investment creating or diverting, yet a few patterns do emerge. Section 4 concludes.

2. The model

The model consists of two goods, two internationally immobile factors, and three countries. Two of the three countries, denoted A and B , join in a regional integration agreement, while the rest of the world, denoted R , is excluded. There are two factors of production, labor L and sector-specific resource K , which are both immobile across countries. Good Y is produced under constant returns and perfect competition by combining the resource specific to production of Y , and labor in a Cobb-Douglas production function. Letting K_i be the country's endowment of the Y -specific resource and θ_i be a country-specific efficiency parameter. The output of Y is

$$Y_i = \theta_i L_i^\alpha K_i^{1-\alpha}, \quad i = A, B, R. \quad (1)$$

Y is held to be the numeraire, and free trade in Y equalizes its price across countries. Given (1), the return to each factor is its value marginal product so the equation for wages is

$$w_i = \alpha \theta_i (L_{iy} / K_i)^{\alpha-1}, \quad i = A, B, R. \quad (2)$$

X is produced with increasing returns in a monopolistically competitive environment with free entry by both national R firms and multinationals with headquarters in R . For tractability of the model, it is assumed that A and B have no indigenous source of X headquarter services and produce X only with R multinational subsidiaries. X production requires firm-specific fixed costs (F_R) incurred at the R headquarters, as well as local plant-specific fixed costs (G_i) and constant unit labor inputs (c_i) incurred in the manufacturing location at country $i = (A, B, R)$. Labor is the sole input into X production and is used for both variable and fixed costs. Tariff charges between countries must be incurred by firms and are also specified as units of labor per unit of X exported. The existence of the Y -specific resource implies that an expansion of the X sector will draw labor out of the Y sector and push up the wage.

Let superscripts (n, m) denote national and multinational firms, respectively. X_{ij}^k is the sales in country j of a type- k firm based in i . The labor cost of a R national firm is

$$L_{RX}^n = c_R X_{RR}^n + \sum_{j=A,B} c_R X_{Rj}^n + G_R + F_R. \quad (3)$$

Multinationals consist of headquarters and manufacturing facilities in R and a single manufacturing subsidiary in either A or B . A multinational plant in country A (a mA -type firm) supplies the domestic A market and the B market with output from A . Likewise, a mB -type multinational services A and B with output from the B plant. Multinational labor demand in country R is given by

$$L_{RX}^{mi} = c_R X_{RR}^{mi} + G_R + F_R, \quad i = A, B, \quad (4)$$

and its labor demand in host countries is

$$L_{AX}^{mA} = c_A X_{AA}^{mA} + c_A X_{AB}^{mA} + G_A, \quad (5)$$

$$L_{BX}^{mB} = c_B X_{BB}^{mB} + c_B X_{BA}^{mB} + G_B.$$

If the labor endowment for country i is denoted \bar{L}_i , then the market clearing condition is

$$\bar{L}_A = L_{Ay} + m_A [c_A X_{AA}^{mA} + c_A X_{AB}^{mA} + G_A], \quad (6a)$$

$$\bar{L}_B = L_{By} + m_B [c_B X_{BB}^{mB} + c_B X_{BA}^{mB} + G_B], \quad (6b)$$

$$\begin{aligned} \bar{L}_R &= L_{Ry} + n [c_R X_{RR}^n + \sum_{j=A,B} c_R X_{Rj}^n + G_R + F_R] \\ &+ m_A [c_R X_{RR}^{mA} + G_R + F_R] + m_B [c_R X_{RR}^{mB} + G_R + F_R], \end{aligned} \quad (6c)$$

where m_i denotes the number of multinationals invested in $i = (A, B)$ and n the number of national firms.

Free entry in the X sector constrains profits to zero. Thus income in each country equals the payments to factors and tariff transfers

$$I_i = w_i \bar{L}_i + (1 - \alpha) Y_i + \sum_k \sum_{j \neq i} (\tau_{ji} X_{ji}^{kj} - \tau_{ij} X_{ij}^{ki}), \quad i, j = A, B, \quad k = m, n \quad (7)$$

where τ_{ij} is the specific tariff charge per unit of X shipped from i to j . We assume that initially each country maintains an MFN tariff structure, i.e. $\tau_{Rj} = \tau_{ij}$, $i, j = (A, B)$, $i \neq j$, implying no cross-hauling.

Denoting the consumption level of X and Y in country i as X_{ic} and Y_{ic} , Cobb-Douglas preferences of the representative consumer are given by

$$U_i = X_{ic}^\beta Y_{ic}^{1-\beta}, \quad (8)$$

where X_{ic} is simply the sum of sales of X in country i . Denoting p_i as the relative price of X in country i , the Marshallian demands are derived from (8) as

$$X_{ic} = \beta I_i / p_i, \quad Y_{ic} = (1-\beta) I_i. \quad (9)$$

Pricing in the X market will be determined by the condition that marginal revenue equals marginal cost. Given demand, price is set as a markup over marginal cost (unit labor requirement times the wage). Denote the markup e_{ij}^k in country j as that of a type k firm producing in country i . Cournot conduct is assumed by firms in the X sector, implying marginal cost markups equal market share divided by own-price elasticity of demand. Recognizing that Cobb-Douglas preferences yield own-price elasticities of unity, the markup is simply equal to each firm's market share,

$$e_{ij}^k = \frac{X_{ij}^k}{X_{jc}} = \frac{p_j X_{ij}^k}{\beta I_j}. \quad (10)$$

Assuming all firm types are active, the relevant pricing equations are³

$$p_R(1 - e_{RR}^k) = w_R c_R, \quad [X_{RR}^n] \quad (11)$$

$$p_i(1 - e_{Ri}^n) = w_R c_R + \tau_{Ri}, \quad [X_{Ri}^n] \quad i = A, B \quad (12)$$

$$p_i(1 - e_{ii}^{mi}) = w_i c_i, \quad [X_{ii}^{mi}] \quad i = A, B \quad (13)$$

$$p_j(1 - e_{ij}^{mi}) = w_i c_i + \tau_{ij}. \quad [X_{ij}^{mi}] \quad i, j = A, B, \quad i \neq j \quad (14)$$

