Does North-South Integration affect Multinational Firms' Strategies?

Sylvie Montout* Habib Zitouna †

Abstract

Regional integration implies a gradually fall in transaction costs influencing foreign firms' strategies and inward foreign direct investment. Moreover, if it occurs between countries in different stages of development, it has specific outcomes. In the first part of the paper, we present a theoretical model distinguishing between FDI and/or exports motives. Our results suggest that tariff jumping and export-platform motives depend on a trade-off between transaction and fixed costs in addition to wage differences. In addition, we highlight the strategic interactions between insiders and outsiders. Local firms may affect foreign ones in their strategic behavior by reducing the market accessibility advantages.
In the second part of the paper, we applied our theoretical model to the automobile industry in NAFTA. Production of outsiders in Mexico increased significantly, which is not the case for insiders'. Moreover, NAFTA affected positively the Mexican share of the production of either insiders and outsiders, suggesting that, all else equal, it promoted relocation of automobile production in Mexico.

Keywords: Regional integration, FDI, Multinationals.

JEL Classification: F12, F15, F21, F23.

*TEAM - Paris 1 Panthéon-Sorbonne University and CNRS, Maison des Sciences Economiques, 106-112, Bd de l'Hôpital - 75647 Paris Cedex 13. Tel : (33) 1 44 07 82 64. Fax : (33) 1 44 07 82 67. Email: sylvie.montout@malix.univ-paris1.fr

†Corresponding author, TEAM - Paris 1 Panthéon-Sorbonne University and CNRS, Maison des Sciences Economiques, 106-112, Bd de l'Hôpital - 75647 Paris Cedex 13. Tel : (33) 1 44 07 82 64. Fax : (33) 1 44 07 82 67. Email: hzitouna@univ-paris1.fr

1 Introduction

Process of economic integration have continued to develop over the past decades with the creation of Regional Integration Agreements (RIAs) such as North American Free Trade Agreement (NAFTA), MERCOSUR, European Union, etc. This evolution in world economic relations have renewed interest in the economics of regional integration, first raised by Viner (1950). Since Foreign Direct Investment (FDIs) are one of the two channels to supply a foreign market, the most topical issues in the debate on RIAs concern FDI creation, FDI diversion . Therefore, the main question is to know whether RIAs promote FDI flows or not?

Regional economic integration refers to reductions in trade barriers and investment restrictions. It induces a greater efficiency in the allocation of resources, due to increased competition. Moreover, economic integration may have a distinct impact following the firm's strategy : whether it aims to avoid trade barriers or to internalize firm-specific intangible assets. FDI inflows from outsiders into the region could obviously go up if the average level of protection increases as a result of the RIAs or if the free trade agreement raises fears about future protection (as described by Blonigen and Feenstra (1996)). Regional integration creates a larger market which allows some firms to grow larger and stronger than what would have been possible in individual national markets. The main benefits of integration is to make the region more attractive towards location, which should stimulate intra-regional FDI as well as inflows from the rest of the world.

The existing theoretic literature on economic integration and FDI deals with the question of whether RIAs, by eliminating trade barriers, promote FDI flows or not. Norman and Motta (1996) found that increased market accessability prompts outside firms to invest in the regional block, reducing product prices, profits of intra-block firms, and increasing total surplus. Integrating economies are more likely to gain from improving intra-regional market accessability

than from tougher external trade policy, and may wish to offer investment incentives to encourage FDI by outside firms. Norman and Motta (1993) analyzed the effects of the creation of Free Trade Area (FTA[1]) between Eastern European countries on external firms' strategies in supplying these markets. They showed that both market growth and improved market accessability lead the external firms to switch from exporting to FDI.

Neary (2002) identified three distinct influences on how Multinational Firms (MNFs) choose to serve a union market :

- The tariff-jumping motive favoring FDI over exporting the higher the external tariff and the lower the fixed costs of a new plant. Moreover, reductions in internal tariffs reduce the tariff-jumping incentive to establish more than one union plant, and so encourage plant consolidation.
- The export platform motive, as internal tariffs fall, this favors FDI with only a single union plant relative to exporting. It may also induce a firm which has never exported to invest : this is more likely for multinationals with high access and fixed costs, and which face less competition from union firms.
- Increased competition - due to reduced internal tariffs - works against both FDI and exports and may lead to the 'fortress' outcome of MNFs leaving union market even though external tariffs are unchanged.

Empirical studies found a positive incidence of regional integration on FDIs. Yannopoulos (1990) highlighted the significant growth of intra-regional FDI flows in the European Union. Moreover, Dunning (1997) demonstrated the positive incidence of EU on the inter- and intra-capital flows. In addition, a sectoral analysis on the England agro-food industry by Morgan and Wakelin (2001) emphasized the increase of foreign and domestic investment in this sector. Besides, Girma (2002) examines the determinants of FDI location choices in the UK using disaggregated data for manufacturing industry between 1981 and 1991. He concluded that

[1]we use FTA for both Free Trade Area and Free Trade Agreement

opportunities created by regional integration deepening have changed the FDI flows' determinants. Furthermore, Barrel and Pain (1999) found that Japanese investment flows in European countries were influenced by trade barriers.

Blomström and Kokko (1997) analyzed in detail the incidences of North American integration on FDIs. They consider that *the stronger the environmental change connected with regional integration and the stronger locational advantages of the individual country or industry, the more likely it is that integration agreement will lead to inflows of FDI from the outside as well as from the rest of the integrating region.* As a matter of fact, they highlight differences in structures of regional blocs by distinguishing North-North (Canada and US) and North-South regional integration (the inclusion of Mexico). On the one hand, the former agreement had a negligent impact on FDI flows. On the other hand, the latter had a significant incidence on inward foreign investment flows in Mexico.

The aim of the first part of the paper is to examine theoretically the effects of North-South regional integration on the MNFs strategies. Notably, we explain motives for different strategies of FDI. Then, we see whether reaction by firms from the FTA (insiders) affects the location choices of firms from outside (ousiders).

This paper is closely related to the problematic of regionalism versus multilaterlism since developing countries engaged in FTAs process can be more or less closed towards countries outside the FTA in terms of FDI attractiveness. This question is quite crucial since FDI is considered as an important channel of positive externalities that benefit local firms.

In the second part, our aim is twofold :

First, we study the determinants of the automobile production in Mexico. We find a significant positive (negative) impact of Mexican demand (costs). US variables have nuanced effects. Moreover, we find positive (negative) impact of Mexican relative demand (costs) on the Mexican production share -regarding Mexican and US ones.

Second, we examine the effects of the creation of NAFTA on firms operating in the automobile sector. We find a positive impact on the production of outsiders in Mexico and no significant one on insiders. Furthermore, it affected positively the Mexican share of the production of either insiders and outsiders, suggesting that, all else equal, it promoted relocation of automobile production in Mexico. Finally, we found that NAFTA affected firms' strategies in 1991 for insiders and 1992 for outsiders.

The reminder of the paper proceeds as follows. In section 2 we display the theoretical model, section 3 presents the regional integration's incidences on foreign firms' strategies. In section 4, we present the empirical analysis. Finally, section 5 concludes.

2 The Model

Consider a world in which there are three countries j, j=A,B and C.

Because we are interested in the effects of economic integration on FDI location choices by firms from outside the region, we suppose that countries A and B are involved in a FTA, that is, there is a gradual decrease in trade barriers between countries A and B.

We suppose that there is a duopoly. One firm from country A (insider) and one from country C(outsider) producing homogeneous good. We suppose that the aim of these firms is mainly to provide country A market. Moreover, we suppose no firms originating from country B.

