Regional Portfolios and the Affiliate Location Decision of Multinational Firms*

Leo Karasik

University of Toronto

JOB MARKET PAPER

First Draft: August 2012
This Draft: February 2013

For the most up to date version please check
http://individual.utoronto.ca/leokarasik/

Abstract
Wholesale affiliates account for a significant share of the foreign earnings of multinational firms. Yet little is known about them since empirical work on multinationals typically focuses on manufacturing affiliates. Instead, it has been presupposed that wholesale affiliates are a form of exporting by the parent company, and not a form of foreign direct investment. This paper presents evidence to the contrary. Using hand-collected data on French multinationals, I show that wholesale affiliates are strategically located in proximity to a multinational firm’s manufacturing affiliates. The purpose of many wholesale affiliates is to serve as conduits for the exports of nearby manufacturing affiliates, not those of the parent company. Extensive case study evidence on the prevalence of this mechanism is presented. My findings indicate that wholesale affiliates are a form of foreign direct investment that complements manufacturing affiliates. This conclusion is further reinforced by the finding that a firm is more likely to establish a wholesale affiliate than a manufacturing affiliate in a more distant country once I condition on its operations in geographic proximity. Since a firm’s preference for a manufacturing affiliate over exporting is greater in more distant countries, the latter finding further dispels the notion that wholesale subsidiaries are simply a means of exporting by the parent company.

Keywords: Foreign Direct Investment, Multinational Firms, Subsidiaries, Wholesale Trade

JEL classification: D23, F21, F23, L81

*I would like to thank Daniel Trefler and Peter Morrow for all of their help and advice. I have also benefited greatly from discussions with Dwayne Benjamin, Kunal Dasgupta, Gilles Duranton, Nathan Halmrast, and Josh Lewis, as well as the suggestions of seminar participants at the RCEF 2012 conference. All mistakes are my own.
Email: leonid.karasik@utoronto.ca
1 Introduction

The affiliate location decision of multinational corporations (MNCs) has attracted significant attention from trade economists. Previous studies have either restricted attention to manufacturing affiliates, or ignored how a firm’s entry decision in one country is shaped by its actions elsewhere. Both approaches are problematic. Consider the operations of French tire manufacturer Michelin in South America. It owns commercial subsidiaries in Argentina, Chile and Peru, which are supplied from its production sites in Brazil and Colombia, not from the headquarters in France.\(^1\) Michelin is not unique in supplying its wholesale subsidiaries from nearby manufacturing subsidiaries. Inter-affiliate trade has implications for our understanding of the role of wholesale affiliates.

The international trade literature has presupposed that wholesale affiliates are a form of exporting by the parent company, not a form of foreign direct investment (FDI). An examination of firm-level data reveals that MNCs strategically locate their wholesale affiliates in close proximity to their manufacturing affiliates as part of a regional portfolio. The primary role of many wholesale affiliates is therefore to act as conduits for the exports of nearby manufacturing affiliates, rather than the exports of the parent company. These exports are economically significant. In 1999, inter-affiliate trade among foreign entities belonging to US multinational corporations (MNCs) operating in a manufacturing sector amounted to $253 billion (see Ramondo et al., 2012). By comparison, total US manufactured exports that year were $629 billion.\(^2\) Hence, a framework that regards FDI as confined exclusively to manufacturing affiliates or one that ignores the role of inter-affiliate trade in a firm’s affiliate location decision obscures important features by which multinational firms organize their global operations. This oversight hampers our understanding of the purpose of wholesale affiliates.

This paper examines the international expansion strategies of multinationals in the presence of third-country effects. Using hand-collected data for French MNCs in 2010, I find that, ceteris paribus, a firm is more likely to establish a foreign affiliate in a target country if it operates a manufacturing affiliate in a nearby location. The type of affiliate established in the target country is more likely to be a wholesale affiliate rather than an additional manufacturing affiliate. I also show that the purpose


\(^2\)US export data is obtained from the International Trade Administration (ITA). See [http://tse.export.gov/TSE/HTMLOnlyTableDisplay.aspx?COL=2&DESC=true](http://tse.export.gov/TSE/HTMLOnlyTableDisplay.aspx?COL=2&DESC=true).
of wholesale affiliates has heretofore been misunderstood. Theories on horizontal FDI are built on the proximity-concentration trade-off hypothesis: a firm can access a market by either exporting from the parent or establishing a manufacturing affiliate. The latter option is preferred in more distant countries, since export sales are more sensitive to distance. Wholesale subsidiaries have been assumed to be a form of exporting by the parent, suggesting that they are less likely to be established in more distant countries than manufacturing subsidiaries. I find that that the opposite is true once I condition on a firm’s manufacturing sites in geographic proximity. This reinforces the paper’s hypothesis that the objective of wholesale affiliates is to facilitate the exports of nearby manufacturing affiliates. Wholesale subsidiaries are therefore a key component in the geographic organization of MNCs that complement manufacturing subsidiaries.

Figure 1: Production Sites of L’Oréal in 2011.

The operations of French cosmetics manufacturer L’Oréal illustrate the mechanisms at work. Figure 1 displays the location of L’Oréal’s manufacturing affiliates. Even a cursory glance at it reveals that the proximity-concentration trade-off is missing an important element. Since L’Oréal’s production sites are scattered throughout the world, most potential markets are closer to at least one manufacturing affiliate than they are to the parent company. Furthermore, note that consumer products — which account for almost half of L’Oréal’s total revenues — are produced in every region of the world. See p. 70 of L’Oréal’s 2011 financial report for a breakdown of its revenues.

*See Brainard (1997) and Helpman et al. (2004) for empirical evidence.
*Furthermore, note that consumer products — which account for almost half of L’Oréal's total revenues — are produced in every region of the world. See p. 70 of L’Oréal's 2011 financial report for a breakdown of its revenues.
as Australia from China, Indonesia or Japan than from France, establishing a manufacturing affiliate in one country increases potential export profits in nearby markets. Higher export sales justify the establishment of wholesale affiliates there, particularly if wholesale affiliates import their products from nearby manufacturing affiliates. In Appendix A, I present case study evidence for three French multinationals — Bonduelle, Michelin, and Nexans — that document the widespread prevalence of inter-affiliate trade.\textsuperscript{6} These examples suggest that a firm’s affiliate location decision may be shaped by its actions in third countries. The objective of this paper is to determine whether these are isolated anecdotes, or whether they inform us as to the manner in which MNCs establish their affiliates.

Towards that purpose I set-up a three-country model with heterogeneous firms. A firm has three ways to access each market. One option is to export through an arm’s length intermediary. This enables the firm to penetrate a market without establishing a direct presence abroad. Relying upon intermediaries, however, forces the firm to relinquish control over the marketing of its product, resulting in lower sales.\textsuperscript{7} An alternative is to establish a wholesale affiliate. While this incurs sizeable fixed costs, it enables the firm to control its foreign sales and obtain a higher market share. It does not, however, alter the fact that the firm will have to import the product from abroad. Thus, a third option is for a firm to establish a manufacturing affiliate and produce locally. Though this economizes on trade costs, it incurs even higher fixed costs. An added benefit is that a manufacturing affiliate can be used to produce for a nearby foreign market.

The model generates three testable predictions about a firm’s affiliate location decision. Provided that the two foreign markets are sufficiently close to each other, establishing a manufacturing affiliate in one is found to (i) increase the probability that the firm will conduct FDI in the other country, and (ii) increase the probability that the subsidiary established in the other country will be for wholesale rather than for manufacturing. The third prediction deals with the role of distance on the choice between the two forms of FDI. The proximity-concentration trade-off predicts that manufacturing FDI will be preferred relative to exporting in more distant markets. Consequently, if wholesale affiliates are a form of exporting by the parent, one should expect manufacturing subsidiaries to be the preferred form of FDI in more distant markets. The model predicts the opposite. Testing this prediction is

\textsuperscript{6}In many instances a manufacturing affiliate is in charge of the entire spectrum of the parent company’s operations in a region (which includes product marketing), with little input from the parent. See in particular Bonduelle’s operations in Eastern Europe, Michelin’s operations in South America, and Nexans’ operations in Scandinavia.

\textsuperscript{7}The ITA reports that firms exporting at arm’s length typically do not control the marketing or pricing decisions for their products abroad. See ch. 5 of its Basic Guide to Exporting, \url{http://export.gov/basicguide/eg_main_017244.asp}. 
therefore akin to testing whether wholesale affiliates are indeed a form of exporting by the parent.

These predictions are tested using a unique, hand-collected dataset on the foreign activities of 159 publicly-traded French MNCs in 58 countries in 2010. The dataset contains over 9,200 firm entry decisions. Using a variety of sources, I classify a firm’s operations in each market as consisting of either (i) a manufacturing subsidiary, (ii) a wholesale subsidiary, or (iii) no subsidiary. In order to test the predictions dealing with third country effects, I construct a count variable of the number of manufacturing affiliates that a firm operates within a 2000 km radius of each host country.\footnote{I focus on a radius of 2000 km for the baseline specification. I also consider other radii ranging from 1500-5000 km.}

Estimating third-country affects on a firm’s affiliate location decision is complicated by the fact that the firm’s operations in nearby countries is endogenously determined. To address this, I construct a variable that aggregates firm-region specific characteristics, and use it to instrument for a firm’s manufacturing presence in nearby countries. Since estimation of a firm’s entry decision is conducted through multinomial logit — for which an instrumental variable estimator does not yet exist — I use a two-stage control function estimator. This approach yields consistent parameter estimates (see Wooldridge, 2010). Consistent standard errors can be obtained by bootstrapping.\footnote{Obtaining bootstrapped standard errors in a multinomial logit regression is computationally cumbersome. Consequently, they are currently unavailable, but will be included in a future revision of this paper.}

The empirical results are supportive of the theory. A firm is more likely to establish an affiliate in a country that is close to its manufacturing affiliates. An additional manufacturing affiliate within a 2000 km radius of a perspective host lowers the probability of staying out relative to establishing a wholesale affiliate by between 39-44%. It also increases the probability that the firm will establish a wholesale affiliate relative to the probability of establishing a manufacturing affiliate in the target country by about 28%. Both results are robust to the inclusion of numerous controls.