Putting (10) together with (11)-(14), we can obtain relations for outputs in terms of prices,

$$X_{RR}^k = \beta I_R \frac{p_R - w_R c_R}{p_R^2}, \quad k = n, mA, mB, \quad (15)$$

$$X_{Ri}^n = \beta I_i \frac{p_i - w_R c_R - \tau_{Ri}}{p_i^2}, \quad i = A, B, \quad (16)$$

$$X_{ii}^{mi} = \beta I_i \frac{p_i - w_i c_i}{p_i^2}, \quad i = A, B, \quad (17)$$

$$X_{ij}^{mi} = \beta I_j \frac{p_j - w_i c_i - \tau_{ij}}{p_j^2}, \quad i, j = A, B, \quad i \neq j. \quad (18)$$

The zero profit condition is equivalent to the condition that markup revenues equal fixed costs;

$$p_R e_{RR}^n X_{RR}^n + p_A e_{RA}^n X_{RA}^n + p_B e_{RB}^n X_{RB}^n = w_R (G_R + F_R), \quad [n] \quad (19)$$

$$p_R e_{RR}^{mA} X_{RR}^{mA} + p_A e_{AA}^{mA} X_{AA}^{mA} + p_B e_{AB}^{mA} X_{AB}^{mA} = w_R (G_R + F_R) + w_A G_A, \quad [mA] \quad (20)$$

$$p_R e_{RR}^{mB} X_{RR}^{mB} + p_A e_{BA}^{mB} X_{BA}^{mB} + p_B e_{BB}^{mB} X_{BB}^{mB} = w_R (G_R + F_R) + w_B G_B. \quad [mB] \quad (21)$$

Substituting X from (15)-(18) and the markup from (10) and considering the case when all outputs are positive, conditions (19)-(21) become

$$\beta \left[I_R \left(\frac{p_R - w_R c_R}{p_R} \right)^2 + \sum_{i=A,B} I_i \left(\frac{p_i - w_R c_R - \tau_{Ri}}{p_i} \right)^2 \right] = w_R (G_R + F_R), \quad [n] \quad (22)$$

³ In a more general expression the following equations would be written in complementary-slackness form with the relevant variable in brackets. Assuming all firm types are active leads to an interior solution to each equation, hence the equality where complementary slackness generally requires inequalities.

$$\beta \left[\sum_{i=R,A} I_i \left(\frac{p_i - w_i c_i}{p_c} \right)^2 + I_B \left(\frac{p_B - w_A c_A - \tau_{AB}}{p_B} \right)^2 \right] = w_R (G_R + F_R) + w_A G_A, \quad [m_A] \quad (23)$$

$$\beta \left[\sum_{i=R,B} I_i \left(\frac{p_i - w_i c_i}{p_c} \right)^2 + I_A \left(\frac{p_A - w_B c_B - \tau_{BA}}{p_A} \right)^2 \right] = w_R (G_R + F_R) + w_B G_B, \quad [m_B] \quad (24)$$

Trade must balance, giving us the conditions

$$Y_{Rc} - Y_R = n \sum_{k=A,B} X_{Rk}^n (p_k - \tau_{Rk}),$$

$$Y_i - Y_{ic} = n X_{Ri}^n (p_i - \tau_{Ri}) + m_j X_{ji}^{mj} (p_i - \tau_{ji}), \quad i, j = A, B, \quad i \neq j. \quad (25)$$

The X sector is thus defined with the number of each firm type given in (22)-(24), outputs given by the nine inequalities in (15)-(18), goods prices derived from (9), and factor prices determined by skilled labor market clearing in (6). Income levels from (7) and skilled labor demand in the Y sector from (2) serve to close the model.

Suppose that countries A and B enter a regional integration agreement such that the tariff between them is eliminated and consumers are able to arbitrage across the two regions. Trade in goods within the RIA is integrated ($\tau_{AB} = \tau_{BA} = 0$), but factors remain internationally immobile. A multinational can now service both markets A and B from a single plant in either country A or B while exports from R -national firms remain subject to non-member external tariffs. We assume that strict rules of origin preclude a national firm from cross-hauling, or supplying a high-tariff RIA partner with exports shipped from R via a low-tariff partner. In addition, upon integration the A and B markets are considered unified and no price discrimination is possible and we let p_u be the integrated, post-union price in A and B . As the integration of A and B requires only superficial changes in the model specification, we omit the amended equations noting only the above required changes in variables.

3. General equilibrium results

The analysis is complicated by endogeneity of factor prices and national income. Multinational entry, as well as expansion of existing multinational production, will draw labor out of the Y sector and increase the marginal product of labor in Y (and hence the wage) when combined with the sector-specific resource. For a given X supply the number of X plants (and hence fixed plant costs) is also positively correlated with labor costs. While we were able to obtain limited analytical solutions to the general equilibrium problem, these were largely intractable due to nonlinearities in the system and the possibility of corner solutions. To characterize the general equilibrium in the presence of these complications, we simulate the model and perform numeric comparative static exercises. In each experiment a pre-union equilibrium and a post-union equilibrium is computed and compared as parameters of interest are varied. This technique allows us to conduct computational comparative static evaluations on simulated new investment (or disinvestment), which we measure as a positive (negative) percentage change in multinational plants in a country, or dm_i/m_{i0} where m_{i0} is the number of multinational plants before the formation of the RIA.⁴ Investment with an RIA is assumed to be characterized by both R national firms and R -headquartered multinationals. Many possible scenarios are imaginable and we limit our scope of inquiry to a few illustrative and interesting cases.