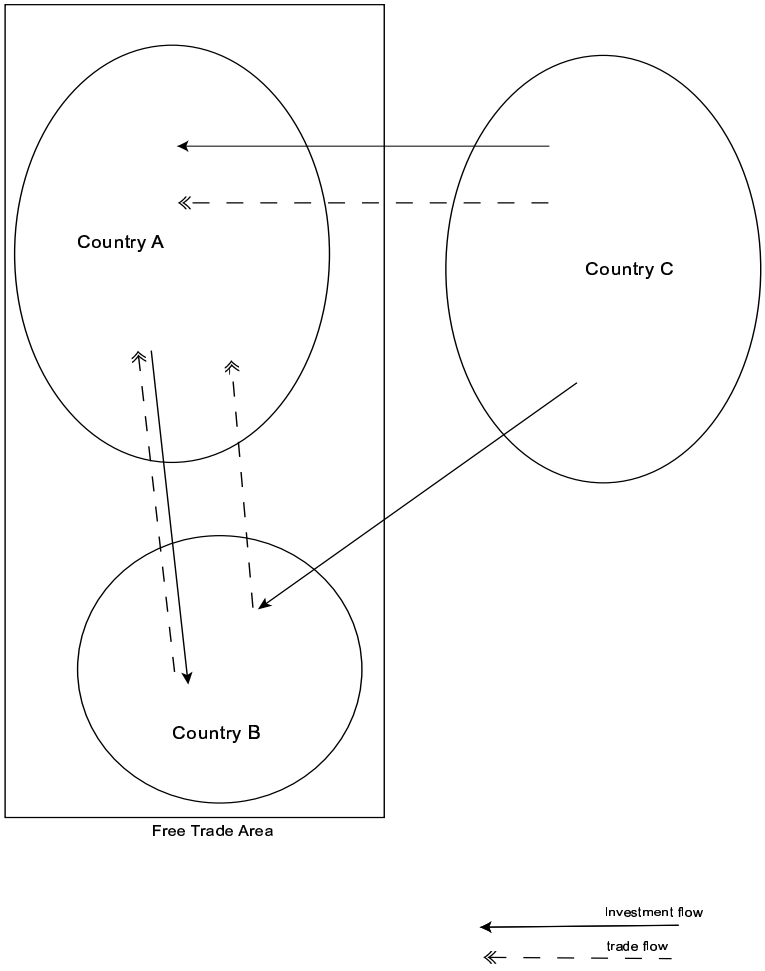
Choices of these firms are as follow and represented in figure 1.

Country A firm (insider) has the choice between :

- Staying in its home country, in this case it has not to pay neither variable nor fixed additional costs. However by producing in country A, production variable costs are higher due to differences in wages $w_A > w_B$.

- Investing in country B, and re-export to its home market. In this case, it pays fixed (F_B) and

Figure 1: The game



transaction (t_B) costs. Moreover, it benefits from lower wages.

Country C firm (outsider) has three choices :

- It exports from its home market and bears transaction costs (t_C) which include not only transport but also trade barriers.

- It invests in country A and pays fixed costs (F_A^*).

- It invests in B and bears not only fixed costs (F_B^*) but also transaction ones (t_B). However, by investing in country B, it benefits from lower wages.

Cost function is:

$$CT_j = (w_j c + t_j)q_j + w_j F_j \qquad j = A, B \tag{1}$$

for insider, and :

$$CT_j^* = (w_j c + t_j)q_j^* + w_j F_j^* \qquad j = A, B, C \tag{2}$$

for outsider. Where :

- c is the variable production costs. They are the same in A,B and C and for both firms, that is why they are not indexed.

- w_j : wages in country j. Throughout the paper, we suppose that $w_B = w_l$ and $w_A = w_C = w_h$ (h for high and l for low)

- F_j and F_j^* is the fixed labor requirements (in terms of wage) of final good producers for respectively local and foreign firm located in j.

- t_j is transaction costs to ship goods from country j to country A. If firms are located in A, they don't pay any transaction cost. We distinguish internal (t_B) and external (t_C) transaction costs.

- $F_A = F_C^* = 0$: We consider only additional fixed costs associated with investment in a foreign country.

We suppose an inverted linear demand function :

$$p = a - bQ \tag{3}$$

Where p is product price. Moreover, $Q = q + q^*$. So profits of country A firm have the form :

$$\Pi_j = pq_j - CT_j \qquad j = A, B. \tag{4}$$

and those of country C firm :

$$\Pi_j^* = pq_j^* - CT_j^* \qquad j = A, B, C. \tag{5}$$

Table 1: Firms' strategies

	Outsider's strategies		
Insider's strategies	exports	invests in A	export platform
stays in A	case1 : (Π_A, Π_C^*)	case2 : (Π_A, Π_A^*)	case3 : (Π_A, Π_B^*)
relocates in B	case4 : (Π_B, Π_C^*)	case5 : (Π_B, Π_A^*)	case6 : (Π_B, Π_B^*)

We model the quantity-location game played by these firms as a two-stage game using the concept of subgame perfect Nash equilibrium . In the first stage, each firm chooses a location configuration then its mode of supplying market A. The second-stage is modelled as a Cournot game in which each firm makes its quantity choices given the market configuration established in the first stage; that is; in the second-stage subgame, we identify the Cournot equilibrium for all firms for each market location.

All the equilibrium configurations are summarized in table 1.

Case 1 :

In case 1, insider stays at home, it does not has to pay neither transaction costs nor fixed ones associated to implementation abroad. It competes with outsider which is disadvantaged since the latter has to pay additional transaction costs. This case works like a Brander and Krugman (1983) reciprocal dumping case. Outsider accepts lower markups on its exports.

Profits are described in equations (6) and (7) [2]:

$$\Pi_A = \frac{1}{9b}\left[a - w_h c + t_C\right]^2 \tag{6}$$

$$\Pi_C^* = \frac{1}{9b}\left[a - w_h c - 2t_C\right]^2 \tag{7}$$

We see that country A (C) firm's profits are decreasing (increasing) with external transaction costs. Here, there is neither wage difference nor fixed costs.

[2]The complete model (quantities, prices) is in Appendix A

Case 2 :

In this case, both firms are located in country A. So they have the same variable costs. However, profits of country A firm are higher than those of country C one since the latter has to bear fixed costs. Nevertheless, foreign firm has not to pay transactions costs including trade barriers and transport costs.

Profits are described in equations (8) and (9) :

$$\Pi_A = \frac{1}{9b}\left(a - w_h c\right)^2 \tag{8}$$

$$\Pi_A^* = \frac{1}{9b}\left(a - w_h c\right)^2 - w_h F_A^* \tag{9}$$

Case 3 :

In this case, insider stays at home, it produces at high production costs and does not bear fixed ones. On the other hand, outsider invests in the low wage country. By doing so, it bears fixed costs of implementing new facilities abroad. These fixed costs are lower than those in case 2 since they depend on wages and $w_B < w_A$. Moreover, it pays low wages in country B and pays intra-regional transaction costs (t_B).

Profits are described in equations (10) and (11) :

$$\Pi_A = \frac{1}{9b}\left[a + (w_l - 2w_h)c + t_B\right]^2 \tag{10}$$

$$\Pi_B^* = \frac{1}{9b}\left[a + (w_h - 2w_l)c - 2t_B\right]^2 - w_l F_B^* \tag{11}$$

Case 4 :

In this case, country A firm relocates in B whereas, country C one stays in C. The former has to pay fixed costs and transaction ones in order to re-export. In doing so, it benefits from low wages. The latter has to pay only transaction costs. Profits are described in equations (12) and

(13) :

$$\Pi_B = \frac{1}{9b}\left[a + (w_h - 2w_l)c + t_C - 2t_B\right]^2 - w_l F_B \tag{12}$$

$$\Pi_C^* = \frac{1}{9b}\left[a - 2t_C + t_B - (2w_h - w_l)c\right]^2 \tag{13}$$

Case 5 :

In this case, country A firm invests in B whereas country C one invests in A. The former has to bear fixed costs in order to re-export produced goods to market B. In the same way that in case 4, the former benefits from wage differential between w_l and w_h. Profits are described in equations (14) and (15) :

$$\Pi_B = \frac{1}{9b}\left[a + (w_h - 2w_l)c - 2t_B\right]^2 - w_l F_B \tag{14}$$

$$\Pi_A^* = \frac{1}{9b}\left[a + (w_l - 2w_h)c + t_B\right]^2 - w_h F_A^* \tag{15}$$

Case 6:

In this case, either country A and C firms relocate in B . They have the same variable costs. Profits are described in equations (16) and (17) :

$$\Pi_B = \frac{1}{9b}\left[a - w_l c - t_B\right]^2 - w_l F_B \tag{16}$$

$$\Pi_B^* = \frac{1}{9b}\left[a - w_l c - t_B\right]^2 - w_l F_B^* \tag{17}$$

3 Regional Integration Effects' on Firms' Strategies

North-South regional integration affects firms' strategies. We distinguish the tariff jumping and the export platform motives that can be alternative or successive.