The data also confirms the model’s prediction that wholesale subsidiaries are the preferred form of FDI in more distant countries once we account for a firm’s manufacturing operations in geographic proximity. Doubling a country’s distance from France lowers the probability of a firm establishing a manufacturing affiliate relative to a wholesale affiliate by nearly 25%. This is an entirely novel result, which provides further evidence that wholesale affiliates are primarily established to facilitate exports from neighboring manufacturing affiliates rather than from the parent, a finding that is at odds with the conventional view of wholesale affiliates. My findings therefore uncover an additional factor that influences the manner in which firms organize their global operations.
The present paper contributes to a number of strands of the trade literature. Among them is the burgeoning literature on wholesale affiliates, which are drawing increased attention. Hanson et al. (2001) report that wholesale affiliates were responsible for nearly a quarter of the total revenue generated by US MNCs abroad in 1998. Similarly, wholesale affiliates belonging to German MNCs generated about 2/3 of the revenue that manufacturing affiliates did in 2001 (Krautheim, 2009). However, papers that focus on wholesale affiliates typically regard them as simply a form of exporting by the parent, and ignore the importance of third country effects.

Third country effects on FDI have received significant attention. Important contributions include Baltagi et al. (2007, 2008), Blonigen et al. (2007) and Chen (2008). Such papers typically use aggregate data, which cannot distinguish between different forms of FDI. To the best of my knowledge, the only studies of this issue that use micro data are Antràs and Foley (2011) and Chen (2011). The former confines the empirical analysis to a single region (Southeast Asia), while the latter focuses on vertical production linkages between manufacturing affiliates. Both abstract from consideration of wholesale affiliates.

The rest of this paper is organized as follows. Section 2 presents the model and the main theoretical predictions. I discuss the data sources in section 3. Section 4 discusses the empirical strategy and provides the estimation results, while section 5 concludes.

2 Theory

This section outlines a three-country model that demonstrates the role of third countries in a firm’s trade-off between different forms of FDI. The actors are firms headquartered in the source country $s$. In addition to serving the local market, these firms can serve two foreign countries called $A$ and $B$. Firms based there are treated as passive actors. Countries are indexed by $i$ where need be. Let $\tau_i > 1$ denote the distance between $s$ and $i$, and let $t > 1$ denote the distance between countries $A$ and $B$. Given that the focus of this paper is on the use of manufacturing affiliates as an export platform, it is assumed that countries $A$ and $B$ are closer to each other than either one is to $s$. Hence, $t < \min_{i \in \{A,B\}} \{\tau_i\}$. Moreover, $\tau_A < \tau_B$. As is common in the international trade literature, I let bilateral distance serve as a proxy for the variable trade costs of exporting a product from one country to another.

---

10 Based on author’s calculations of total sales for both types of affiliates as provided in Table 1 of Krautheim (2009).
2.1 Preferences

There are $L$ identical workers in each country. Each worker is endowed with a unit of productive time which is supplied inelastically. Workers derive utility from consuming a homogeneous good $q_0$ and a CES aggregate of differentiated varieties in the following manner

$$U_i = q_0 + \frac{1}{\gamma}Q_i^\gamma, \quad \text{with} \quad Q = \left[ \int_{\omega \in \Omega_i} b_i(\omega) \frac{1}{\sigma} q_i(\omega)^\rho d\omega \right]^\frac{1}{\rho} \quad \text{and} \quad \sigma = \frac{1}{1-\rho} > 1.$$

The homogeneous good is produced by a large number of identical firms. It is shipped across national boundaries at no cost, to the effect that its price is identical everywhere. Hence, it is treated as the numeraire, with $p_0 = 1$.\(^{12}\) Firms producing the homogenous good require one unit of labor to produce a unit of output. They pay a wage equal to the value of the marginal product of labor, meaning that $w_0 = p_0 = 1$. This is also the wage paid by firms producing differentiated varieties since workers are fully mobile across sectors within a country. Wages are therefore also identical across countries.\(^{13}\)

Consumer demand for differentiated variety $\omega$ in market $i$ is $q_i(\omega) = b_i(\omega)p_i(\omega)^{-\sigma}Q_i^{1-\rho}$, where $p_i(\omega)$ is the price charged for variety $\omega$ in country $i$. It is assumed that $\rho > \gamma$ to ensure that differentiated varieties are closer substitutes for each other than for the homogenous good. $b_i(\omega)$ is a parameter that reflects consumer perceptions and knowledge of variety $\omega$ in country $i$ (more on this below). Since I do not model the actions of firms based in either $A$ or $B$, $Q_i$ is treated as exogenous for both. For ease of exposition, I let $Q_A = Q_B = Q$.

2.2 Production

Firms producing differentiated varieties are heterogeneous with respect to their productivity, as in Melitz (2003). Production of a differentiated variety requires the completion of two tasks. One task is performed by the headquarters whereas the other can performed by labor located anywhere. Let $h$ denote the amount of headquarter services in production and $l$ denote the amount of labor employed in production. The two combine to generate output in the following manner:

$$q(\phi) = \phi h^\alpha l^{1-\alpha},$$

\(^{12}\)It is assumed that the population and consumer income are sufficiently large everywhere to ensure positive consumption and production of the homogenous good in all three countries.

\(^{13}\)The use of an outside homogeneous good to pin-down wages is standard in models of international trade. See Helpman et al. (2004) for an example.
where $\phi \in [1, \infty)$ denotes the firm’s productivity. By definition, headquarter services must be performed in country $s$, whereas the second task may be performed in any manufacturing site. If we regard headquarter services as corresponding to a specialized input that can be performed only by the parent, then the production process resembles the one in Irarrazabal et al. (2012), where the input is shipped from the parent to a manufacturing affiliate.\textsuperscript{14} A manufacturing affiliate is incapable of replicating headquarter services because the production process involves tacit knowledge that is difficult to codify and communicate to entities distant from the headquarters (Oldesnki, 2012; Keller and Yeaple, 2012). Oldenski (2012) argues that product design typically occurs at the headquarters. Hence, while a manufacturing affiliate abroad improves a firm’s ability to communicate with consumers and deliver the good to them in a timely manner, it also increase the knowledge transfer problem within the firm. This problem is magnified with distance, as shown by Keller and Yeaple (2012).

### 2.3 Modes of Foreign Market Access

Firms producing differentiated varieties can serve a foreign market in one of three ways: exporting through an arm’s-length intermediary, wholesale FDI, and manufacturing FDI. Each of these approaches results in different fixed and variable costs, thereby generating different profit streams. Irrespective of how a firm chooses to serve either foreign market, it is assumed that it will always serve the home market through domestic production. Vertical FDI is thereby ruled out.

The least costly means of penetrating a foreign market is to export through an intermediary.\textsuperscript{15} There is an exogenous mass of identical export intermediaries that can deliver a product to a foreign market. For simplicity, the fixed costs associated with matching with an intermediary are normalized to zero, ensuring a perfectly competitive market for matching between an exporting firm and an intermediary.\textsuperscript{16} Consequently, intermediaries have no bargaining power and earn zero profits in equilibrium. An advantage of exporting through an intermediary is that the firm does not have to commit resources to establish a presence abroad or to conduct extensive market research. A drawback of this approach is that the firm relinquishes control over the marketing and the sale of its products abroad. Instead,

\textsuperscript{14}This approach is similar to Keller and Yeaple (2012) who present a model where production requires the completion of a continuum of tasks that vary in terms of the coordination cost between the headquarters and the affiliate. As in the present setting some of the tasks will be conducted at the headquarters with the remainder being conducted by the manufacturing affiliate.

\textsuperscript{15}Bernard et al. (2010, 2011), Blum et al. (2010, 2012), and Ahn et al. (2011) provide empirical evidence that export intermediaries play a key role in facilitating exports.

\textsuperscript{16}The results of this paper are robust to the inclusion of fixed costs of matching with an intermediary. See also footnote 20.
as the International Trade Administration documents, this is left to the intermediary.\(^{17}\)

Export intermediaries typically handle a large set of products, and frequently alter their product mix (see Akerman, 2012; Bernard et al., 2011).\(^{18}\) Hence, an intermediary has no incentive to extensively market any individual product. Lack of extensive product promotion prevents consumers from learning about the attributes of the product fully, and undermines their confidence in the product. This is captured by the parameter \(b = \delta < 1\) when a firm exports indirectly.\(^{19}\)

Any alternative to arm’s length exports requires a substantial commitment of resources by the firm to establish a physical presence abroad. The cheaper option is to establish a wholesale affiliate. Doing so incurs a fixed cost of \(F_w\), which is paid in units of final output. Having a wholesale affiliate enables the firm to be in charge of its own marketing and pricing decisions. It also enables it to respond to consumer queries faster and more efficiently (see Oldenski, 2012). This is reflected in the consumers’ perception of the product’s quality. Hence, \(b = 1\) when a firm has an affiliate in country \(i\).\(^{20}\)

The more costly option is to establish a production site in country \(i\). This incurs a fixed cost of \(F_m > F_w\) units of final output. Akin to wholesale FDI, a firm that engages in manufacturing FDI has full control over the pricing and marketing of its product, resulting in \(b = 1\). A potential added benefit of manufacturing FDI is that the firm can use a production site in country \(i\) to export its product to the nearby country \(j\), if doing so is more cost effective than exporting from the headquarters.\(^{21}\)

### 2.3.1 Manufacturing FDI

In addition to the fixed cost \(F_m\), multinational production is also associated with variable trade costs due to headquarter services in production (see equation (1)). Shipping the input produced by headquarter services \(h\) to country \(i\) is subject to iceberg trade costs \(\tau_i\).\(^{22}\) As in Irarrazabal et al. (2012)

---


\(^{18}\)Bernard et al. (2011) report that Italian intermediaries alter their product mix from year to year. On average, 53% of products that are exported by intermediaries outside of the EU one year are not be exported the subsequent year.

\(^{19}\)Blum et al. (2010, 2012) find evidence for negative assertive matching between exporters and Chilean import intermediaries. The focus of this paper is on multinational firms, which tend to be large firms. Consequently, multinational firms that choose to export at arm’s length are likely to match with a small intermediary. Such an intermediary is unlikely to have the resources necessary to extensively market the firm’s product abroad in a manner that the producer would be able to if it committed the necessary resources.

\(^{20}\)An alternative approach to interpreting the parameter \(b\) is to view it as the share of the producer’s surplus that is kept by the firm. When the intermediary export market is not perfectly competitive, an intermediary can extract a portion of the surplus from the firm. By contrast, a firm that is in control of its exports retains the entire surplus. Such a feature was included in an earlier version of the paper. Its omission does not alter any of the results.

\(^{21}\)The manufacturing affiliate can export through an intermediary or export to a wholesale affiliate in the other country (provided that the firm has a wholesale affiliate there).

\(^{22}\)It is recognized that the variable trade cost associated with intermediates are lower than those associated with final goods. Nevertheless, I do not distinguish between the two in order to avoid adding additional notation. My approach
and Keller and Yeaple (2012), the intermediate is shipped from the parent to the affiliate at marginal
cost. From (1), the marginal cost function for a manufacturing affiliate is

\[ \frac{\tau^\alpha_i}{\phi}: \text{marginal cost of multinational production}. \]  

Total profits from manufacturing FDI in country \( i \) are \( \pi_{m,i}(\phi) = D \left( \frac{\phi}{\tau^\alpha_i} \right)^{1-\sigma} - F_m \), where \( D = (1/\sigma)Q[(\sigma - 1)/\sigma]^{\sigma-1} \).