3.1. Common external tariffs

In the first set of experiments, A and B are assumed to maintain a common tariff both with and without a RIA. This situation approaches that of a customs union with the exception that, in practice, tariffs are rarely harmonized prior to the formation of a union. The counterfactual experiment is useful in decomposing the investment effects of the formation of a RIA while holding external rates of protection essentially fixed. Unless otherwise noted, assume both A and B have identical endowments, technologies, and preferences and R is three times as large as either A or B . R has sufficient labor to service headquarter costs for a large number of national and multinational firms. Simulations demonstrate the impact of

⁴ In order to obtain unique solutions, we impose an additional restriction on the general model. It is assumed that consumers differentiate X products by firm type (n, m_A, m_B) at an elasticity of substitution that approaches that of perfect substitutes. This allows us to rule out computational equilibria with extreme crosshauling.

changes in external tariff rates, partner size and relative factor endowments, and the size of the member region relative to the rest of the world, Figures 1 to 3.

3.1.1. Comparative advantage

A rough measure of a country's comparative advantage is its endowment of labor relative to the Y-specific resource. In the first exercise (Figure 1), we define country i 's relative labor endowment as a factor (l_{iL}) of benchmark national income with factor prices scaled to one. A 's and R 's labor endowments are constant at $l_{AL} = 0.50$ and $l_{RL} = 0.75$. B 's labor stock is varied over a range while the endowment of the Y-specific resource is computed as a residual,

$$K_B = [I_B - \sum_k^{n,mA} \sum_j^{W,A} X_{jB}^k \tau_{jB}] * [1 - l_{BL}]$$

to maintain a constant benchmark national income equivalent to A 's ($I_A = I_B$). As X production is relatively labor-intensive, B moves from comparative disadvantage in X production, relative to both A and R , for very low levels of l_{BL} to a comparative advantage in X as we move along horizontal axis of Figure 1. The vertical axis measures the percentage change in firm numbers in A and B (Panels 1 and 2, respectively) resulting from the formation of a RIA. Each curve represents firm entry and exit responses at a specified common external tariff.

Several observations are of interest. First, as the level of external protection increases the motivation for entry or exit of multinational firms is exacerbated – a magnification effect. This result is consistent across all customs union counterfactuals. Raising the tariff barrier increases the incentive for multinational firm entry in the AB region upon integration.

Second, the rate of change in multinational activity depends on the comparative advantage of the partner country, but in a complicated manner. An ambiguous relationship emerges between the change in percentage change in A multinational plants and B 's relative labor endowment, $\partial (d m_A / m_{A0}) / \partial l_{RL}$. For very low B labor endowments, as l_{BL} increases investment in both A and B occurs at an increasing rate, though at a more accelerated rate in A indicating A 's superior ability to respond to the expanded market.

A turning point occurs at roughly the endowment factor $l_{BL} = 0.2$. Thereafter there is a negative relationship between l_{BL} and new FDI in A (dm_A/m_{A0}) while new FDI in B increases rapidly in l_{BL} . In this region (roughly $0.2 < l_{BL} < 0.35$), marginal improvements B 's comparative advantage in X allow B multinationals to better exploit the growing market size which, in turn, generates increased competition for A firms.

As A and B converge ($0.35 < l_{BL} < 0.65$), multinational entry in A plateaus while new investment in B grows at a diminished rate. This appears to indicate, on B 's part, higher investment levels in the pre-union protected market and hence less room for new multinational firms in the integrated market. As external tariffs rise, the tariff-jumping motivation for direct foreign investment is enhanced. Where B 's relative endowment levels approach R 's, the regime shift to an RIA will tend to dampen this incentive for investment as B is a more competitive supplier to the region regardless of the RIA. Free preferential trade encourages exit of redundant multinational plants that existed prior to the RIA to jump tariff barriers.

Third, regional multinational entry is inversely related to regional trade diversion, as shown in Figure 1 Panel 3. Integration entails some trade diversion as the exports from national firms are supplanted by the production of multinationals domestically and in the union partner. *ROW* national firms may also convert to multinationals and replace its *ROW* exports to the union with supply from a regional subsidiary. Trade creation is partially at the expense of investment diversion when redundant firms exit the region.

Finally, the welfare impact of an RIA depends on the interaction of these elements. Negative trade diversion impacts can be offset by the inflow of multinational investment while trade creation tends to be investment diverting. The presence of scale economies implies technological gains (or losses) as multinational plants move down (or up) their average cost curves as output responds to RIA incentives. With imperfect competition, the opportunity for pro-competitive gains arises as markups adjust to RIA equilibrium. Thus, welfare is not a monotonic function of a nation's regional comparative advantage.

In general, the country with the regional comparative advantage in X production will have more to gain from an RIA, as shown in Figure 1 Panel 4. A comparatively disadvantaged X producer gains less

and may even lose from integration. A member country that is extremely disadvantaged in X production will gain little from an RIA and welfare gains are *decreasing* as its regional comparative advantage in X improves (Panel 4: country B at $l_{BL} < 0.2$). Here, the RIA diverts B 's trade from ROW to A with a commensurate loss in tariff revenues – a classic trade diversion effect. Multinational entry into A exacerbates this tendency. There is a change in this trend at B relative labor endowments of about 0.2 to 0.35, where the RIA leads to an investment boom in B and a plateau in A . As B becomes a somewhat more competitive X supplier it is better able to exploit the expanding market. B 's wages rise while prices fall as l_{BL} rises, and welfare as well as real wages rise at an increasing rate. As nations within the region converge (Panel 4, $0.35 < l_{BL} < 0.65$), B is not as uncompetitive before integration and the market expanding RIA is not as crucial for investment. Welfare levels in A and B converge as relative factor endowments converge, with the gains favoring the nation with the strongest X comparative advantage. Should B have the strongest global comparative advantage in X ($l_{BL} > 0.75$), country A may actually lose by joining an RIA. In this range, new FDI is concentrated in B while trade diversion occurs largely in A .