3.1 Tariff jumping Motive

In order to integrate a country, outsiders can adopt two strategies. They have the choice between exporting from their home country, and in this case, they pay transaction costs (tariffs and transport costs). They can also invest in the considered country in order to jump the border and do not pay these transaction costs. However, in the latter case, they have to pay fixed costs. This traditional choice of foreign firm is the tariff jumping motive for internationalization.

We assume that local firm stays in its home market (A) and does not invest in the partner country (B).

This effect holds if Π_A^* $(case\ 2) > \Pi_C^*$ $(case\ 1)$

This motive is not specific to the creation of FTA, nevertheless we chose to illustrate it in order to better explain next motives of FDI and effects of FTAs.

Exporting is profitable for external tariffs below a threshold level $(\tilde{t_C})$(equation 18)[3] which equalizes Π_C^* and Π_A^*.

$$\tilde{t_C} = \frac{1}{2}\left[a - w_h c - \sqrt{(a - w_h c)^2 - 9 b w_h F_A^*}\right] \tag{18}$$

The derivative of $\tilde{t_C}$ regarding F_A^*, is positive [4] suggesting that $\tilde{t_C}$ is increasing with fixed costs of settlement in the FTA.

This is an intuitive result, the trade-off between FDI and trade occurs between fixed costs associated to the former strategy and variable ones associated to the latter.

3.2 Export Platform Motive

Regional integration improves market accessability by lowering internal tariffs. Thus, if two countries engage in a FTA, the fall in transaction costs between them gives incentive for foreign

[3] analytical derivation of $\tilde{t_C}$ is in Appendix B.1

[4] see Appendix B.1

countries' firms to invest in one country and export to its partner. Moreover, if this regional integration occurs between two countries in different stages of development, outsiders are more likely to locate where production costs are cheaper : this is the export platform motive.

What about the effects of a decrease in internal transaction costs t_B?

Consider the case of one firm which does not invest in the country before the FTA and it chooses to invest in country B (the partner country) using this subsidiary as an export platform[5] : there is FDI creation.

The condition for this effect to hold is : Π_B^* $(case\ 3) > \Pi_A^*$ $(case\ 1)$ and Π_B^* $(case\ 3) > \Pi_C^*$ (case 2): That is, foreign country firm prefers to invest in B over exports and/or FDI in A.

The first condition (investment in B is preferred to exports) is explained by equation (19). $\tilde{t}_B^1$[6] represents the internal transaction cost's level below which outsider prefers to invest in B.

$$\tilde{t}_B^1 = \frac{1}{2}\left[a + (w_h - 2w_l)c - \sqrt{9bw_l F_B^* + (a - w_h c - 2t_C)^2}\right] \tag{19}$$

An increase in w_h (w_l) affects positively (negatively) $\tilde{t}_B^1$ [7]. It means that the more differences in wages between countries involved in a RIA are, the more likely outsider invests in the low wages one.

Moreover, $\tilde{t}_B^1$ increases with t_C : If external tariffs increase, the costs of exporting from country C are higher inducing a decrease in their profits in case 1. Then, the profitability to switch from exports to investment in B rises.

The second condition relative to this motive relies on the fact that foreign firm prefers to invest in country B to country A. This condition is represented in equation (20). $\tilde{t}_B^2$[8] represents the internal transaction costs' level below which outsider invests in B. It depends on wage differences

[5] by export platform, we consider only the establishment of production activities

[6] analytical derivation of $\tilde{t}_B^1$ is in Appendix B.2

[7] see Appendix B.2

[8] analytical derivation of $\tilde{t}_B^2$ is in Appendix B.3

and fixed costs.

$$\tilde{t}_B^2 = \frac{1}{2}\left[a + (w_h - 2w_l)c - \sqrt{9b(w_l F_B^* - w_h F_A^*) + (a - w_h c)^2}\right] \tag{20}$$

What about the effects of change in relative wages and external trade costs on the foreign firm's profitability?

External trade barriers do not affect $\tilde{t}_B^2$. Whereas difference in wages is important. In fact an increase (decrease) in high (low) wages country rises the profitability to invest in B compared to A.

An increase in w_h has a double impact here. First, they affect positively quantities produced and variable profits in case 3. Second, they affect negatively quantities produced and profits in case 2 (either variable and total profits since fixed costs depend on labor costs).

As a conclusion, we see that the motives for an 'export platform' strategy depend on either wages and trade barriers differences. The more these differences important are, the more likely foreign firms use this strategy when internal trade costs fall.

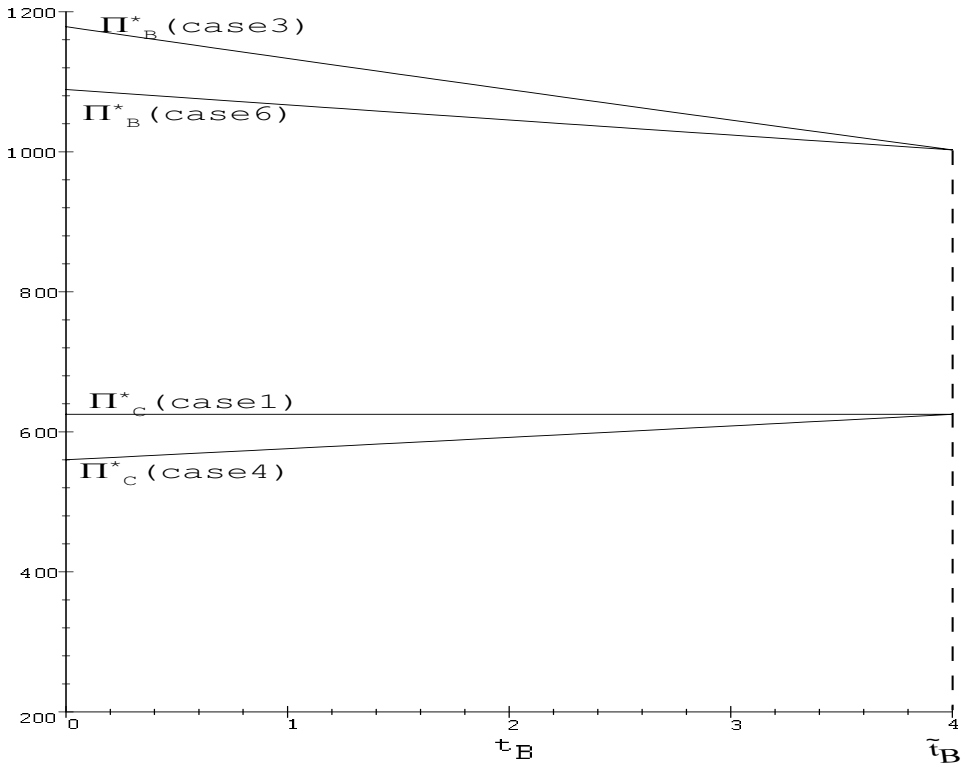
In addition to North-South characteristics of regional integration, we add to Neary (2002) framework the possibility of FDI for insiders in the low wage country. By doing so, the model takes into account the strategic interactions between insiders and outsiders.

3.3 Effects of insider's reaction on outsider's strategy : The eviction effect

By considering North-South FTA, what could be interesting to see is the strategic interactions between local and foreign firms. In fact, if the fall in internal trade barriers and the difference in wages give incentive to outsiders to set up in the low wage country, we can expect that it is also the case for local ones.