### 2.3.2 Wholesale FDI

A firm with a wholesale affiliate in country \( i \) always has the option of supplying the affiliate from
the headquarters. The associated marginal cost is

\[ \frac{\tau_i}{\phi}: \text{marginal cost of importing from headquarters}. \]  

Alternatively, the wholesale affiliate in \( i \) can be supplied by a manufacturing affiliate in \( j \). This option is
available only to those firms that have a production site in the latter country. The associated marginal
cost from such a logistical option is

\[ \frac{t\tau^\alpha_j}{\phi}: \text{marginal cost of importing from affiliate in } j. \]  

Since manufacturing affiliates are reliant upon intermediates imported from the parent company, \( t < \min_{i \in \{A, B\}} \tau_i \) does not ensure that a foreign production site will be used as an export platform. If \( t \) is
sufficiently large, a firm will prefer to supply country \( i \) directly from the headquarters. Profits from
wholesale FDI, therefore, depend on the logistical organization of production:

\[ \pi_{w,i}(\phi) = -F_w + \begin{cases} 
D \left( \frac{\phi}{\tau_i} \right)^{\sigma-1} & \text{if the firm does not have a manufacturing affiliate in } j, \\
D\phi^{\sigma-1} \max \left\{ \tau_i^{1-\sigma}, t\tau_j^{\alpha(1-\sigma)} \right\} & \text{if the firm has a manufacturing affiliate in } j.
\end{cases} \]

has no bearing on the results.
2.3.3 Exporting Through an Intermediary

Akin to wholesale FDI, a firm will export to country $i$ at arm’s length from the production location that can deliver the product at the lowest possible cost. Recalling that there are no fixed costs associated with arm’s length exporting, the possible profits from this approach are

$$
\pi_{x,i}(\phi) = \begin{cases} 
\delta D \left( \frac{\phi}{\tau_i} \right)^{\sigma - 1} & \text{if the firm does not have a manufacturing affiliate in } j, \\
\delta D \phi^{\sigma - 1} \max \left\{ \tau_i^{1 - \sigma}, t \tau_j^{\alpha (1 - \sigma)} \right\} & \text{if the firm has a manufacturing affiliate in } j.
\end{cases}
$$

(6)

2.4 The Logistics of Production

As stated earlier, $t < \min_{i \in \{A, B\}} \tau_i$ is not a sufficient condition to ensure that manufacturing affiliates will be used as an export platform. Instead, combining (3) and (4) shows that a necessary condition is

$$
t < \frac{\tau_i}{\tau_j^\alpha}.
$$

(7)

Consequently, there exist two types of configurations, depending on whether export-platform affiliate sales are profitable. Both will be examined.

2.4.1 Equilibrium Without Export-Platform Affiliate Sales

As a benchmark, consider the case when export-platform affiliate sales are ruled out due to the fact that equation (7) does not hold. The equilibrium of the model thus resembles the one in Helpman et al. (2004), where each firm’s market entry decision is independent of its actions elsewhere. Consequently, the model’s predictions are what one would expect from an empirical framework that does not control for a firm’s operations in nearby countries.

Since there are no fixed costs of exporting, each firm will serve both foreign markets. The least productive cohort will do so via an arm’s length intermediary, earning profits of $\pi_{x,i}(\phi) = \delta D \left( \frac{\phi}{\tau_i} \right)^{1 - \sigma}$. This is a profitable approach only for those firms for whom $\pi_{x,i}(\phi) > \pi_{w,i}(\phi)$, where $\pi_{w,i}(\phi) = D \left( \frac{\phi}{\tau_i} \right)^{1 - \sigma} - F_w$ are wholesale FDI profits in $i$. Let $\tilde{\phi}_{w,i}$ denote the productivity cut-off for wholesale FDI in country $i$ when $t > \tau_i \tau_j^{-\alpha}$. This is the productivity level at which $\pi_{x,i}(\tilde{\phi}_{w,i}) = \pi_{w,i}(\tilde{\phi}_{w,i})$, and is defined as

$$
\left( \tilde{\phi}_{w,i} \right)^{\sigma - 1} = \frac{F_w}{(1 - \delta) D}.
$$

(8)
\( \tilde{\phi}_{w,i} \) exists provided that it exceeds the minimal productivity level, which is 1. Such is the case when

\[
F_w > \frac{(1 - \delta)D}{(\tau_i)^{\sigma-1}} \quad \forall i. \tag{9}
\]

Firms with a productivity level \( \phi > \tilde{\phi}_{w,i} \) opt for wholesale FDI rather than manufacturing FDI as long as profits from the former approach outweigh the ones from the latter. Manufacturing FDI profits in country \( i \) are \( \pi_{m,i}(\phi) = D \left( \frac{\phi}{\tau_i} \right)^{1-\sigma} - F_m \). The value of \( \phi \) at which wholesale FDI profits are equal to manufacturing FDI profits is

\[
(\tilde{\phi}_{m,i})^{\sigma-1} = (\tau_i^{\sigma-1}) \frac{F_m - F_w}{DT_i}, \quad T_i = \tau_i^{(1-\alpha)(\sigma-1)}. \tag{10}
\]

A necessary condition for \( \tilde{\phi}_{m,i} \) to exist is for it to be greater than \( \tilde{\phi}_{w,i} \), which is the case when

\[
F_w < \frac{1 - \delta}{1 - \delta + T_i} F_m \quad \forall i. \tag{11}
\]

### 2.4.2 Equilibrium With Export-Platform Affiliate Sales

Let us now consider an alternative to the benchmark case. When equation (7) is satisfied, multinational firms find it profitable to use manufacturing affiliates as an export platform. Entry into one country therefore has the potential to affect a firm’s entry decision into the other. It has already been assumed that \( \tau_A < \tau_B \), which means that country \( A \) is the more lucrative foreign market from the perspective of firms in \( s \). In equilibrium, therefore, a firm is more likely to conduct FDI in country \( A \). To minimize the number of potential equilibrium outcomes and to illustrate clearly the mechanisms of the model, I further assume that

\[
\tau_A^{1-\alpha} > t \left( \frac{1 + \delta}{\delta} \right)^{\frac{1}{\sigma-1}}. \tag{12}
\]

Equation (12) ensures that only firms that are sufficiently productive to establish a manufacturing affiliate in \( A \) find it profitable to establish a wholesale affiliate in the less lucrative market \( B \).

The presence of third country effects does not alter the fact that the least productive firms export at arm’s length to both countries. Moreover, there are no third country effects influencing a firm’s wholesale affiliate location decision into the more lucrative market \( A \). This is on account of the fact that a firm just indifferent between exporting indirectly and directly to \( A \) does not have a manufacturing affiliate in the nearby market \( B \). Hence, the productivity cut-off for wholesale FDI in \( A \) is unchanged.
from the earlier case. That is, $\phi_{w,A} = \tilde{\phi}_{w,A}$, with the latter being defined in equation (8).

Due to the absence of fixed costs impediments to exporting through an intermediary, a firm with a production site in $A$ will always use it as an export platform to serve $B$ when $t < \tau_B \tau_A^{\alpha}$. Establishing a manufacturing affiliate in $A$, however, alters the manner in which the firm accesses country $B$. Notice that the firm’s aggregate profits from foreign operations contingent upon it establishing a manufacturing affiliate in country $A$ are

$$\Pi_{m,A}(\phi) = D \left( \frac{\phi}{\tau_A^\alpha} \right)^{\sigma-1} - F_m + \delta D \left( \frac{\phi}{t \tau_A^\alpha} \right)^{1-\sigma}.$$  

(13)

Manufacturing FDI profits in $A$  Arm’s length export profits in $B$ from $A$

By contrast, a firm that establishes a wholesale affiliate in country $A$ continues to export to country $B$ at arm’s length from the headquarters. Its total profits from foreign operations are

$$\Pi_{w,A}(\phi) = D \left( \frac{\phi}{\tau_A^\alpha} \right)^{1-\sigma} - F_w + \delta D \left( \frac{\phi}{\tau_B} \right)^{1-\sigma}.$$  

(14)

Wholesale FDI profits in $A$  Arm’s length export profits in $B$ from $s$

The productivity cut-off at which a firm is indifferent between these two forms of FDI reflects the additional exporting profits that the firm can earn in country $B$. Hence, the size of both markets effects the productivity cut-off for manufacturing FDI in country $A$, which is

$$\phi_{m,A}^{\sigma-1} = \left( \frac{\tau_A^{\sigma-1}}{T_A \left( 1 + \delta t^{1-\sigma} - 1 - \delta (\tau_A/\tau_B)^{\sigma-1} \right)} \right) \frac{F_m - F_w}{D}.$$  

(15)

$\phi_{m,A}$ exists provided that

$$(1 - \delta)F_m > F_w \left[ T_A \left( 1 + \delta t^{1-\sigma} \right) - \delta \left( 1 + \left( \frac{\tau_A}{\tau_B} \right)^{\sigma-1} \right) \right].$$  

(16)

Establishing a manufacturing affiliate in $A$ lowers the costs of supplying the firm’s product to $B$. In so doing, it also justifies an investment in a wholesale affiliate in $B$ for firms that otherwise would prefer to export at arm’s length. This is done in order to maintain control of the firm’s sales and marketing decisions in $B$. This results in a lower productivity cut-off for wholesale FDI in $B$:

$$\phi_{w,B}^{\sigma-1} = \left( t \tau_A^\alpha \right)^{\sigma-1} \frac{F_w}{(1 - \delta)D} < \tilde{\phi}_{w,B}. $$  

(17)
Entry into $A$ does not affect a firm’s profits from manufacturing FDI in $B$. By altering a firm’s wholesale FDI sales, however, manufacturing FDI in $A$ does affect the productivity cut-off for manufacturing FDI in $B$. Since $\phi_{m,B}$ is the value of $\phi$ at which $\pi_{w,B}(\phi_{m,B}) = \pi_{m,B}(\phi_{m,B})$, any factor that affects either side of the equation will alter the productivity cut-off at which profits from these two forms of FDI are equalized. Hence,

$$\left(\phi_{m,B}\right)^{\sigma-1} = \frac{(t\tau_A)^{\sigma-1} F_m - F_w}{(t\tau_A)^{\sigma-1} - (t\tau_B)^{\sigma-1}} D > \left(\tilde{\phi}_{m,B}\right)^{\sigma-1}. \tag{18}$$

$\phi_{m,B}$ exists provided that it is greater than $\phi_{w,B}$, which is the case if

$$(1 - \delta)F_m > F_w \left[\frac{(t\tau_A)^{\sigma-1} - \delta (t\tau_B)^{\sigma-1}}{(t\tau_B)^{\sigma-1}}\right]. \tag{19}.$$.