3.1.2. Relative partner size

Countries may have similar relative endowments but may differ in absolute size. In Figure 2, potential partner countries (A and B) are assumed to be identical in terms of *relative* factor endowments and technologies. B 's absolute size (measured as the pre-union value of endowments), however, varies as a proportion of A 's factor endowment along the horizontal axis of Figure 2 while the percentage change in multinational plants is measured on the vertical axis. Again, variations in the external tariff rate are represented by shifts in the curves.

A clear and unambiguous pattern emerges in Panels 1 and 2. The larger is B relative to A , the lower is the opportunity for new FDI in B and the greater is new FDI in A . Upon integration multinationals are able to serve the region from plants located in either A or B , which favors investment in the smaller country as they gain improved market access in the region. For the large country, the gain in market access is relatively small while the increased competition from foreign plants may be substantial.

In addition, the larger is B the relatively greater the number of multinationals producing in B prior to integration. Integration leads to a redistribution of production in favor of the small country as its plants have more to gain in terms of enhanced market access. Indeed, for sufficiently low tariff levels and large B country size, the formation of a customs union is accompanied by an exit of multinationals in B . All else equal (Figure 4 Panel 3), the relatively smaller is the integrating country, the larger are the relative RIA market expansion effects and the greater the welfare gains from integration.

3.1.3. Size of the integrating region relative to ROW

A third numerical exercise considers the impact of the RIA size relative to R on regional investment by simulating increases in R 's endowments holding relative endowments (K_R/L_R) constant. Potential partner countries (A and B) are assumed to be identical in terms of national income, relative factor endowments, technology, and preferences, and external tariffs on X imports.

We examine the effect of changes in external tariff rates and R 's size on post-RIA FDI in Figure 3 Panel 1. The number of multinational plants in each country is increasing in relative RIA size at an increasing rate, or equivalently decreasing in R size at a decreasing rate. The relatively larger is the integrated region, the greater the market-access incentive for ROW firms to jump the tariff barrier through FDI. Second, multinationality appears to be increasing in the external tariff rate. This indicates that for these parameter values, the incentive to jump tariff barriers is more pronounced when A and B engage in free regional trade than when they do not. The percentage change in firms within the union appears to converge across tariff levels as ROW size expands. As shown in Figure 3 Panel 2, the larger is the integrating region relative to the rest of the world, the larger are the welfare gains.

3.2. Free trade agreements

The second set of experiments models an additional level of distortion as external tariffs differ between A and B . The policy regime shift resembles the formation of a free trade agreement (FTA). A and B initially set independent MFN tariffs on imports. Upon formation of a FTA, A and B eliminate

tariffs internally but maintain sovereign external tariffs on imports from R . Rules of origin are assumed to require complete local content in the manufacturing of X to qualify for preferential access to FTA markets. This eliminates the possibility of cross-hauling as R is not able to service the high-tariff country with exports deflected through the low-tariff country. Figure 4 gives results of comparative advantage simulations. Other results are comparable to those in counterfactuals with a common external tariff and are not shown.

In each case, the analysis differs from Figures 1 to 3 in that each curve represents firm entry and exit responses at a unique *relative* tariff rate (τ_{RA}/τ_{RB}). While multinational responses are similar to those observed with common external tariffs, one important distinction exists. The higher is the tariff in A relative to B , the greater is new FDI (or lower is the exit of FDI) in B and the lower is new FDI (or greater the exit of FDI) in A . The tariff wedge implies an over-investment in the high tariff country, which drives up labor prices in the non-integrated equilibrium. The formation of a FTA tends to redistribute investment more evenly throughout the region until factor prices are equalized.

4. Concluding remarks

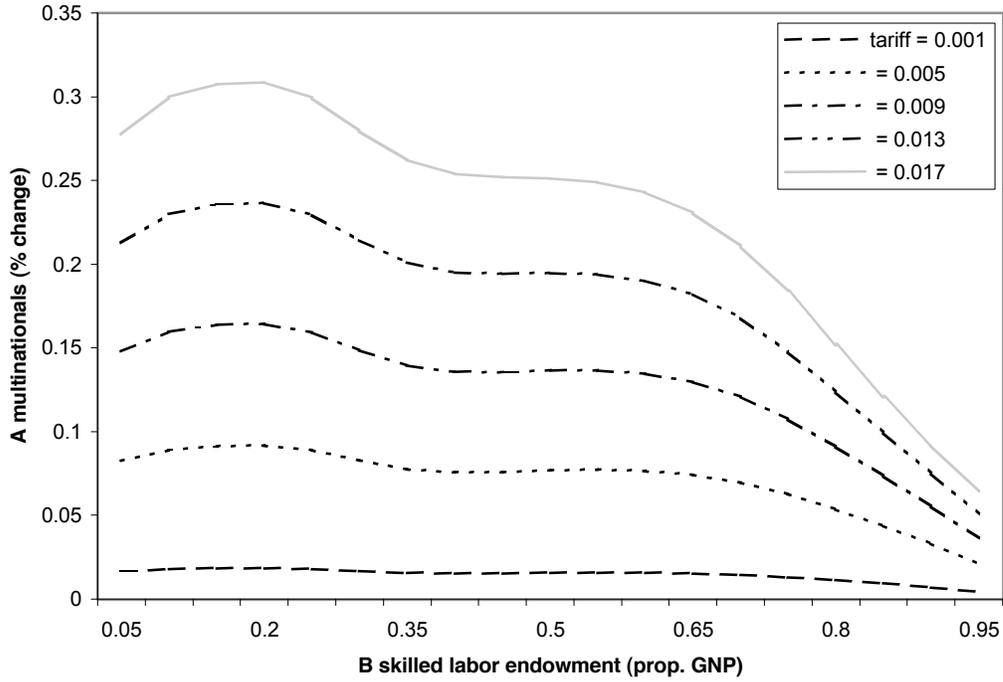
In a general equilibrium model with endogenous FDI in a monopolistically-competitive industry, we analyze a regional agreement between host countries. Results differ in important ways from those obtained in similar models that ignore FDI. We find that regional integration agreements may result in either an increase or a decrease in the level of multinational activity within a member country. While RIAs are neither clearly investment creating or diverting, several predictions are forthcoming. For one, the level of external protection has a magnification effect on the new FDI (or on the exit of existing multinationals). If integrating the region provides a more favorable climate for investment then the higher is the external tariff rate the greater is the incentive for tariff-jumping FDI. However, if multinationals over-invested in the non-integrated nations the RIA may lead to reverse tariff-jumping, which is exacerbated as external tariff rates increase.