Figures (2,3 and 4)[9] plot outsider's profits when it chooses to get in country B and insider is located in B (case 6), its profits when it chooses to get in B and its competitor stays in A(case 3), its profits when it stays in C and its competitor invests in B(case 4) and its profits when it stays in C and country A firm stays in A (case1). These profits are function of internal trade costs (t_B).

Figure 2: Low fixed costs ($F_B^* = 0$)



First, we describe outsider's profits when insider locates in A. In case 1, outsider's profit do not depend on internal tariffs. This is an expected slope since, either local and foreign firms do not locate in country B. In case 4, profits are positive function of internal transaction costs. In this case, foreign firm is located in C and local one in B. So, internal tariffs constitute a cost only for local firm. In both previous cases, insider is located in country A. By comparing them,

[9]parameters values chosen are : a=100, b=1, $w_l = 1$, c=1,$w_h = 5$,$t_C = 10$

we see that if internal trade costs are low (high), outsider prefers to invest in country B (export) when insider locates in A. $\tilde{t_B}$[10] represents the internal transaction level which equalizes profits in cases 1 and 4.

$$\tilde{t_B} = (w_h - w_l)c$$

If $t_B > \tilde{t_B}$, then outsider prefers to stay in C on investment in B.

Then, we describe profits when insider locates in B. In case 3, internal tariffs have a negative impact on foreign firm's profits, this is due to the fact that, when outsider is located in country B, then, internal tariffs constitute a cost for it. The slope of the case 6 profits is also negative but less sharper. If we look at equations (11) and (17), we see that this difference in slopes is due to the fact that in case 3, it beneficiates alone from a decrease in internal trade costs. Whereas, in case 6, a decrease in trade costs affects positively not only its profits but also those of insider. In these two cases, if internal trade costs are low (high), outsider invests in B (stays in C). The threshold level of internal trade costs is also $\tilde{t_B}$.

If $t_B > \tilde{t_B}$, then outsider prefers to stay in C on investment in B for any given strategy of the insider. Internal transaction costs are not enough low, so, outsider prefers when insider is alone there.

We choose to represent profits only for internal transaction costs lower that $\tilde{t_B}$ because it constitutes the maximum level for which insider would accept to invest in B whatever is the strategy of the outsider[11].

These slopes suggest that fixed costs are crucial in determining the outcome. In fact, if F_B^* varies, it affects profits in cases 3 and 6. The slope of curves is unchanged but the level is. By decreasing or increasing, profits do not intersect at the same level. So, we can have different configurations.

[10] analytical derivation of $\tilde{t_B}$ is in Appendix C.1
[11] calculations are in Appendix C.2

In order to put the stress on the effects of the insider's on the outsider's location strategy, we ask whether the latter changes its strategy when the former switches from investing in A to B. So, we compare case 3 to case 1 profits (outsider profits when the insider is located in A) and case 6 to case 4 ones (outsider profits when the insider is located in B).
(all configurations are described in table 2).

Figure (2) represents profits for low fixed costs of settlement in B. We see that Π_B^* (*in case* 3) > Π_C^* (*in case* 1) and Π_B^* (*in case* 6) > Π_C^* (*in case* 4). It indicates that outsider prefers to invest in B whatever internal transaction costs are.

Figure (3) represents profits for medium fixed costs of settlement in B. The outcome depends also on internal trade costs. If the latter are high, outsider exports from C. If they decrease, there is a set of levels (corresponding to A and A') for which foreign firm invests in country B when local one is located in A (case 3 profits are higher than case 1 ones) whereas it stays in country C when the latter invests in B : this is an eviction effect. Finally, for low levels of internal trade costs, outsider invests in B.

We are particularly interested in explaining this eviction effect. Suppose that internal trade costs are high enough so that outsider prefers to export. If they decrease, the profitability to switch from exports to FDI is higher when the insider is located in A. Indeed, in this case, outsider benefits alone from the decrease in variable costs (its market share increases). Whereas, when the insider is located in B (cases 6 and 4), the same decrease in internal trade costs benefits less the outsider since it has to share the gain from this fall in variable costs with the insider (the market share is not changed). So, we have this set of internal trade costs for which, if the insider is located in A, outsider invests in B, whereas, if the former relocates in B, fixed costs of settlement in B for outsider could be enough high to prevent it from investing there.

Figure 3: Medium fixed costs ($F_B^* = 500$)

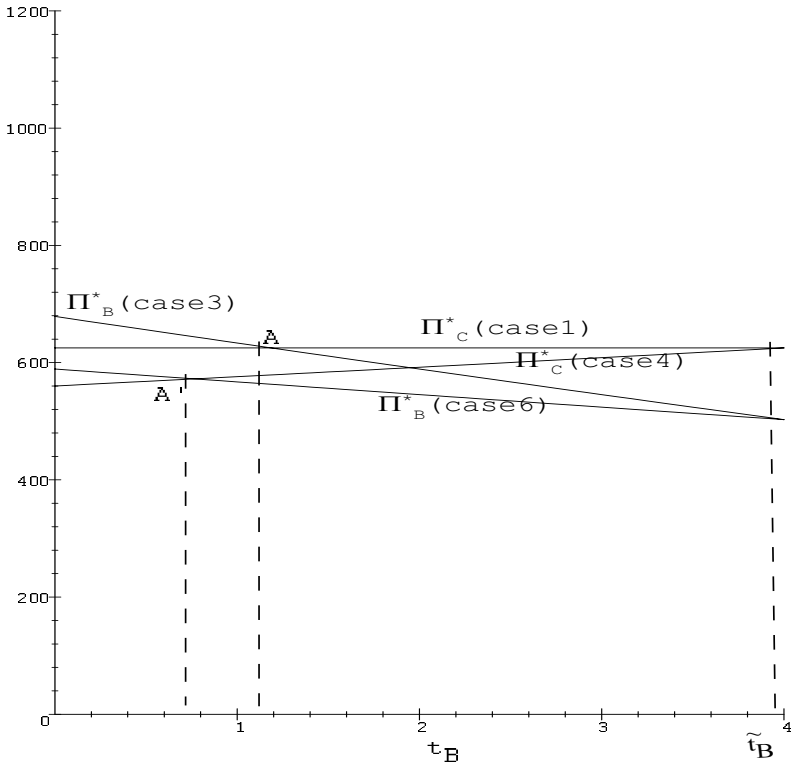


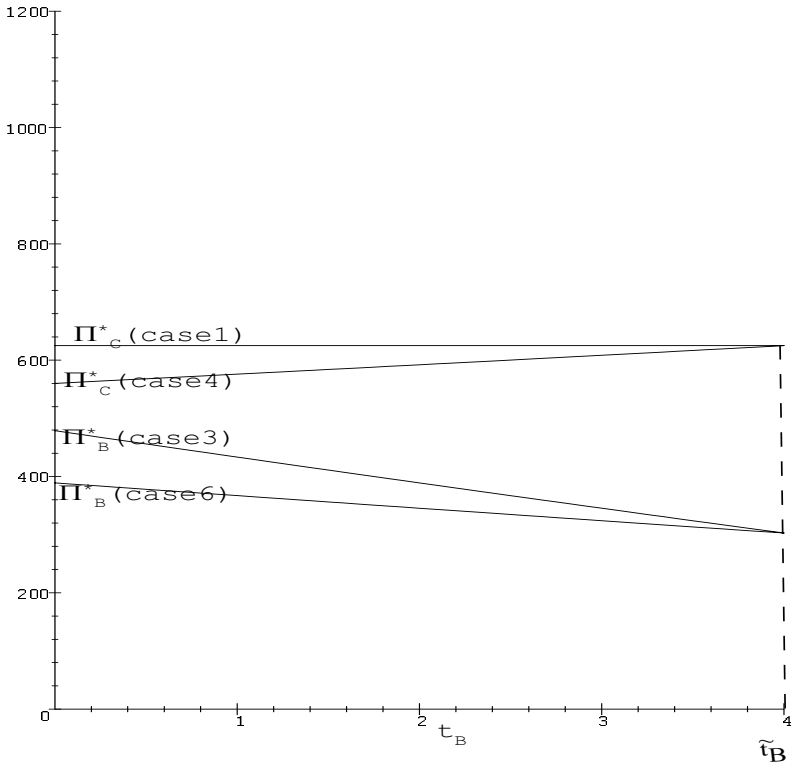
Table 2: Eviction Effect

	internal transaction costs		
fixed costs	low	medium	high
level1	Investment in B	Investment in B	Investment in B
level3	Investment in B	eviction effect	exports
level4	exports	exports	exports

Analytically, we found that the eviction effect holds for $t_B < \bar{t}_B$[12][13].