### 2.5 Empirical Predictions on FDI Patterns

The above framework can be used to derive predictions about FDI patterns. In order to do so, I follow the convention in the literature and assume that firm productivity is Pareto distributed, with shape parameter $k$ and support on $[1, \infty)$. The prevalent assumption in the literature is that wholesale affiliates are a form of exporting by the parent company, not a form of FDI. If that is the case, then one would expect firms to prefer manufacturing FDI relative to wholesale FDI in more distant markets if the proximity-concentration trade-off is valid.\(^{23}\) The present model suggests the opposite. Let $\rho_{m,i}$ denote the probability that a firm establishes a manufacturing affiliate in country $i$ and $\rho_{w,i}$ denote the probability that a firm establishes a wholesale affiliate in country $i$. Recalling that firm productivity is Pareto distributed, we can write

$$\frac{\rho_{m,i}}{\rho_{w,i}} = \frac{\Pr[\phi \geq \phi_{m,i}]}{\Pr[\phi_{w,i} \leq \phi \leq \phi_{m,i}]} = \frac{1}{\left(\frac{\phi_{m,i}}{\phi_{w,i}}\right)^k - 1}. \tag{20}$$

By comparing $\frac{\rho_{m,A}}{\rho_{w,B}}$ with $\frac{\rho_{m,B}}{\rho_{w,B}}$ we can establish the following:

**Proposition 1:** Let equations (9), (11), (12), (16) and (19) hold. Then, the fraction of firms that

\(^{23}\)Brainard (1997) and Helpman et al. (2004) both find empirical evidence in support of the proximity-concentration trade-off.
prefer wholesale FDI relative to manufacturing FDI in the more distant country B is higher than in country A. Moreover, the number of firms that establish a wholesale affiliate in B relative to the number that establish a manufacturing affiliate is increasing in $\tau_B$.

Consider now how third country affiliates affect a firm’s market entry decision. Let $\rho_B$ represent the probability of a firm owning a subsidiary in country B, be it for either manufacturing or wholesale. The corresponding probability that a firm does not have a direct presence in B is $1 - \rho_B$. The odds of owning an affiliate relative to the odds of not owning an affiliate in B are:

$$\frac{\rho_B}{1 - \rho_B} = \frac{\Pr[\phi \geq \phi_{w,B}]}{\Pr[\phi \leq \phi_{w,B}]} = \frac{1}{(\phi_{w,B})^k - 1}. \quad (21)$$

As mentioned earlier, a manufacturing affiliate in A makes it more likely that a firm will commit resources towards establishing an affiliate in B when (12) holds. This manifests itself in a decrease in the productivity cut-off for conducting FDI in country B.

**Proposition 2:** Let equations (9), (11), (16) and (19) hold. Then, establishing a manufacturing affiliate in country A increases the odds of a firm establishing a subsidiary in country B if equation (12) holds.

Though Proposition 2 tells us how the odds of establishing a subsidiary in a given country are affected by a firm’s actions in a nearby market, it is silent on the more likely form of entry. The odds of establishing a manufacturing affiliate relative to a wholesale affiliate in B are:

$$\frac{\rho_{m,B}}{\rho_{w,B}} = \frac{\Pr[\phi \geq \phi_{m,B}]}{\Pr[\phi_{w,B} \leq \phi \leq \phi_{m,B}]} = \frac{1}{\left(\frac{\phi_{m,B}}{\phi_{w,B}}\right)^k - 1}. \quad (22)$$

It has already been mentioned that $\phi_{m,B} > \tilde{\phi}_{m,B}$. Potential wholesale FDI profits are higher when a firm finds it profitable to use a manufacturing affiliate in a third country as an export platform relative to exporting from the headquarters. Although this does not affect profits for manufacturing FDI, it does reduce the incentive to establish a manufacturing subsidiary in B. The odds of establishing a manufacturing affiliate relative to a wholesale affiliate in B are therefore lower when (12) holds.
Proposition 3: Let equations (9), (11), (16) and (19) hold. Then, establishing a manufacturing affiliate in country A increases the odds of a firm establishing a wholesale subsidiary relative to a manufacturing subsidiary in country B if equation (12) holds.

Propositions 1-3 provide testable predictions about a firm’s affiliate location decision.

3 Data

3.1 Firm-Level Data Sources

The validity of the mechanisms behind Propositions 1-3 are tested using a unique, hand collected dataset on the operations of publicly traded French multinationals in 2010. The focus is on the entry decisions of these firms in 58 countries (see Table 1 for the list of countries).\textsuperscript{24} The construction of the dataset proceeded in three stages. First, I obtained a list of publicly traded French multinationals whose primary business is a manufacturing industry from Mergent Online.\textsuperscript{25} This survey frame was supplemented by a list of firms obtained from CreditRiskMonitor’s Worldwide Directory of Public Companies. A listing of each firm’s foreign affiliates in 2010 was then obtained from each firm’s annual report.

<table>
<thead>
<tr>
<th>Table 1: List of Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
</tr>
<tr>
<td>Argentina</td>
</tr>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>Austria</td>
</tr>
<tr>
<td>Belgium</td>
</tr>
<tr>
<td>Brazil</td>
</tr>
<tr>
<td>Bulgaria</td>
</tr>
<tr>
<td>Canada</td>
</tr>
<tr>
<td>Chile</td>
</tr>
<tr>
<td>China\textsuperscript{a}</td>
</tr>
</tbody>
</table>

\textsuperscript{a} I treat China and Hong Kong as one country.

\textsuperscript{24}The 58 countries examined accounted for nearly 95% of French outbound FDI in 2006 (the final year for which there is data on all countries). Source: OECD Globalization database, \url{http://stats.oecd.org/Index.aspx?DatasetCode=FDI_FLOW_PARTNER#}.

\textsuperscript{25}Mergent Online contains data on both active and inactive corporate entities that account for 95% of total stock market value.
financial report for that year.26 Lastly, each firm’s operations in a given country were then classified as being either manufacturing or wholesale.27 A firm is considered to engage in manufacturing in a given country if the parent owns at least one production site in the country.28

A number of different data sources were used in order to classify a firm’s affiliates as engaging in either manufacturing or in wholesale. The primary resource is a firm’s annual financial reports. Many firms give a detailed breakdown of their foreign operations in their financial statements, including the location of their production sites. A number of firms also provide this information on the parent’s or the affiliate’s website. I also rely upon national business directories. Some countries provide a searchable database of business entities registered within their borders. For each establishment, the directory provides information on the entity’s main line of business (among other information). Additional sources of information include Factiva, Hoover’s, and ISI Emerging Markets. Factiva is a database operated by Dow Jones that provides balance sheet data as well as the primary business activity for a large number of companies throughout the world. Hoover’s is operated by Dun & Bradstreet and provides information similar to that of Factiva. Lastly, ISI Emerging Markets is operated by Euromoney Institutional Investor. It provides information similar to Factiva and Hoover’s, though its focus is restricted to emerging markets such as Eastern Europe, Latin America and Southeast Asia.

3.2 Descriptive statistics

The sample is comprised of 2092 affiliates belonging to 159 firms whose primary business is a manufacturing industry. 1089 of these are manufacturing affiliates and 1003 are wholesale affiliates. This breakdown reveals that French MNCs operate only wholesale affiliates in nearly half of the countries in which they establish a subsidiary, suggesting that wholesale affiliates are a highly prevalent form of FDI. Among the 159 firms in the sample, 131 operate at least one manufacturing affiliate and 132 firms operate at least one wholesale affiliate.29 104 firms operate at least one affiliate of both types.

The data is heavily skewed towards the most globally-engaged firms, as is common in firm level datasets. In fact, nearly a quarter of the 2092 foreign affiliates in the sample belong to just the 10

---

26Every publicly traded multinational firm lists its foreign holdings in its annual financial report. Most firms make their annual reports available in the finance section of the parent’s website. Annual reports can also be obtained from Mergent Online. The focus is restricted to affiliates in which the parent company held at least a 50% stake in 2010.
27I omit all holding and financial companies.
28My approach differs from Krautheim (2009) who considered the aggregate number of manufacturing and wholesale affiliates in a given country. His results are therefore not entirely comparable to mine since many firms own multiple affiliates in the same country.
29All 159 firms operate at least one production facility in France.
most globally-engaged firms.\textsuperscript{30} This skewness is evident in Figure 2 which plots the kernel density

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Figure2.png}
\caption{Kernel Density Plot, Number of Countries Entered}
\end{figure}

estimates of the number of countries that a firm enters broken down by form of entry. The probability
densities for the number of manufacturing and wholesale affiliates established appear similar. This is
unsurprising since the number of countries in which the average and median firm own a manufacturing
and a wholesale affiliates are similar as well. However, the hypothesis that the two distributions are
identical is rejected by the Kolmogorov-Smirnov test.

Whereas Figure 2 informs as to the distribution of the number of subsidiaries that the firms
in the sample establish, it is silent as to the preferred location for subsidiaries of different type. This
information is presented in Table 2, which lists the 20 most popular destinations for FDI, both overall
as well as broken down by form of FDI. It is not uncommon for some countries to receive a large
amount of manufacturing FDI and a small amount of wholesale FDI, and vice versa. For example,
whereas Austria, Japan, the Netherlands, Norway, Singapore, and Sweden are popular destinations for
wholesale FDI, they are not among the main recipients of manufacturing FDI. Conversely, Argentina,
Brazil, India, Mexico, Spain and the US receive a disproportionate amount of manufacturing FDI
relative to wholesale FDI. Not all countries fall within one of these two categories, however. Rather,
countries such as Australia, the Czech Republic, Portugal and Russia attract both forms of FDI in
roughly equal proportions.