Second, investment creation tends to favor the low tariff country at the expense of the high tariff country. In the pre-integration equilibrium multinationals flow disproportionately into high tariff countries, which draws resources out of other sectors and increases factor prices. Integration permits a more regionally-efficient distribution of multinationals as firms can service high-tariff members by exports from subsidiaries in low-tariff members. Third, there is an ambiguous relationship between a country's regional comparative advantage and the change in multinational activity from an RIA. In welfare terms, however, the RIA favors the country with a regional comparative advantage in the multinational sector though the relationship between welfare and relative endowments is not monotonic. Fourth, as is the case for national firm models, the larger is the region relative to non-member countries, the greater is the responsiveness of regional multinational activity to integration and the greater are the welfare gains from integrating. Finally, the RIA favors small member countries in terms of welfare gains and investment creation as they gain improved access to large countries upon integration.

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Figure 1: Comparative advantage with customs union
 Panel 1: Multinational Activity in A



Panel 2: Multinational Activity in B

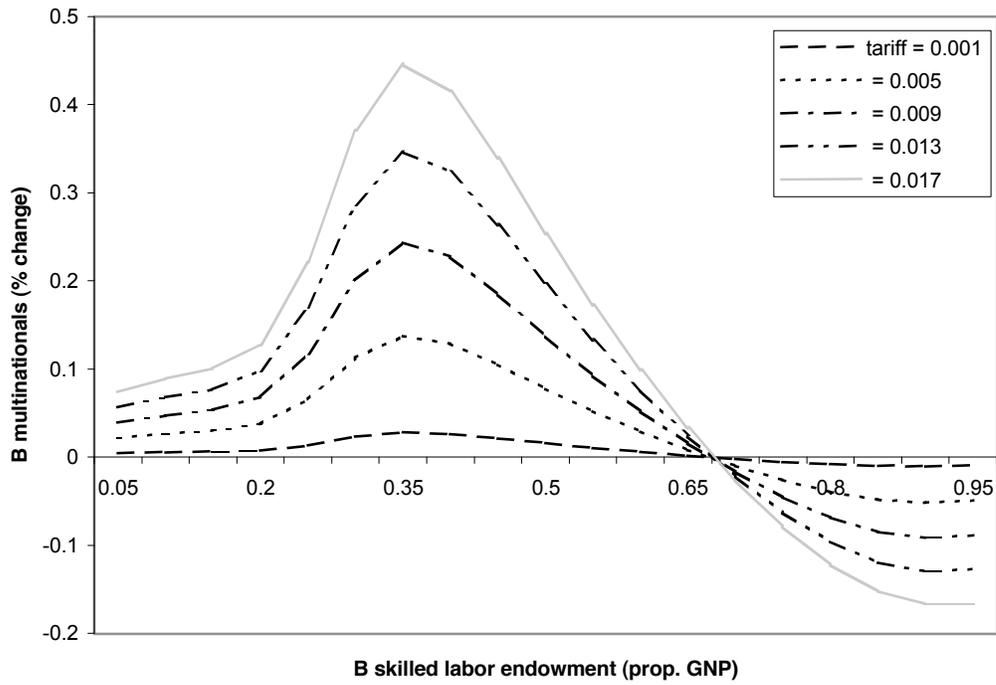
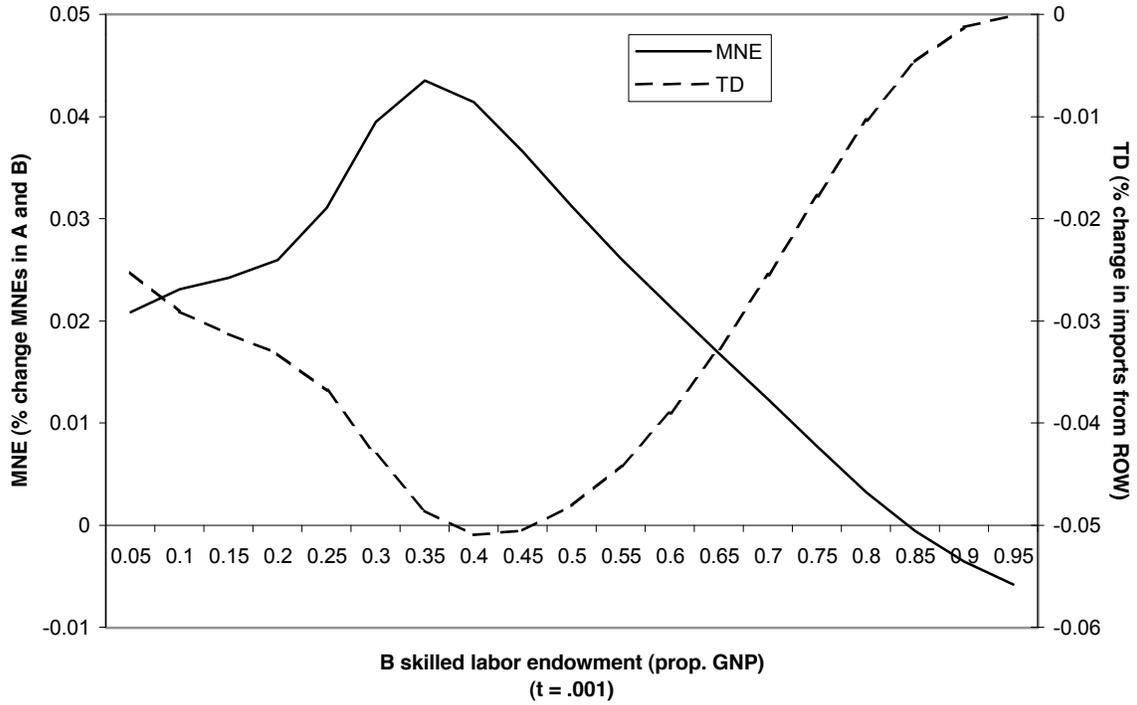