Finally, if fixed costs are high (Figure 4), foreign firm always chooses the export strategy : it prefers to bear external trade costs to settlement abroad.

Figure 4: High fixed costs ($F_B^* = 700$)



As a conclusion of this theoretical study, we found that the tariff jumping argument and

[12] demonstration is in Appendix C.3

[13] $\bar{t}_B$ represents a condition on trade costs for which eviction effect can exist (if profits intersect for these values of internal trade costs, eviction effect holds)

the export platform motive depend on wages differences, relation between internal and external trade costs and fixed costs of settlement in the low wage country. Moreover, there is an eviction effect - in the sense that insiders prevent outsiders from investing in the FTA - but is not due to the same reasons than in Neary (2002). In fact, it is not the competition which explains it but the strategic reaction of the insiders. Indeed, we allowed for insider to invest in the partner country and we saw that when the latter exploits the differences in wages and better access to demand, fixed costs of settlement prevent outsiders from investing in the FTA.

4 Empirical Analysis : The Case of Mexican automobile Industry

4.1 Stylized Facts

Since the beginning of the 1980s', the automobile production in Mexico experienced a significant and continuous increase (see figure 5). Moreover, the production of foreign companies excluding American firms knew an important growth and notably since 1997 which represents the date of take-over of Chrysler by Benz, a German firm. This take-over explains the asymmetric evolution of US and outsider companies' production between 1997 and 1998.

The main automobile constructors are Volkswagen, Chrysler, General Motors, Ford and Nissan. In fact, these multinational firms concentrate for all the considered period more than 95% of the production (see table3). Moreover, data illustrate the predominant presence of US firms in Mexico until 1997. During this period, they realize, in mean, more than 60% of total production. The substantial modifications in this industry result mainly from investments engaged by Chrysler, Ford and General Motors.

Figure 6 illustrates the evolution of Mexican exports from 1983 to 1999. It translates the important role of the US market in addition to the Mexican one. At the end of the period about

Figure 5: Mexican production in the automobile industry by country of origin of firms

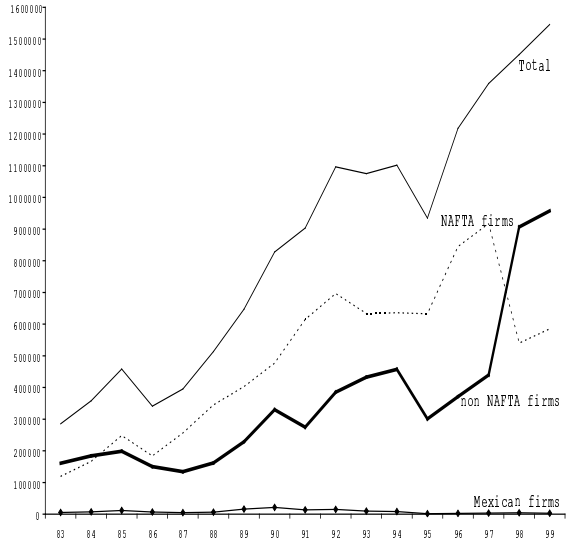


Table 3: Production shares (% of total production) of the five largest automobile constructors in Mexico

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total (in units)	820 558	989 373	1 083 091	1 086 621	1 127 515	935 159	1 219 424	1 359 588	1 455 360	1 493 666
Chrysler*	20,41	19,62	21,68	21,02	21,61	21,98	29,62	26,18	24,70	21,38
Ford	2,08	22,49	23,75	19,27	20,18	24,31	17,51	18,19	14,67	15,42
GM	20,41	19,46	18,50	17,70	14,29	21,26	21,96	22,13	21,71	21,66
Nissan	16,63	12,37	15,93	17,11	17,17	11,42	11,12	12,71	13,04	12,01
Volkswagen	23,54	22,31	18,65	22,00	22,73	20,47	18,95	18,93	23,29	26,56
Total (shares)	83,07	96,25	98,50	97,09	95,99	99,45	99,16	98,14	97,42	97,02

Source : Authors' calculations from French Comity of Automobile Constructors's data.
From 1997, Chrysler-Benz

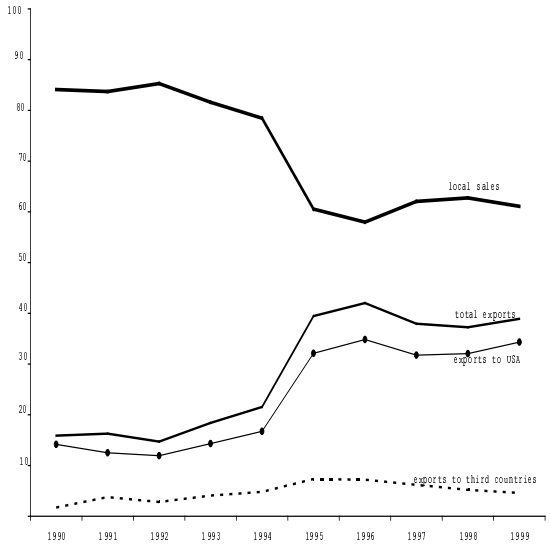
90% of the production is sold in the North American market (USA and Mexico). Indeed, 60% of the production is intended to local consumption and about 35% is exported to the US market. Trade relations between Mexico and Canada in this industry are negligible. As a matter of fact, in the 90's, about 95% of Mexican trade in the automobile industry in NAFTA is done with USA[14]. That is why we don't take into account Canadian production, demand and production costs.

Thus, the location of firms in Mexico seems to be motivated by the proximity to United

[14]Calculations made by authors from Foreign Trade Statistics (FTS) database, OECD

States in addition to the advantages of Mexico in terms of labor costs. Therefore, this automobile production is essentially influenced by the strategies of multinationals firms beneficiating from Mexican low wage costs, Mexican market size and proximity to the US market.

Figure 6: Destination of Mexican automobile production (Shares)



4.2 Econometric Study

NAFTA being a North-South regional integration, it may affect the production and the location strategies of MNFs. Moreover, the outcome could be different depending on the origin of the firm : insider or outsider to the to the free trade area.

In our econometric model, our objectives are:

- We test whether automobile production in Mexico is affected by production costs differential between Mexico and the US. Does Mexican and US costs affect automobile production in Mexico?. In fact, firms may be incited to locate in the low wages country in order to export to the largest market.

- Do Mexican or/and US sectoral demand play a role in determining output of automobile producers' in Mexico? It permits us to evaluate the importance of Mexican demand relative to the US one in determining the automobile production in Mexico.

- We see if NAFTA contributed to the increase (decrease) of the production of foreign (local) firms. By foreign firms, we mean outsiders.

- We check if NAFTA affected the location choice of MNFs' production between US and Mexico. Is there a substitution between both alternative locations?

4.2.1 Data and Variables

In order to better explain firm strategies, we use firm data on automobiles produced in Mexico and United States between 1983 and 1999 : 40 firms produce automobiles in Mexico and/or at least for two years in the considered period. Demand, production costs and regional integration variables are integrated in the econometric model to explain production and location strategies of MNFs (see table 4 for a description of variables and data sources).

- Endogenous variable As a dependant variable, we take the volume and the share of production per firm in Mexico. We have information only on final goods. In our knowledge, no data is available on parts' and components' production in Mexico.