Table 2 thus provides a mixed picture as to whether there exists a correlation between a country’s
attractiveness as a recipient of these two forms of FDI. To determine whether a correlation exists, I
let $E$ denote the number of firms that establish an affiliate in a given country, $M$ denote the number

\textsuperscript{30}The 10 most globally-engaged firms are: Air Liquide, Compagnie de Saint-Gobain, Danone, L’Oréal, LVMH Moët Hennessy-Louis Vuitton, Michelin, Pernod Ricard, Sanofi-Aventis, Schneider Electric, and Sequana.
<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Number of Firms</th>
<th>Country</th>
<th>Number of Firms</th>
<th>Country</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>US</td>
<td>110</td>
<td>US</td>
<td>71</td>
<td>Belgium</td>
<td>47</td>
</tr>
<tr>
<td>2</td>
<td>UK</td>
<td>97</td>
<td>Spain</td>
<td>61</td>
<td>UK</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>Spain</td>
<td>95</td>
<td>China</td>
<td>59</td>
<td>Germany</td>
<td>41</td>
</tr>
<tr>
<td>4</td>
<td>Germany</td>
<td>93</td>
<td>UK</td>
<td>55</td>
<td>US</td>
<td>39</td>
</tr>
<tr>
<td>5</td>
<td>Italy</td>
<td>83</td>
<td>Germany</td>
<td>52</td>
<td>Netherlands</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>China</td>
<td>80</td>
<td>Italy</td>
<td>47</td>
<td>Italy</td>
<td>36</td>
</tr>
<tr>
<td>7</td>
<td>Belgium</td>
<td>75</td>
<td>Brazil</td>
<td>45</td>
<td>Japan</td>
<td>35</td>
</tr>
<tr>
<td>8</td>
<td>Poland</td>
<td>64</td>
<td>Poland</td>
<td>39</td>
<td>Spain</td>
<td>34</td>
</tr>
<tr>
<td>9</td>
<td>Brazil</td>
<td>58</td>
<td>Canada</td>
<td>35</td>
<td>Singapore</td>
<td>33</td>
</tr>
<tr>
<td>10</td>
<td>Switzerland</td>
<td>57</td>
<td>India</td>
<td>34</td>
<td>Switzerland</td>
<td>32</td>
</tr>
<tr>
<td>11</td>
<td>Netherlands</td>
<td>56</td>
<td>Mexico</td>
<td>32</td>
<td>Sweden</td>
<td>28</td>
</tr>
<tr>
<td>12</td>
<td>Japan</td>
<td>51</td>
<td>Belgium</td>
<td>28</td>
<td>Czech Rep.</td>
<td>26</td>
</tr>
<tr>
<td>13</td>
<td>Canada and Mexico</td>
<td>49</td>
<td>Romania</td>
<td>26</td>
<td>Australia,</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Austria,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Poland</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Czech Rep.</td>
<td>48</td>
<td>Switzerland</td>
<td>25</td>
<td>Portugal</td>
<td>24</td>
</tr>
<tr>
<td>15</td>
<td>Australia</td>
<td>45</td>
<td>South Africa</td>
<td>24</td>
<td>China and Turkey</td>
<td>21</td>
</tr>
<tr>
<td>16</td>
<td>India and Sweden</td>
<td>44</td>
<td>Russia</td>
<td>23</td>
<td>Hungary and Russia</td>
<td>19</td>
</tr>
<tr>
<td>17</td>
<td>Portugal</td>
<td>43</td>
<td>Czech Rep.</td>
<td>22</td>
<td>Denmark, Greece and Norway</td>
<td>18</td>
</tr>
<tr>
<td>18</td>
<td>Romania, Russia and Singapore</td>
<td>42</td>
<td>Argentina, Australia, Hungary, Morocco and Tunisia</td>
<td>20</td>
<td>Malaysia and Mexico</td>
<td>17</td>
</tr>
<tr>
<td>19</td>
<td>Hungary and Turkey</td>
<td>39</td>
<td>Portugal and South Korea</td>
<td>19</td>
<td>Romania and South Korea</td>
<td>16</td>
</tr>
<tr>
<td>20</td>
<td>South Korea and South Africa</td>
<td>35</td>
<td>Netherlands and Turkey</td>
<td>18</td>
<td>Slovakia and Ukraine</td>
<td>15</td>
</tr>
</tbody>
</table>

that establish a manufacturing affiliate and $W$ denote the number that establish a wholesale affiliate. $E$ is strongly correlated with both $M$ and $W$, with the correlations being 0.93 and 0.83, respectively. However, the correlation of $M$ and $W$ is significantly lower, and is only 0.56. The positive correlation suggests that host-country features that make a country an attractive destination for wholesale FDI also makes it an attractive destination for manufacturing FDI. The low correlation suggests that such host-country attributes exert disparate impacts on a firm’s decision as to the type of affiliate that it should establish.
3.3 Gravity Variables

The firm-level dataset is complemented by the gravity variables that have been shown to influence a firm’s entry decision. Population and real PPP-adjusted GDP are obtained from the World Economic Outlook database of the IMF. Both are used to obtain each country’s real per-capita GDP. Data on bilateral distance as well as dummy variables indicating that the host borders France, was once colonized by it, or where French is an official language were obtained from CEPII. I use GDP and distance data to construct each country’s surrounding market potential. Similar to Blonigen et al. (2007), \( SMP_i = \sum_{j \neq i, FR} \frac{GDP_j}{\tau_{ij}} \), is the distance-weighted sum of the GDPs of all countries in the world other than \( i \) and France. \( SMP_i \) reflects the alternative investment options for a firm in close proximity to country \( i \). Holding \( GDP_i \) constant, an increase in \( SMP_i \) makes country \( i \) a less attractive destination relative to its neighbors. The literature has also identified the importance of a host country’s financial sector in influencing a firm’s entry decision and performance. I use the amount of domestic credit provided to the private sector as a percentage of GDP as a proxy for the host country’s financial development. It is obtained from the World Bank’s World Development Indicators.

Two other measures of trade costs are considered in addition to bilateral distance. The first is the tariff rate that the host country imposes on imports from France and is collected at the two-digit SIC level. Data on tariffs is obtained from the World Integrated Trade Solution (WITS) database. The second measure captures various non-tariff regulations that countries put in place that impose a burden on importing. The World Bank’s Doing Business database contains three types of non-tariff import restrictions: (i) the number of days that it takes to import a container, (ii) the number of documents necessary to import a container, and (iii) the monetary cost of importing a container. Bernard et al. (2011) point out that these three indicators are correlated. Hence, I follow their approach by using the primary factor derived from principal component analysis of these three variables. The constructed variable is called Import Freedom. A lower value indicates that the host country has more restrictive regulations. Table 3 provides summary statistics for all continuous gravity variables.

---

31 Yeaple (2009) finds that a country’s distance from the US, a dummy variable denoting that English is its main language, its GDP and its per-capita GDP can explain nearly three-quarters of the variation in the number of firms investing in a given country as well as their aggregate sales there.

32 See Desai et al. (2004), Chor et al. (2008), Antras et al. (2009) and Buch et al. (2009).

33 Chor et al. (2008), Antras et al. (2009) and Manova (2012) use a similar measure as an indicator of the financial development of the host country.

34 The data is for 2008 for all countries except Norway. The latest year for which Norwegian data is available is 2006.

35 The primary industry of the parent firm at the two-digit SIC level was obtained from Factiva.
Table 3: Summary of Macro Variables and Data Sources

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data Source</th>
<th>Average</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>WDI</td>
<td>26.38</td>
<td>1.42</td>
</tr>
<tr>
<td>GDP per Capita</td>
<td>WDI</td>
<td>9.45</td>
<td>0.81</td>
</tr>
<tr>
<td>Private Credit</td>
<td>WDI</td>
<td>4.31</td>
<td>0.70</td>
</tr>
<tr>
<td>Distance</td>
<td>CEPII</td>
<td>7.96</td>
<td>1.10</td>
</tr>
<tr>
<td>SMP</td>
<td>WDI, CEPII</td>
<td>23.55</td>
<td>0.46</td>
</tr>
<tr>
<td>Tariff</td>
<td>WITS</td>
<td>1.02</td>
<td>1.17</td>
</tr>
<tr>
<td>Import Freedom</td>
<td>Doing Business</td>
<td>0.93</td>
<td>0.72</td>
</tr>
</tbody>
</table>

Note: All variables except Import Freedom are in natural logs. Tariff is the logarithm of 1+ the tariff rate.

4 Estimation Results

4.1 Estimation Strategy

The model outlined in section 2 generates the following empirical predictions:

1. A firm is more likely to establish a wholesale affiliate relative to a manufacturing affiliate in a more distant country if it operates a manufacturing affiliate in a neighboring country.

2. A firm is more likely to establish a wholesale affiliate relative to a manufacturing affiliate if it has a manufacturing affiliate in a nearby country.

3. A firm is more likely to establish an affiliate in a country that is close to an existing manufacturing affiliate.

A sole production site in a nearby country is sufficient to generate these results in a single-product firm model, akin to the one outlined in section 2. Most multinational firms, however, produce multiple products, and rarely produce their entire product range within a single foreign market. Instead, multinational firms typically produce their products within a group of countries within a given region. This is evident from examining L’Oréal’s manufacturing operations (see Figure 1). Luxury products are produced in Japan, but not in China. The reverse is true for consumer products. Similarly, dermatological products are produced in Canada but not in the US, while both luxury and consumer products are produced in the US but not in Canada. Similarly, Michelin produces tires for heavy equipment trucks in Brazil and tires for small trucks and passenger cars in Colombia. Nor is such an approach confined to firms that produce relatively light products such as cosmetics or tires. Automobile manufacturer Peugeot has a similar approach. Its affiliate in Argentina produces models such as the
Berlingo van which the affiliate in Brazil does not. Similarly, its Brazilian affiliate produces the Hoggar concept car, which the Argentine affiliate does not.\textsuperscript{36,37}

Hence, a single production site nearby may not necessarily impact a firm’s entry decision into a neighboring country, particularly for firms that produce a large number of varieties. However, as the number of products that a firm produces in geographic proximity rises, so does the incentive to establish a wholesale affiliate in the target country in order to coordinate the exports of the various nearby manufacturing affiliates. Such an incentive is particularly strong since the alternative would be to retain multiple export intermediaries, which is costly.\textsuperscript{38} Consequently, the variable of interest is the firm’s manufacturing operations in close geographic proximity to a given host country.

To construct this variable, I define the following three terms:
\begin{align*}
c(i; j) & : \text{indicator that } i \text{ and } j \text{ are contiguous}, \\
d(i; j, FR) & : \text{indicator that } \tau_{ij} \leq \tau_{iFR}, \\
r(i; j) & : \text{indicator that } j \text{ is within a specified radius of } i.
\end{align*}

Let \( n(i) \) be the set of countries that: (i) border \( i \), (ii) are closer to \( i \) than is France, and (iii) are within a specified radius of \( i \). That is, \( n(i) = c(i; j) \cup (d(i; j, FR) \cap r(i; j)) \). Let \( m_f(j) \) be a dummy variable denoting whether firm \( f \) has a manufacturing affiliate in country \( j \). The variable of interest is \( M_f(n(i)) = \sum_{j \in n(i)} m_f(j) \). In the estimation results below I focus on a radius of 2000 km.\textsuperscript{39} Table 4 provides summary statistics for the variable \( M_f(n(i)) \) when the radius considered is 2000 km. Estimation results for radii varying between 1500-5000 km are presented in Appendix B.\textsuperscript{40}


\textsuperscript{37}There exist several explanations as to why firms choose to produce different products in a number of nearby locations. One explanation could be the desire to avoid the cannibalization of sales (see Baldwin and Ottaviano, 2001). An alternative explanation could be coordination costs involved in producing multiple products that lower the per-product efficiency of the firm/affiliate (see Nocke and Yeaple, 2008; 2012). A third explanation could be due to country-specific idiosyncratic demand shocks that a firm vary across products, akin to the model of Bernard et al. (2011). Due to lack of data, I do not test for the validity of these competing explanations.