Figure 1: Comparative advantage with customs union
 Panel 3: Multinational enterprise activity (MNE) and trade diversion (TD)



Panel 4: Welfare changes upon integration

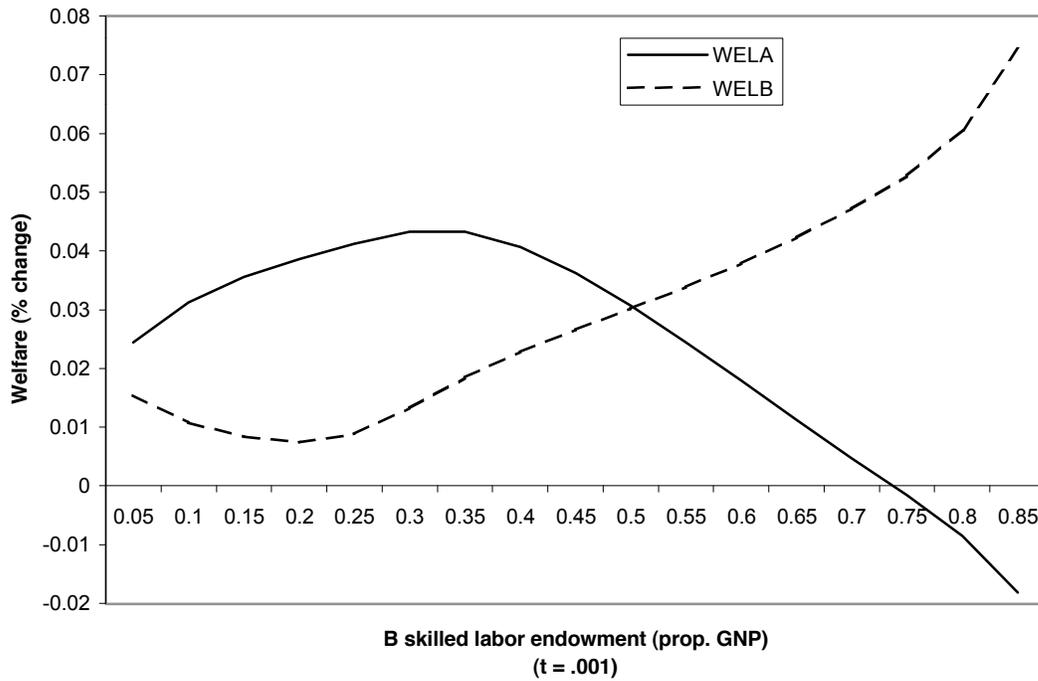
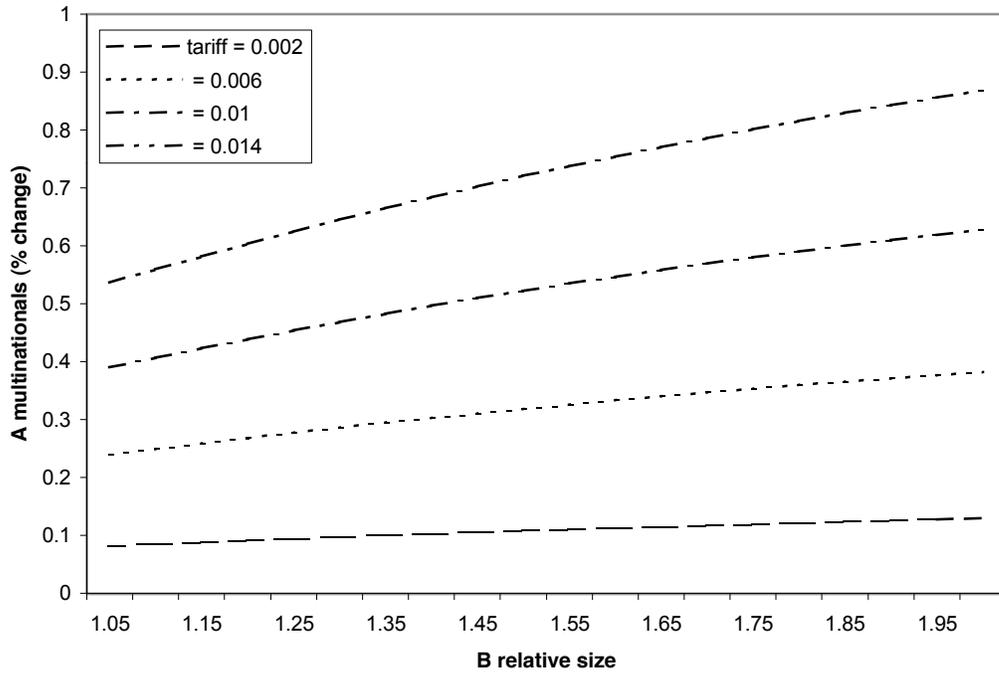


Figure 2: B Size and Investment Creation with Customs Union
Panel 1: Investment creation in A