- Explanatory Variables Mexican output volume is supposed to be partially explained by the production of the same firm in the US (P_{US}). In fact, in addition to demand and costs considerations, the production of the same firm in the US gives us information about the evolution of and the strategy of the multinational firm as a hole. If they are positively correlated, it may illustrate their hole situation - If a firm is declining (growing), it decreases (increases) its production in all locations, then reduces (raises) its production in Mexico abstracting from all other considerations-. A positive sign may also explain the strategy of 'diversification' of the firm. Firms can specialize in the production of a

Table 4: Variables used in regressions (sources in parentheses)

Dependent variable	
$Prod_{Mex}$	Automobile production in Mexico (per firm) (French Comity of automobile Constructors, 1983 – 1999)
$Share_{Mex}$	Mexican share of Automobile production (per firm) (French Comity of automobile Constructors, 1983 – 1999)
Independent variables	
P_{US}	Automobile production in USA (per firm) (French Comity of automobile Constructors, 1983 – 1999)
Demand	
$dreg_{Mex}$	differential in registration sales in Mexico relative to previous year (World Automotive market and The Society of motors manufacturers and traders Ltd, 1983 – 1997)
$dreg_{US}$	differential in registration sales in USA relative to previous year (The Society of motors manufacturers and traders Ltd, 1983 – 1999)
$Share_{dreg}$	Share in Mexican new registration regarding US ones = $\frac{dreg_{Mex}}{dreg_{US}}$
Production costs	
$wages_{Mex}$	Mexican wages corrected by Productivity per Mexican employee in the automobile sector = $\frac{Mex\ wages}{Mex\ productivity}$ (calculations made by authors from STAN OECD, 1983 – 1999)
$wages_{US}$	US wages corrected by Productivity per US employee in the automobile sector = $\frac{US\ wages}{US\ productivity}$ (calculations made by authors from STAN OECD, 1983 – 1999)
$Share_{wages}$	Share in Mexican wages regarding US ones in the automobile sector = $\frac{wages_{Mex}}{wages_{US}}$ (calculations made by authors from STAN OECD, 1983 – 1999)
Regional Integration	
$NAFTA_{loc}$	A dummy for regional integration for non NAFTA firms =1 for NAFTA firms after NAFTA
$NAFTA_{for}$	A dummy for regional integration for non NAFTA firms =1 for non NAFTA firms after NAFTA

variety in USA and an other one in Mexico. On the other hand, if production in USA affects negatively the Mexican production of the same firm, it illustrates a substitution of the two locations. In this case, firms favor one location which explains the export platform strategy. For example, until 1987, Volkswagen produced in Mexico 45% of its North American output. Since 1988, it produces only in Mexico.

We assume that individual production in Mexico and the Mexican share of the North American output are influenced by both demand variables and production costs.

Demand The American and Mexican market size may affect positively the automobile production in Mexico. We approximate the Mexican and US demand by a sectoral variable (dregMex and dregUS): differences between registrations in the considered year with registrations in the previous year. However, if there is substitution relation between Mexican and US locations, an increase in the US demand may has no effect on the production in Mexico. Besides, In the second regression taking Mexican production share as endogenous variable, a positive effect of Mexican (US) demand would mean that a marginal increase in the Mexican (US) demand affects more Mexican production than the US one.

Costs Previous empirical analysis concerning FDI inward in developing countries put the stress on differential in wage costs between the developing and developed economies (Woodward and Rolfe (1993)). The low wage costs represent a considerable advantage attracting foreign investors (Klayman (1994)). In the same way, Feenstra and Hanson (1997) show the positive correlation between wage costs' of home countries of MNFs located in Mexico and investment flows at the benefit of maquiladoras. Thus, large wages' differential between developing and developed countries involved in a Regional Trade Agreement incite foreign firms to locate in the former (Thomas and Grosse (2001)). Therefore the

incidences US wages in addition to Mexican ones seem to be a relevant analysis.

We consider US ($wages_{US}$) and Mexican ones ($wages_{Mex}$) at the sectoral level. The former (latter) is expected to have a positive (negative) effect on the Mexican production: an increase in wage differences incites the firms to produce relatively more in Mexico. In order to take into account the differences in qualifications, we correct nominal wages by incorporating Mexican and US productivity per employee. The productivity is measured as production per worker in the automobile sector.

Regional Integration Regional integration is approximated by dummy variables because of the non availability of tariff barriers. We distinguish the incidence of the creation of NAFTA on domestic ($NAFTA_{loc}$) and foreign firms ($NAFTA_{for}$) located in Mexico. It equals 1 for local (foreign) firm from, and zero otherwise.

4.2.2 Regressions

In our data base, for almost 50% of observations, there is no production in Mexico. These information are important since they illustrate location strategies of firms : producing in Mexico and/or in US. That is why we use a Tobit model. This model takes into account the values equal to zero in the dependent variable.

In the first regressions (table 5), we run a tobit without any panel analysis. In the first model, the dependent variable is the volume of automobile production in Mexico (per firm). In the second one, we took the Mexican share - regarding US and Mexican ones - of automobile production (per firm).

In the first model, the sign associated with the US production is positive and significant which illustrates a positive and dependent correlation between the US and Mexican output in this industry. Demand variables are not significant. Neither Mexican nor US demand had

Table 5: Regressions1

Model	(1)	(2)
Dependent Variable	$Prod_{Mex}$	$Share_{Mex}$
$ln(P_{US})$	0.414***	
	(0.102)	
$ln(dreg_{Mex})$	0.259	
	(0.470)	
$ln(dreg_{US})$	-0.960	
	(2.486)	
$ln(wages_{Mex})$	0.308	
	(0.710)	
$ln(wages_{US})$	-1.481	
	(2.627)	
$ln(Share_{dreg})$		0.234
		(0.235)
$ln(Share_{wages})$		0.244
		(0.483)
$NAFTA_{loc}$	5.995*	4.140*
	(2.337)	(1.466)
$NAFTA_{for}$	-1.526	-0.797*
	(2.249)	(1.415)
Constant	7.825	-10.064*
	(36.910)	(1.107)
N	349	407
LR chi(2)	28.79	13.86
Prob>chi(2)	0.0002	0.0078
Pseudo R2	0.0230	0.0100
Note: Standard errors in parenthesis with *,** and *** denoting significance at the 1%, 5% and 10% levels.		

incidence on the production of automobiles in Mexico. On the cost side, either Mexican and US wages are not significant whereas. Finally, it seems that NAFTA had an impact on local firms' production only. Thus, regional integration contributed to the growth of insiders' output and had no effect on outsiders' ones.

The results of demand, costs and NAFTA variables have qualitatively similar effects on production in Mexico and the distribution of production between US and Mexico (model 2 in table 5).

We have to be cautious with these results because of the existence of a strong heterogeneity between firms. That is why we include firms' fixed effects in next regressions (table 6).

In the first model (volume of Mexican production as a dependent variable), the volume of US production have no more significant effect. Giving the dualistic productive structure between largest constructors which concentrate more than 90% of production and the others, representing small productive units, the equation without fixed effects biased the results. In fact, production in Mexico is not affected by the production of the same firm in the US.

Mexican demand variable has positive and significant effect. So, this result sheds light on the importance of Mexican market in determining the volume of automobile production in Mexico. However, US demand has no significant effect. Cost variables are both significant. As expected, Mexican (US) wages have a negative (positive) incidence. Thus, the higher the wages differential is, the more firms are incited to produce in Mexico. Recall that, if we don't correct wages by the productivity, results will be different. In fact, by doing so, we found a positive effect of Mexican wages which reflects an increase in productivity per employee and not obviously an increase in costs for firms.

Turning to the effects of NAFTA on insiders and outsiders, we found a positive impact on the latter meaning that, all else equal, the creation of this regional integration attracted foreign investors in this industry. Whereas, there is no incidence on the production of insiders.