\textsuperscript{38}Realistically, a firm would need to contract with multiple intermediaries if it wishes to export different products to a given country from a number of different production sites. This is consistent with the findings of Blum et al. (2010) that export intermediaries specialize in a narrow range of products and countries. As they write, “(v)irtually all intermediaries, including the largest ones, obtain the vast majority of their imports from one or two countries.”

\textsuperscript{39}2000 km is roughly the distance between Japan and China or between Hungary and Russia. Among the 58 countries, the average country has 8.53 countries that are (i) border it, (ii) are within a 2000 km radius of it, and (iii) are closer to it than is France. The median country has 4 such countries.

\textsuperscript{40}In their analysis of the impact of US FDI into third countries on US FDI into a given host country Blonigen et al. (2007) used a weighting matrix whereby US FDI into other countries was weighed by the distance of each country from a given host. Due to costly intra-firm trade, however, considering a firm’s operations everywhere else in the world would be inconsistent with the theory. For example, a firm’s entry decision into Canada is more likely to depend upon a firm having a manufacturing presence in the US than upon the firm having a manufacturing presence in Australia. Hence,
Table 4: Summary statistics for $M_f(n(i))$ for 2000 km radius

<table>
<thead>
<tr>
<th>Sample</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>All observations</td>
<td>0.98</td>
<td>2.02</td>
<td>9222</td>
</tr>
<tr>
<td>All affiliates</td>
<td>1.77</td>
<td>2.93</td>
<td>2092</td>
</tr>
<tr>
<td>All manufacturing affiliates</td>
<td>2.00</td>
<td>3.21</td>
<td>1089</td>
</tr>
<tr>
<td>All wholesale affiliates</td>
<td>1.52</td>
<td>2.57</td>
<td>1003</td>
</tr>
</tbody>
</table>

Propositions 1-3 are tested through multinomial logit estimation. For each country $i$, a firm is observed as being in one of three states of the world: (i) having a manufacturing affiliate, (ii) having a wholesale affiliate, and (iii) not having an affiliate of either sort. Let $e \in \{\emptyset, w, m\}$ denote the firm’s entry decision, where $e = \emptyset$ denotes that the firm chooses not to establish any affiliate, whereas $e = w$ and $e = m$ denote that the firm enters by establishing a wholesale or a manufacturing affiliate, respectively. The common element in equations (20)-(22) is the productivity cut-off for wholesale FDI. Hence, $e = w$ is chosen as the base outcome. The two logit regressions performed are

$$
\ln \left( \frac{\Pr[e = m]}{\Pr[e = w]} \right)_i = \beta_0 + \beta_1 M_f(n(i)) + Z_i' \beta + \alpha_f + u_{fi},
$$

(24)

$$
\ln \left( \frac{\Pr[e = \emptyset]}{\Pr[e = w]} \right)_i = \gamma_0 + \gamma_1 M_f(n(i)) + Z_i' \gamma + \rho_f + \varepsilon_{fi}.
$$

The right-hand side variables include $M_f(n(i))$, a vector of host country characteristics $Z_i$, and firm fixed effects. Firm fixed effects control for aspects such as firm productivity and product scope.

The coefficient estimates from multinomial logit estimation inform us as to how a change in a covariate impacts the logarithm of the odds ratio. Table 5 presents the probabilities observed in the

Table 5: Summary of Probabilities and Odds Ratios

<table>
<thead>
<tr>
<th>Observed Firm Decision</th>
<th>Probability</th>
<th>Odds (Relative to Wholesale Affiliate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Affiliate</td>
<td>0.118</td>
<td>1.083</td>
</tr>
<tr>
<td>Wholesale Affiliate</td>
<td>0.109</td>
<td>1</td>
</tr>
<tr>
<td>No Affiliate</td>
<td>0.773</td>
<td>7.092</td>
</tr>
</tbody>
</table>

the focus is solely upon the firm’s operations in close geographic proximity of a potential host country.
data of each option being chosen as well as the odds ratio for each option relative to \( e = w \) as the base outcome. A positive coefficient in the first regression means that an increase in the regressor increases the log odds of \( m \) being chosen relative to \( w \). A positive coefficient in the second regression means that an increase in the value of the regressor raises the log odds of \( \Omega \) being chosen relative to \( w \). When discussing the impact of a covariate, I focus on the odds ratio rather than the log odds.

4.2 Controlling for Potential Endogeneity

The estimation procedure must also account for the possibility that the variable \( M_f(n(i)) \) is endogenous. Note that the dependent variable in (24) is a firm’s entry decision in country \( i \). If the decision is made simultaneously with a firm’s entry decisions into all countries \( j \neq i \), then \( M_f(n(i)) \) would be correlated with the error term, resulting in biased coefficient estimates of \( M_f(n(i)) \). Such estimates would most likely be biased downwards. The downward bias stems from the fact that the demand for a firm’s products within a region varies across firms due to unobservable firm-country specific characteristics, that manifest themselves in idiosyncratic demand shocks across firm-country pairs. Consequently, a pair of firms is likely to respond differently to the establishment of a manufacturing affiliate in a given country.\(^{41}\) A second source of attenuation bias for \( M_f(n(i)) \) is that the constructed variable does not discriminate between manufacturing affiliates located in different countries. However, it is reasonable to presume that manufacturing affiliates in some nearby countries would exert a greater effect on a firm’s entry decision in a given target country than others. This is evidenced by the operations of Michelin in South America. Since the production decisions for the region are made in Brazil (see Appendix A.2), the presence of a manufacturing affiliate in Brazil has a greater effect on a firm’s entry decision in nearby countries than the manufacturing affiliate in Colombia. Controlling for endogeneity addresses both sources of attenuation bias.

Following Kuksov and Villas-Boas (2008) and Petrin and Train (2010), I address endogeneity using a control function. This approach entails a two-stage procedure. In the first stage, I regress the endogenous variable \( M_f(n(i)) \) on an exogenous instrument \( V_f(n(i)) \) and the other explanatory variables:

\[
M_f(n(i)) = \delta_0 + \delta_1 V_f(n(i)) + Z'_i \Delta + \alpha_f + \mu_{f,i}. \tag{25}
\]

\(^{41}\)It is well known that firms do not follow a strict hierarchy in terms of the destinations that they serve (Yeaple, 2009; Eaton et al., 2011). Eaton et al. (2011) and Crozet et al. (2012) argue that one of the causes for this are firm-country specific idiosyncratic demand shocks. Bernard et al. (2011) argue that such demand shocks vary even across products within firms.
I then recover the residuals, \( \hat{\mu}_{f,i} \), and include them in the second stage multinomial logit regression along with \( M_f(n(i)) \). This approach provides consistent parameter estimates (see Wooldridge, 2010; Ch. 16). Consistent standard errors can be obtained through bootstrapping.\(^{42}\)

What remains is to obtain an exogenous variable \( V_f(n(i)) \) that is correlated with \( M_f(n(i)) \). Recall that \( m_f(j) \) has earlier been defined as a dummy variable indicating whether firm \( f \) has a manufacturing affiliate in country \( j \). I regress \( m_f(j) \) on firm and country fixed effects and obtain the residual from this regression. Let \( \hat{\nu}_f(j) \) denote this residual. \( \hat{\nu}_f(j) \) captures aspects that are unique to a particular firm-country match. Consequently, it corrects for simultaneity and unobservable firm-region characteristics. \( \hat{\nu}_f(j) \) is then used to construct \( \bar{V}_f(n(i)) \) in the same manner that \( M_f(n(i)) \) was constructed. That is, \( \bar{V}_f(n(i)) = \sum_{j \in n(i)} \hat{\nu}_f(j) \), where \( n(i) \) is the set of all countries that (i) border country \( i \), (ii) are within a specified radius of country \( i \), and (iii) are closer to country \( i \) than is France. Lastly, I use the monotonic transformation \( V_f(n(i)) = \exp(\bar{V}_f(n(i))) \) as the instrument. The instrument is found to be quite significant in the first stage, regardless of the radius used.

4.3 Estimation Results

4.3.1 Trade Costs and Firm Entry Decision

The international trade literature has commonly assumed that wholesale affiliates are a form of exporting by the parent company, and not a form of FDI. To the best of my knowledge, the only test of this hypothesis is conducted by Krautheim (2009). Conditioning solely on a host country’s distance from Germany, Krautheim (2009) finds that German firms are more likely to establish manufacturing subsidiaries over wholesale subsidiaries in more distant countries. His findings are consistent with the view that wholesale affiliates are simply a form of exporting by the parent company.\(^{43}\) The theoretical framework outlined in section 2 contends otherwise. Specifically, Proposition 1 states that firms are more likely to establish a wholesale affiliate than a manufacturing affiliate in more distant countries. Table 6 provides the first empirical assessment of this prediction. Columns (1) and (2) examine only the impact of trade costs on a firm’s entry decision without controlling for other country characteristics. The signs on the coefficient estimates are consistent with the findings of Krautheim (2009). Firms

---

\(^{42}\)Bootstrapping a multinomial logit regression is computationally burdensome, and therefore, quite lengthy. Consequently, bootstrapped standard errors are currently unavailable. However, they will be provided in a future revision of the paper.

\(^{43}\)Recall that the proximity-concentration trade-off framework suggests that firms prefer manufacturing FDI relative to exporting in more distant countries to economize on transportation costs.
are less likely to conduct FDI in more distant markets. Those that do establish an affiliate tend to prefer a manufacturing affiliate relative to a wholesale affiliate. In keeping with the tariff-jumping motive for manufacturing FDI, firms are more likely to establish a manufacturing affiliate relative to a wholesale affiliate in countries that impose higher tariffs on imports from France. Firms are also more likely to enter countries with lower non-tariff trade barriers and prefer to do so through wholesale FDI rather than manufacturing FDI. These findings are consistent with the predominant view that wholesale affiliates are primarily established to facilitate exporting by the parent company. They also contradict Proposition 1.