Panel 2: Investment creation in B

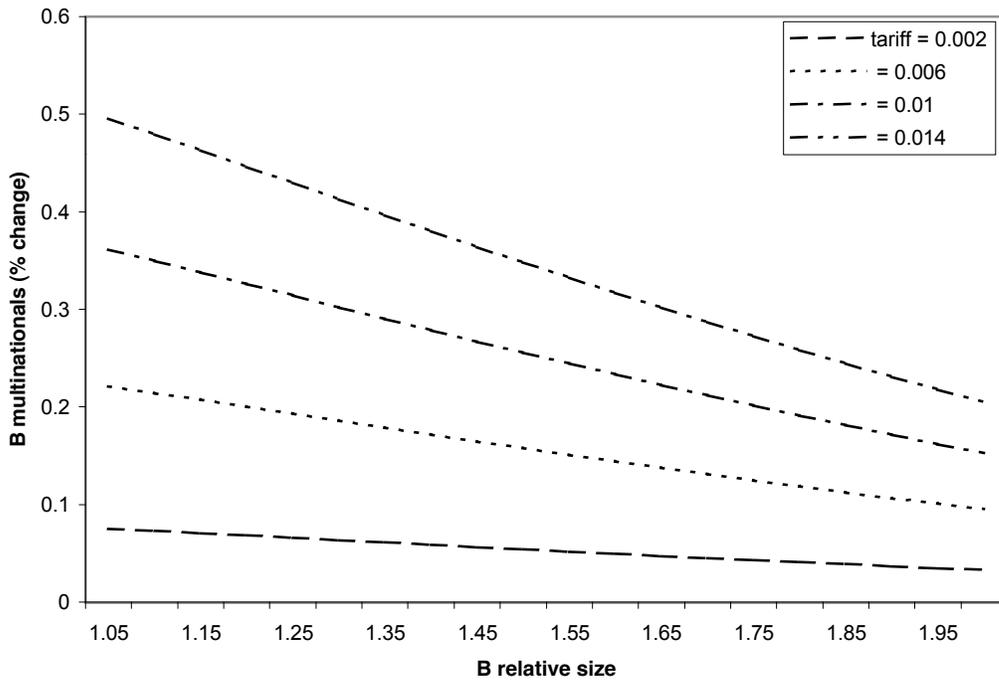


Figure 2: B size and investment creation with customs union
Panel 3: Welfare change

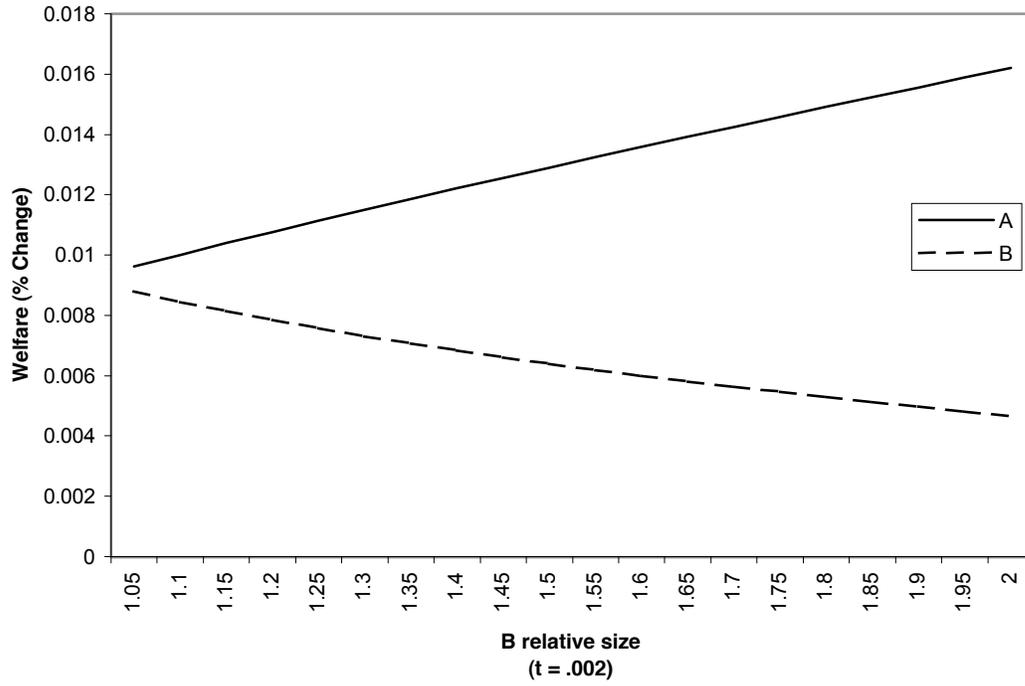
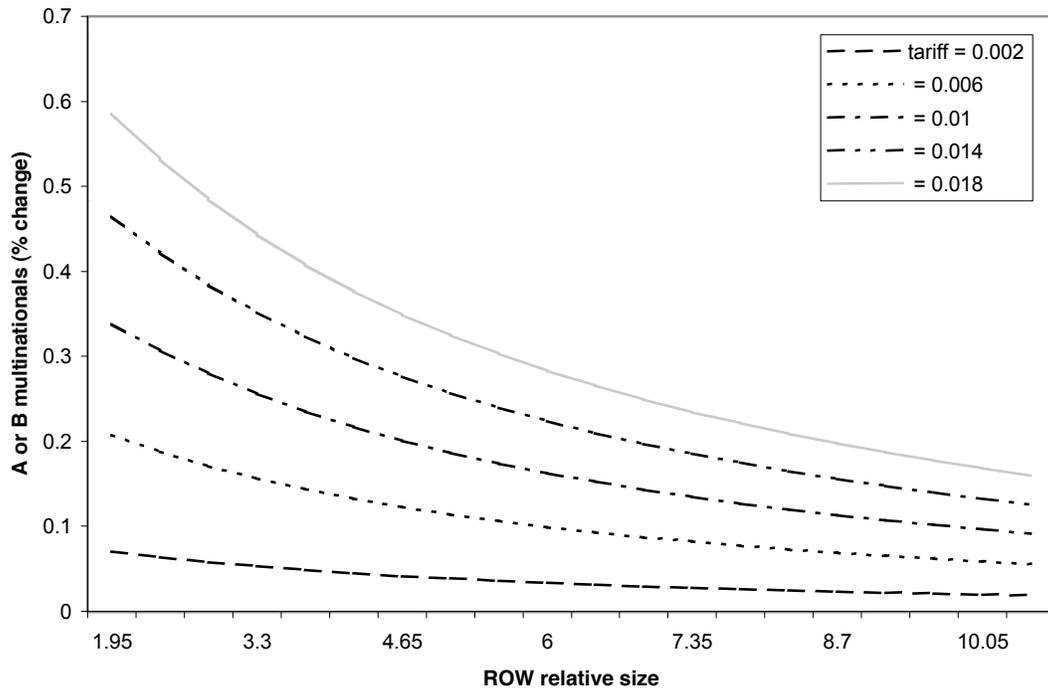