Table 6: Regressions2

Model	(1)	(2)	(3)
Dependent Variable	$Prod_{Mex}$	$Share_{Mex}$	$Share_{Mex}$
$ln(P_{US})$	-0.075		
	(0.081)		
$ln(dreg_{Mex})$	0.173***		
	(0.104)		
$ln(dreg_{US})$	-0.401		
	(0.541)		
$ln(wages_{Mex})$	-0.275***		
	(0.159)		
$ln(wages_{US})$	1.075***		
	(0.589)		
$ln(Share_{dreg})$		0.239*	0.189**
		(0.088)	(0.096)
$ln(Share_{wages})$		-0.375**	-0.442**
		(0.187)	(0.208)
$NAFTA_{loc}$	-0.401	1.567*	1.092***
	(0.533)	(0.555)	(0.618)
$NAFTA_{for}$	3.043*	1.440*	1.192***
	(0.623)	(0.602)	(0.655)
Constant	7.677	-8.446*	-8.408*
	(8.050)	(0.659)	(0.741)
N	349	407	407
LR chi(2)	709.77	606.78	601.05
Prob>chi(2)	0.0000	0.0000	0.0000
Pseudo R2	0.5681	0.4381	0.4339
Note: Standard errors in parenthesis with *,** and *** denoting significance at the 1%, 5% and 10% levels.			

The aim of the second model is to emphasize on the location choices between Mexico and the US. Mexican relative demand regarding US one seems to affect positively the share of automobile production in Mexico relative to the production in US and Mexico. On the cost side, Mexican relative costs regarding US ones have negative effect on the Mexican share of output. This result illustrates the important role of differences in production costs in determining the location of Automobiles firm.

Finally, NAFTA had a significant positive impact on either local and foreign firms' Mexican shares. So, abstracting for demand and cost considerations, NAFTA modified the production structure of either insiders and outsiders. In fact, NAFTA increased the Mexican production relatively more than the US one in the automobile industry.

Now, we try to see in which year NAFTA had really an impact on the distribution of automobile production between Mexico and US. By doing so, we check whether firms anticipated gains resulting from improved market accessability. In fact, In model 2, we chose 1993 as a reference year. We run different models and found that for insiders, 1991 is the first year for which NAFTA had a significant and positive impact whereas, for outsiders it is rather 1992 (model 3).

5 Conclusion

The aim of this paper was to study RIAs' effects on FDI flows and multinational firms' strategies. Our theoretical model is based on FDI motives developed by Neary (2002) and extended to north-south free trade agreements characteristics, notably wage differences and the possibility of FDI by firms originating from the area.

Our theoretical results suggest :

- A traditional result in multinational firms' strategies models : the tariff-jumping motive to

FDI holds if transaction costs (including transport and trade barriers) are important relative to additional fixed costs associated to investing abroad.

- Second, export-platform strategy holds if foreign firms choose to locate in the low wage country in order to re-export. This motive depends on wage and trade barriers differences. The more these differences important are, the more likely foreign firms use this strategy when intra-regional trade costs fall (countries becoming more and more integrated).

- Third, we study the influences of domestics firms' strategies on foreign ones. An eviction effect holds if foreign firms invest in the low wage country when local ones do not invest abroad and export from their home market (and leave the FTA) if the insiders decide to delocate. We found that this effect could exist and results from insiders' delocation. It reduces the market accessibility advantages of investing in the low wages country.

In the second part of this work, we applied our theoretical framework to the automobile industry in the North American Free Trade Area. We employ Tobit estimates in order to study the determinants of automobile production in Mexico. Moreover, we assess the effects of the creation of the North American Free Trade Agreement on the strategies of MNFs by distinguishing insiders and outsiders to the area.

We find a significant positive (negative) impact of Mexican demand (costs). US variables have nuanced effects. Moreover, we find a positive (negative) impact of Mexican relative demand (costs) on the Mexican production share -regarding Mexican and US ones.

By examining the effects of the creation of NAFTA on firms operating in the automobile sector, we find a positive impact on the production of outsiders in Mexico and no significant one on insiders.

Furthermore, NAFTA affected positively the Mexican share of the production of either insiders and outsiders, suggesting that, all else equal, it promoted relocation of automobile production in Mexico.

Finally, we found that NAFTA affected firms' strategies in 1991 for insiders and 1992 for outsiders, meaning that firms anticipate trade policies.

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A Equilibrium quantities and prices

A.1 Case 1

$$CT_A = w_h c q_A \tag{21}$$

$$CT_C^* = (w_h c + t_C) q_C^* \tag{22}$$

$$q_A = \frac{1}{3b}\left[a - w_h c + t_C\right] \tag{23}$$

$$q_C^* = \frac{1}{3b}\left[a - w_h c - 2t_C\right] \tag{24}$$

$$p = \frac{1}{3}(a + 2w_h c + t_C) \tag{25}$$

A.2 Case 2

$$CT_A = w_h c q_A \tag{26}$$

$$CT_A^* = w_h c q_A^* + w_h F_A^* \tag{27}$$

$$q_A = q_A^* = \frac{1}{3b}\left(a - w_h c\right) \tag{28}$$

$$p = \frac{1}{3}(a + 2w_h c) \tag{29}$$

A.3 Case 3

$$CT_A = w_h c q_A \tag{30}$$

$$CT_B^* = (w_l c + t_B) q_B^* + w_l F_B^* \tag{31}$$

$$q_A = \frac{1}{3b}\left[a + (w_l - 2w_h)c + t_B\right] \tag{32}$$

$$q_B^* = \frac{1}{3b}\left[a + (w_h - 2w_l)c - 2t_B\right] \tag{33}$$

$$p = \frac{1}{3}(a + (w_h + w_l)c + t_B) \tag{34}$$

A.4 Case 4

$$CT_B = (w_l c + t_B)\, q_B + w_l F_B \tag{35}$$

$$CT_C^* = (w_h c + t_C)\, q_C^* \tag{36}$$

$$q_B = \frac{1}{3b}\left[a + (w_h - 2w_l)c + t_C - 2t_B\right] \tag{37}$$

$$q_C^* = \frac{1}{3b}\left[a - 2t_C + t_B - (2w_h - w_l)c\right] \tag{38}$$

$$p = \frac{1}{3}(a + c(w_l + w_h) + t_B + t_C) \tag{39}$$

A.5 Case 5

$$CT_B = (w_l c + t_B)\, q_B + w_l F_B \tag{40}$$

$$CT_A^* = w_h c q_A^* + w_h F_A^* \tag{41}$$

$$q_B = \frac{1}{3b}\left[a + (w_h - 2w_l)c - 2t_B\right] \tag{42}$$

$$q_A^* = \frac{1}{3b}\left[a + (w_l - 2w_h)c + t_B\right] \tag{43}$$

$$p = \frac{1}{3}(a + (w_l + w_h)c + t_B) \tag{44}$$

A.6 Case 6

$$CT_B = (w_l c + t_B)\, q_B + w_l F_B \tag{45}$$

$$CT_B^* = (w_l c + t_B)\, q_B^* + w_l F_B^* \tag{46}$$

$$q_B = q_B^* = \frac{1}{3b}\left[a - w_l c - t_B\right] \tag{47}$$

$$p = \frac{1}{3}(a + 2(w_l c + t_B)) \tag{48}$$

B Tariff jumping and export platform

B.1 tariff jumping

$$\Pi_A^* (2) = \frac{1}{9b} (a - w_h c)^2 - w_h F_A^* \tag{49}$$

$$\Pi_C^* (1) = \frac{1}{9b} [a - w_h c - 2t_C]^2 \tag{50}$$

$$\Pi_A^*(2) > \Pi_C^*(1) \Longleftrightarrow \frac{1}{9b} (a - w_h c)^2 - w_h F_A^* > \frac{1}{9b} [a - w_h c - 2t_C]^2$$

$$\Longleftrightarrow t_C > \frac{1}{2} \left[a - w_h c - \sqrt{(a - w_h c)^2 - 9b w_h F_A^*)} \right]$$

$$\tilde{t_C} = \frac{1}{2} \left[a - w_h c - \sqrt{(a - w_h c)^2 - 9b w_h F_A^*)} \right]$$

$$\frac{\partial \tilde{t_C}}{\partial F_A^*} = \frac{9b w_h}{4\sqrt{(a - w_h c)^2 - 9b w_h F_A^*)}} > 0$$