Including additional host country characteristics, however, overturns this result. In columns (3)-(5), we can see that a firm becomes less likely to establish a manufacturing affiliate relative to a wholesale affiliate in more distant countries once the other gravity variables are controlled for. Moreover, whereas higher tariff levels discourage FDI, they have no statistically significant impact on a firm’s choice between a manufacturing and a wholesale affiliate. In column (5) we can see that doubling a country’s distance from France lowers the odds of it establishing a manufacturing affiliate relative to a wholesale affiliate by about 23%. This is a sizeable impact. To put it into perspective, a 23% decrease in the odds of a manufacturing affiliate being established relative to a wholesale affiliate corresponds with a decline in the odds ratio from 1.083 to 0.834 (see Table 5 for odds ratios). This result challenges the hypothesis that wholesale affiliates are simply a means of exporting from the parent and is consistent with Proposition 1.

It should be noted that the impact of distance on a firm’s choice between a manufacturing and a wholesale affiliate is sensitive to the inclusion of SMP. In column (4), the coefficient on distance is indeed negative. However, it is small in absolute value, and is insignificant. The inclusion of SMP nearly triples the estimated impact of distance on the log odds (see column (5)). The inclusion of SMP also makes the distance significant at the 5% level. One explanation for such an occurrence could be that a higher surrounding market potential makes it more likely that a firm will have manufacturing affiliates in nearby countries, especially given the coefficient estimate on GDP. Hence, SMP may be capturing the firm’s operations in nearby countries. It is therefore of interest to consider how the inclusion of $M_f(n(i))$ affects the coefficient estimates on distance and SMP. This is done in the following section.

Table 6 also presents interesting results on the impact of a country’s per-capita GDP on a firm’s

---

Krautheim (2009) did not condition on the other gravity variables such as GDP, per-capita GDP, SMP, etc.
Table 6: Firm Entry Decision

<table>
<thead>
<tr>
<th>Firm Entry Decision</th>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distance</td>
<td>0.163***</td>
<td>(0.052)</td>
<td>−0.130*</td>
<td>−0.999</td>
</tr>
<tr>
<td></td>
<td>Tariff</td>
<td>0.207***</td>
<td>(0.062)</td>
<td>0.063</td>
<td>(0.076)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.057)</td>
<td>(0.070)</td>
<td>(0.080)</td>
<td>(0.081)</td>
</tr>
<tr>
<td></td>
<td>Import Freedom</td>
<td>−0.227***</td>
<td>(0.076)</td>
<td>−0.120</td>
<td>−0.208***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.076)</td>
<td>(0.082)</td>
<td>(0.079)</td>
<td>(0.081)</td>
</tr>
<tr>
<td></td>
<td>GDP</td>
<td>0.403***</td>
<td>(0.067)</td>
<td>(0.073)</td>
<td>0.388***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.067)</td>
<td>(0.073)</td>
<td>(0.073)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GDP per Capita</td>
<td>−0.415***</td>
<td>(0.094)</td>
<td>−0.447***</td>
<td>−0.461***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.101)</td>
<td>(0.103)</td>
<td>(0.103)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contiguity</td>
<td>0.096</td>
<td>(0.181)</td>
<td>0.194</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.185)</td>
<td>(0.193)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colony</td>
<td>0.814***</td>
<td>(0.206)</td>
<td>0.660***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.204)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>French</td>
<td>0.112</td>
<td>(0.232)</td>
<td>0.283</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.246)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private Credit</td>
<td>0.019</td>
<td>(0.194)</td>
<td>−0.002</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.194)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surrounded Mkt. Potential</td>
<td>−0.588**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.243)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors are clustered at the firm level and adjusted for heteroskedasticity.

Entry decision. Columns (3)-(5) show that firms are more likely to establish a subsidiary for wholesale rather than manufacturing purposes in richer countries. Whether firms are also more likely to enter richer markets, however, is less clear. Column (3) shows that doubling a country’s per-capita GDP lowers the odds of a firm staying out relative to establishing a wholesale affiliate by about 17%. This result, however, is sensitive to the inclusion of the variable Private Credit. In columns (4) and (5) we can see that the inclusion of Private Credit cuts the estimated impact of per-capita GDP on the log odds by nearly a third, and makes the variable insignificant. Interestingly, the inclusion of Private
Credit leaves the coefficient estimate on GDP per-capita on the choice between a manufacturing and a wholesale affiliate largely unchanged.

Previous papers have established that domestic firms are more sensitive to a host country’s financial development than the foreign affiliates of multinationals because the latter can tap into additional credit resources within the boundaries of the firm.\textsuperscript{45} Regression results from columns (4) and (5) indicate that intra-firm credit is insufficient, however, and that foreign affiliates do rely upon domestic capital markets for some of their financing. The extent to which manufacturing affiliates are reliant upon domestic credit markets is statistically no different from the reliance of wholesale affiliates, however.

4.3.2 The Role of ‘Third-Country’ Affiliates on a Firm’s Entry Decision

Table 7 presents the estimation results of a firm’s entry decision controlling for a firm’s operations in geographic proximity through the inclusion of the variable $M_f(n(i))$. The results shown are for the case when the radius for the construction of the variable $M_f(n(i))$ is set to 2000 km.\textsuperscript{46} In the first four columns of Table 7 I do not control for the potential endogeneity of $M_f(n(i))$ whereas the latter four columns present control function estimation results. Columns (1)-(3) and (I)-(III) of Table 7 correspond to columns (3)-(5) of Table 6. To further refine the analysis, I also examine whether the coefficient estimates of $M_f(n(i))$ are robust to the inclusion of country fixed effects. These results are presented in column (4) and (IV) of Table 7.

$M_f(n(i))$ is significant at the 1\% level throughout and takes on the expect sign, irrespective of whether I condition on the gravity variables or on country fixed effects. The coefficient estimates of $\hat{\mu}$ from control function estimation reveal endogeneity is a problem and that failure to control for it tends to understate the impact of nearby manufacturing affiliates on a firm’s entry decision.

On the whole, nearby manufacturing affiliates have a strong impact on a firm’s entry decision. A one unit increase in the number of countries within 2000 km of the host in which the firm operates manufacturing sites lowers the odds of a firm establishing an additional manufacturing affiliate relative to a wholesale affiliate by about 28\%. Given the odds ratios observed in the data (see Table 5), a 28\% decrease in the odds of a manufacturing affiliate being established relative to a wholesale affiliate being established would correspond with a decline from 1.083 to 0.780. At the same time, an increase

\textsuperscript{45}See Desai et al. (2008) for evidence on affiliates of US MNCs, and Manova et al. (2011) for evidence for firms operating in China.

\textsuperscript{46}Estimation results for alternative radii ranging from 1500-5000 km are presented in Appendix B.
### Table 7: Impact of Nearby Manufacturing Affiliates on Firm Entry Decision

<table>
<thead>
<tr>
<th>Firm Entry Decision</th>
<th>Variable</th>
<th>Regular Estimation</th>
<th>Control Function Estimation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M_f(n(i))</td>
<td>−0.159**</td>
<td>−0.165**</td>
<td>−0.153**</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.037)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>Distance</td>
<td>−0.192**</td>
<td>−0.177**</td>
<td>−0.261**</td>
</tr>
<tr>
<td></td>
<td>(0.080)</td>
<td>(0.083)</td>
<td>(0.105)</td>
</tr>
<tr>
<td>Tariff</td>
<td>−0.011</td>
<td>−0.093</td>
<td>−0.111</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.087)</td>
<td>(0.087)</td>
</tr>
<tr>
<td>Import Freedom</td>
<td>−0.144**</td>
<td>−0.217**</td>
<td>−0.178**</td>
</tr>
<tr>
<td></td>
<td>(0.085)</td>
<td>(0.081)</td>
<td>(0.083)</td>
</tr>
<tr>
<td>GDP</td>
<td>0.368**</td>
<td>0.342**</td>
<td>0.347**</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.074)</td>
<td>(0.075)</td>
</tr>
<tr>
<td>GDP per Capita</td>
<td>−0.449**</td>
<td>−0.449**</td>
<td>−0.461**</td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td>(0.104)</td>
<td>(0.103)</td>
</tr>
<tr>
<td>Contiguity</td>
<td>−0.253</td>
<td>−0.093</td>
<td>−0.111</td>
</tr>
<tr>
<td></td>
<td>(0.200)</td>
<td>(0.205)</td>
<td>(0.210)</td>
</tr>
<tr>
<td>Private Credit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surr. Mkt. Potential</td>
<td>−0.381</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.260)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\hat{\mu})</td>
<td>0.195</td>
<td>0.201</td>
<td>0.206</td>
</tr>
<tr>
<td></td>
<td>(0.106)</td>
<td>(0.107)</td>
<td>(0.109)</td>
</tr>
</tbody>
</table>

Notes: **p < 0.01, * p < 0.05, * p < 0.1.

All standard errors are clustered at the firm level. Standard errors for regular estimation are adjusted for heteroskedasticity. 

\(M_f(n(i))\) is for the case when the radius is set to 2,000 km.

In \(M_f(n(i))\) lowers the odds of a firm not establishing an affiliate of any sort relative to establishing a wholesale affiliate by between 39-44%. A decline of 39% corresponds to a decline in the odds ratio by
from 7.092 to 4.326, which is a sizeable decline.

Comparing columns (3)-(5) of Table 6 with columns (I)-(III) of Table 7 provides further evidence in support of Proposition 1. Recall from Table 6 that the impact of distance on a firm’s choice between a manufacturing and a wholesale affiliate is sensitive to the inclusion of SMP. Such is no longer the case when I control for a firm’s operations in geographic proximity. The inclusion of $M_f(n(i))$ raises the impact of distance on the log odds from -0.130 in column (3) of Table 6 to -0.257 in column (I) of Table 7. Moreover, the inclusion of SMP in column (III) of Table 7 barely effects the estimated impact of distance. This is in contrast to what was seen in Table 6.

The inclusion of $M_f(n(i))$ also alters the estimated impact of a host country’s geography on a firm’s decision to establish an affiliate and on the type of affiliate that it establishes. Column (III) of Table 7 reveals that a perspective host country’s geography has virtually no impact on a firm’s choice between a manufacturing and a wholesale affiliate once $M_f(n(i))$ is included among the regressors. On the other hand, a host country’s surrounding market potential does have a strong impact on a firm’s decision to enter the country once we condition on $M_f(n(i))$. Doubling a host country’s SMP makes it almost twice as likely that a firm will opt to stay out of the market relative to establishing a wholesale affiliate there. This result is consistent with the empirical work of Ahn and McQuoid (2012) and Soderberry (2011), who document that manufacturing firms face capacity constraints. Such constraints should exist also for manufacturing affiliates. Consequently, manufacturing affiliates are more likely to direct their exports to larger nearby markets, where a firm would have a greater incentive to establish a wholesale affiliate. Capacity constraints also serve to limit exports to smaller markets in the region. Thus, a larger surrounding market potential makes a perspective host country a less attractive avenue for FDI, thereby accounting for the positive and highly significant coefficient estimate for SMP.