Figure 3: ROW size relative to integrated region
 Panel 1: Investment creation with customs union



Panel 2: Welfare change with customs union

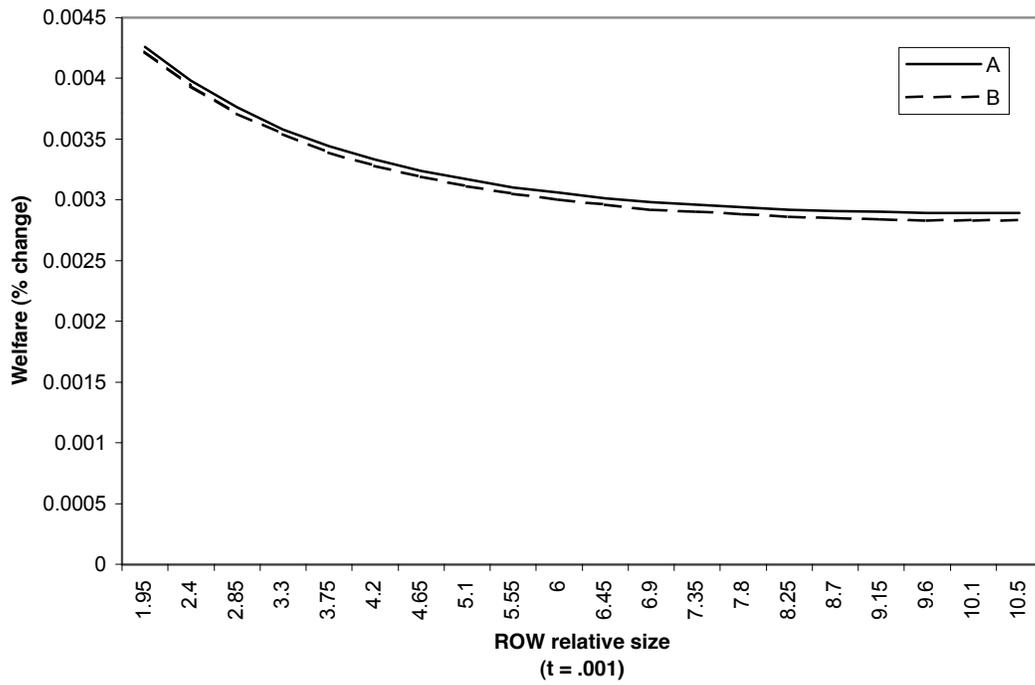
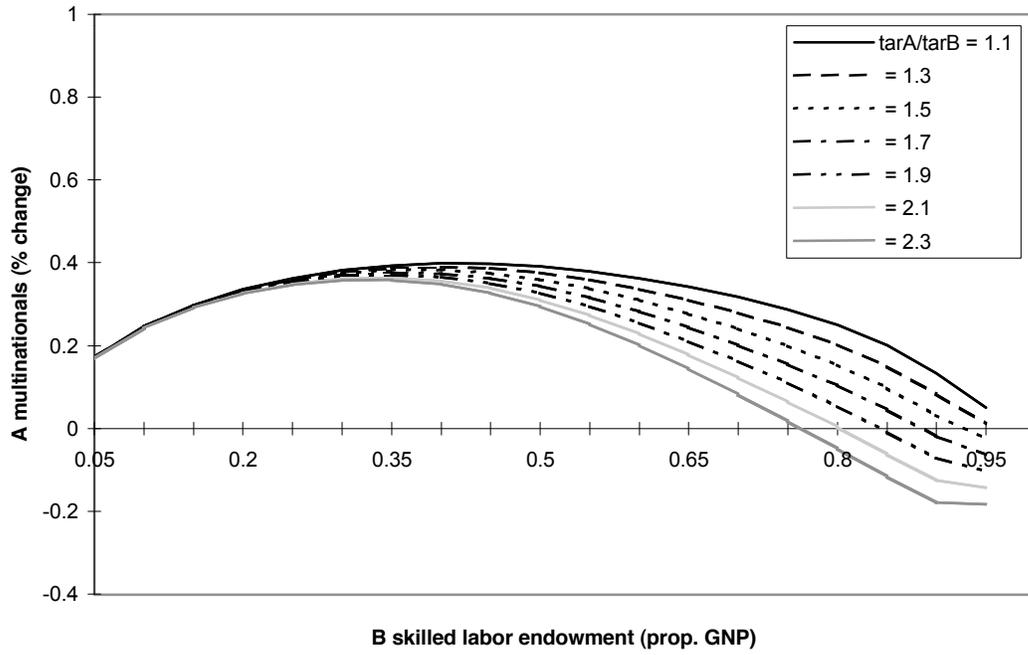


Figure 4: Comparative advantage with free trade agreement
 Panel 1: Multinational Activity in A



Panel 2: Investment creation in B