B.2 Export Platform : condition1

$$\Pi_B^*(3) = \frac{1}{9b} [a + (w_h - 2w_l)c - 2t_B]^2 - w_l F_B^* \tag{51}$$

$$\Pi_C^*(1) = \frac{1}{9b} [a - w_h c - 2t_C]^2 \tag{52}$$

$$\Pi_B^*(3) - \Pi_C^*(1) > 0 \Longleftrightarrow a + (w_h - 2w_l)c - 2t_B > \sqrt{9b \left(w_l F_B^* + \frac{1}{9b} (a - w_h c - 2t_C)^2 \right)}$$

$$\Longleftrightarrow t_B < \frac{1}{2} \left[a + (w_h - 2w_l)c - \sqrt{9b w_l F_B^* + (a - w_h c - 2t_C)^2} \right]$$

$$\tilde{t}_B^1 = \frac{1}{2}\left[a + (w_h - 2w_l)c - \sqrt{9bw_lF_B^* + (a - w_hc - 2t_C)^2}\right]$$

$$\frac{\partial \tilde{t}_B^1}{\partial t_C} = \frac{a - w_hc - 2t_C}{\sqrt{9bw_lF_B^* + (a - w_hc - 2t_C)^2}} > 0$$

$$\frac{\partial \tilde{t}_B^1}{\partial w_h} = \frac{c}{2}\left[1 + \frac{a - w_hc - 2t_C}{\sqrt{9bw_lF_B^* + (a - w_hc - 2t_C)^2}}\right] > 0$$

$$\frac{\partial \tilde{t}_B^1}{\partial w_l} = -\left[c + \frac{9bF_B^*}{4\sqrt{9bw_lF_B^* + (a - w_hc - 2t_C)^2}}\right] < 0$$

B.3 Platform Export : condition2

$$\Pi_B^*(3) = \frac{1}{9b}\left[a + (w_h - 2w_l)c - 2t_B\right]^2 - w_lF_B^* \tag{53}$$

$$\Pi_A^*(2) = \frac{1}{9b}\left(a - w_hc\right)^2 - w_hF_A^* \tag{54}$$

$$\Pi_B^*(3) - \Pi_A^*(2) > 0 \Longleftrightarrow \frac{1}{9b}\left[a + (w_h - 2w_l)c - 2t_B\right]^2 - w_lF_B^* - \frac{1}{9b}\left(a - w_hc\right)^2 + w_hF_A^* > 0$$

$$\Longleftrightarrow t_B < \frac{1}{2}\left[a + (w_h - 2w_l)c - \sqrt{9b(w_lF_B^* - w_hF_A^*) + (a - w_hc)^2}\right]$$

$$\Longleftrightarrow \tilde{t}_B^2 = \frac{1}{2}\left[a + (w_h - 2w_l)c - \sqrt{9b(w_lF_B^* - w_hF_A^*) + (a - w_hc)^2}\right]$$

$$\frac{\partial \tilde{t}_B^2}{\partial w_h} = \frac{1}{2}\left[c + \frac{9bF_A^* + 2c(a - w_hc)}{2\sqrt{9b(w_lF_B^* - w_hF_A^*) + (a - w_hc)^2}}\right] > 0$$

$$\frac{\partial \tilde{t}_B^2}{\partial w_l} = -c - \frac{9bF_B^*}{4\sqrt{9b(w_lF_B^* - w_hF_A^*) + (a - w_hc)^2}} < 0$$

$$\frac{\partial \tilde{t}_B^2}{\partial t_C} = 0$$

C Eviction Effect

C.1 Derivation of $\tilde{t}_B$

Here are foreign firms' profits in cases 1, 3, 4 and 6 :

$$\Pi_C^*(1) = \frac{1}{9b}\left[a - w_h c - 2t_C\right]^2 \tag{55}$$

$$\Pi_B^*(3) = \frac{1}{9b}\left[a + (w_h - 2w_l)c - 2t_B\right]^2 - w_l F_B^* \tag{56}$$

$$\Pi_C^*(4) = \frac{1}{9b}\left[a - 2t_C + t_B - (2w_h - w_l)c\right]^2 \tag{57}$$

$$\Pi_B^*(6) = \frac{1}{9b}\left[a - w_l c - t_B\right]^2 - w_l F_B^* \tag{58}$$

$$\Pi_B^*(6) = \Pi_B^*(3)$$

$$\iff (w_h - w_l)c - t_B) = 0$$

$$\iff \tilde{t}_B = (w_h - w_l)c$$

$$\Pi_C^*(1) = \Pi_C^*(4)$$

$$\iff \tilde{t}_B = (w_h - w_l)c$$

Which is the same condition, So for, $t_B = \tilde{t}_B = (w_h - w_l)c$,$\Pi_B^*(6) = \Pi_B^*(3)$ and $\Pi_C^*(1) = \Pi_C^*(4)$.

C.2

$$\Pi_B(6) = \frac{1}{9b}\left[a - w_l c - t_B\right]^2 - w_l F_B \tag{59}$$

$$\Pi_A(3) = \frac{1}{9b}\left[a + (w_l - 2w_h)c + t_B\right]^2 \tag{60}$$

$$\Pi_B(4) = \frac{1}{9b}\left[a + (w_h - 2w_l)c + t_C - 2t_B\right]^2 - w_l F_B \tag{61}$$

$$\Pi_A(1) = \frac{1}{9b}\left[a - w_h c + t_C\right]^2 \tag{62}$$

$$\Pi_B(6) - \Pi_A(3) > 0 \iff \frac{1}{9b}(a - w_l c - t_B + a + (w_l - 2w_h)c + t_B)(a - w_l c - t_B - (a + (w_l - 2w_h)c + t_B)) > w_l F_B$$

$$\iff (w_h - w_l)c - t_B > \frac{w_l F_B}{4(a - w_h c)}$$

$$\iff t_B < (w_h - w_l)c - \frac{w_l F_B}{4(a - w_h c)}$$

If the outsider is located in B, the insider invests in B only if

$$t_B < (w_h - w_l)c - \frac{w_l F_B}{4(a - w_h c)}$$

For $F_B = 0$, t_B is maximized and equals $\tilde{t}_B$

$$\Pi_B(4) - \Pi_A(1) > 0 \iff (a + (w_h - 2w_l)c + t_C - 2t_B)^2 > 9b w_l F_B + \left[a - w_h c + t_C\right]^2$$

$$\iff t_B < \frac{1}{2}\left[a + (w_h - 2w_l)c + t_C - \sqrt{9b w_l F_B + (a - w_h c + t_C)^2}\right]$$

If the outsider is located in C, the insider invests in B only if

$$t_B < \frac{1}{2}\left[a + (w_h - 2w_l)c + t_C - \sqrt{9b w_l F_B + (a - w_h c + t_C)^2}\right]$$

For $F_B = 0$, t_B is maximized and equals $\tilde{t}_B$

C.3 Conditions on the Eviction Effect

If insider is located in A, The gain from investing in B over exports is

$$\Pi_B^*(3) - \Pi_C^*(1) = \frac{4\left[a - w_l c - t_B - t_C\right]\left[(w_h - w_l)c + t_C - T_B\right]}{9b} - w_l F_B^*$$

The gain from a decrease in t_B is :

$$G1 = \frac{\partial(\Pi_B^*(3) - \Pi_C^*(1))}{\partial t_B} = -\frac{4}{9b}(a + (w_h - 2w_l)c - 2t_B)$$

If insider is located in B, The gain from investing in B over exports is

$$\Pi_B^*(6) - \Pi_C^*(4) = \frac{4}{9b}\left[a - w_h c - t_C\right]\left[(w_h - w_l)c + t_C - t_B\right] - w_l F_B^*$$

The gain from a decrease in t_B is :

$$G2 = \frac{\partial(\Pi_B^*(6) - \Pi_C^*(4))}{\partial t_B} = -\frac{4}{9b}(a - w_h c - t_C)$$

$$|G1| > |G2| \Longleftrightarrow t_B < (w_h - w_l)c + \frac{1}{2}t_C$$

So, for $t_B < \bar{t}_B = \tilde{t}_B + \frac{1}{2}t_C$, the eviction effect holds. Then, For $t_B < \bar{t}_B$, it holds.