It should be noted that the coefficient estimates on SMP have relatively large standard errors throughout. Such is the case because a true measure of a country’s surrounding market potential should account for trade barriers other than distance, such as tariff rates and non-tariff import restrictions. Regional trade agreements, therefore, are likely impact a host country’s effective surrounding market potential. Estimation results from Table 7 suggest, therefore, that a true assessment of the impact of regional trade agreements on the amount of inward FDI that a country receives as well as on its composition needs to properly account for third-country effects on a firm’s affiliate location decision.
5 Conclusion

The international trade literature has recently recognized that a multinational firm’s investment decision in a pair of nearby countries could be interdependent. Papers such as Blonigen et al. (2007) have studied whether the amount of inbound FDI a country receives depends on the amount received by neighboring countries, while Baltagi et al. (2008), Chen (2008) and Antràs and Foley (2011) have looked at the impact of trade liberalization on FDI at the firm, industry and national level. A different strand of the literature has recognized that multinational firms own a large number of affiliates abroad that are engaged in activities such as distribution, wholesale and retail and do not manufacture their own products. Important contributions include papers by Head and Ries (2001), Hanson et al. (2001), and Krautheim (2009). This paper is the first attempt to examine the interaction of these two features in shaping a firm’s entry decision. I construct a three-country model with heterogeneous firms. The model predicts that if the two foreign countries are sufficiently close to each other relative to their distance from the country in which the parent is headquartered, then a firm’s entry decision in one country depends upon its actions in the other country. The establishment of a manufacturing affiliate in one country increases the probability of a firm establishing an affiliate in a nearby country, while making wholesale FDI a more likely form of entry relative to manufacturing FDI.

These predictions are tested using a unique, hand collected dataset on the foreign operations of French multinationals in 2010. I find strong evidence that a firm’s entry decision into a given country is linked to its actions in neighboring countries. Conditioning upon host country and firm characteristics, a one unit increase in the number of nearby countries in which a firm already operates a manufacturing affiliate increases the probability that a firm will enter a given market through a wholesale affiliate rather than through a manufacturing affiliate. The probability that a wholesale affiliate is established relative to no affiliate at all is also increasing in the number of nearby manufacturing affiliates. Both results are significant at standard levels.

Another novel finding of the paper is that firms do not prefer to establish wholesale affiliates relative to manufacturing affiliates in more distant markets. To the contrary, I find that increasing a country’s distance from France lowers the odds of a firm establishing a manufacturing affiliate relative to a wholesale affiliate by almost 25%. At the same time, there is evidence to suggest that less burdensome importing regulations increase the odds of a firm establishing a wholesale affiliate in a country. This indicates that wholesale affiliates do rely upon imported products. These imports, however, come
primarily from manufacturing affiliates controlled by the firm rather than from the parent.
6 References


A Evidence on Regional Production Portfolios

This section presents evidence on the prevalence of inter-affiliate trade by three French multinationals: Bonduelle, Michelin and Nexans. The information presented here was obtained from a combination of affiliate websites and firm press releases. The objective of this section is threefold: (i) to demonstrate that many wholesale affiliates are supplied by nearby manufacturing affiliates, (ii) to show that this practice is widespread even for affiliates located in Europe, and (iii) to show that oftentimes a nearby manufacturing affiliate is responsible not only for supplying output to a wholesale affiliate, but is also tasked with the parent company’s marketing strategy in the region.

A.1 Bonduelle


![Figure A-1: Press Release on North American Operations, Bonduelle.](image-url)

The second press release describes Bonduelle’s operations in Eastern Europe. It makes clear that it

Figure A-2: Press Release on Eastern European Operations, Bonduelle.

A.2 Michelin

Figure A-2 focuses on the operations of tire manufacturer Michelin in South America. Panel (a) was downloaded from the firm’s Brazilian subsidiary, [http://www.michelin.com.br/sobre-nos.html](http://www.michelin.com.br/sobre-nos.html) whereas panel (b) was downloaded from the firm’s Argentine subsidiary, [http://www.michelin.com.ar/wps/portal/!ut/p/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLN4i3dAPJgfKru-pGolIsm6CK0cAfij_zcVH1v_QD9gtzQ0lhyROUE1oM8A!!/delta/base64xml/L3dJdyEvUUd3QndNQSEvNE1VRS82XzBfOUY!?channelId=84772f94426c5010VgnVCM1000001e65600aRCRD](http://www.michelin.com.ar/wps/portal/!ut/p/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLN4i3dAPJgfKru-pGolIsm6CK0cAfij_zcVH1v_QD9gtzQ0lhyROUE1oM8A!!/delta/base64xml/L3dJdyEvUUd3QndNQSEvNE1VRS82XzBfOUY!?channelId=84772f94426c5010VgnVCM1000001e65600aRCRD) on Oct. 12, 2012. Both make clear that Michelin’s South American operations are primarily directed from the firm’s affiliate in Brazil rather than from France. The Brazilian affiliate is responsible not only for supplying the firm’s wholesale affiliates in the region but also for marketing operations in neighboring countries.
Michelin's presence in Brazil began in 1927 with the start of operations of its commercial office in São Paulo. In 1981 he was installed the first Michelin factory in the country, in the neighborhood of Campo Grande (RJ), for the production of tires for trucks and buses. Today the company is present in the country with five factories in two industrial units and two Plants Processing of Natural Rubber.

Shares and company guidelines for South America are coordinated in Brazil. The Group's share of Michelin South America is strategic, especially in terms of potential market. The Brazil Michelin manufactures and sells tires, tubes, and flaps, exporting its products mainly to other countries in South America such as Argentina, Colombia, Chile, Venezuela and Peru. At 2015, investments are expected in the house of 800 million euros - which will bring expansion of factories, more employment opportunities and strengthening the market share of Michelin in all segments.

(a)

Figure A-3: Operations of Michelin South America

A.3 Nexans

The following two figures focus on the operations of Nexans. The first figure is taken from the group's Dutch affiliate, and was downloaded from http://www.nexans.nl/eservice/Netherlands-nl-NL/navigate_148356/Nexans_Nederland.html on Oct. 3, 2012. Notice that the Dutch affiliate is supplied from the production site in Belgium, rather than by the headquarters. This is further evidence that the use of manufacturing affiliates as an export platform is not confined to affiliates that are distant from the parent.

(b)
Figure A-4: English translation of the website of the Dutch affiliate of Nexans.

Figure A-5 focuses on the operations of Nexans’ Swedish affiliate. The picture in Panel (a) was downloaded from [http://www.nexans.se/eservice/Sweden-en/navigate_153122/Nexans_in_Sweden.html](http://www.nexans.se/eservice/Sweden-en/navigate_153122/Nexans_in_Sweden.html) and the one in Panel (b) was downloaded from [http://www.nexans.se/eservice/Sweden-en/navigate_153128/Locations.html](http://www.nexans.se/eservice/Sweden-en/navigate_153128/Locations.html) on Oct. 11, 2012. Both state that the Swedish affiliate is largely responsible for managing the group’s operations in the Baltic and Scandinavian countries.
Figure A-5: Operations of Nexans’ Swedish Affiliate
Tables B-1 and B-2 present control function estimation results for a firm’s entry decision when the radius used to construct the variable $M_f(n(i))$ is varied from 1500-5000 km. In Table B-1 I estimate a firm’s entry decision using country fixed effects. In Table B-2, the country fixed effects are replaced by the gravity variables.

Table B-1: Impact of $M_f(n(i))$ on Entry with Country Fixed Effects, Control Function Estimation

<table>
<thead>
<tr>
<th>Firm Entry Decision</th>
<th>Variable</th>
<th>Estimate</th>
<th>Radius (in km)</th>
<th>1500</th>
<th>2000</th>
<th>2500</th>
<th>3000</th>
<th>3500</th>
<th>4000</th>
<th>4500</th>
<th>5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln Pr[=m] (log probability of entering through a manufacturing affiliate relative to entering through a wholesale affiliate)</td>
<td>$M_f(n(i))$</td>
<td>$-0.245^{**}$</td>
<td>$(0.102)$</td>
<td>$-0.315^{***}$</td>
<td>$(0.114)$</td>
<td>$-0.279^{**}$</td>
<td>$(0.116)$</td>
<td>$-0.271^{**}$</td>
<td>$(0.118)$</td>
<td>$-0.273^{**}$</td>
<td>$(0.114)$</td>
</tr>
<tr>
<td></td>
<td>$\hat{\mu}$</td>
<td>$0.045$</td>
<td>$(0.098)$</td>
<td>$0.133$</td>
<td>$(0.112)$</td>
<td>$0.118$</td>
<td>$(0.111)$</td>
<td>$0.108$</td>
<td>$(0.112)$</td>
<td>$0.109$</td>
<td>$(0.116)$</td>
</tr>
<tr>
<td>ln Pr[=Ø] (log probability of no affiliate being established relative to entering through a wholesale affiliate)</td>
<td>$M_f(n(i))$</td>
<td>$-0.510^{***}$</td>
<td>$(0.128)$</td>
<td>$-0.574^{***}$</td>
<td>$(0.121)$</td>
<td>$-0.558^{***}$</td>
<td>$(0.120)$</td>
<td>$-0.516^{***}$</td>
<td>$(0.116)$</td>
<td>$-0.493^{***}$</td>
<td>$(0.111)$</td>
</tr>
<tr>
<td></td>
<td>$\hat{\mu}$</td>
<td>$0.242^{*}$</td>
<td>$(0.133)$</td>
<td>$0.352^{***}$</td>
<td>$(0.124)$</td>
<td>$0.348^{***}$</td>
<td>$(0.121)$</td>
<td>$0.302^{**}$</td>
<td>$(0.117)$</td>
<td>$0.275^{**}$</td>
<td>$(0.111)$</td>
</tr>
<tr>
<td>Firm FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Country FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
<td>9222</td>
</tr>
<tr>
<td>Pseudo R$^2$</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
</tr>
<tr>
<td>Log pseudolikelihood</td>
<td>$-3374.81$</td>
<td>$-3374.19$</td>
<td>$-3375.83$</td>
<td>$-3377.36$</td>
<td>$-3377.81$</td>
<td>$-3376.86$</td>
<td>$-3375.51$</td>
<td>$-3376.09$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All standard errors are clustered at the firm level.
Table B-2: Control Function Estimation of Impact of Nearby Affiliates on Entry Decision

<table>
<thead>
<tr>
<th>Firm Entry Decision</th>
<th>Variable</th>
<th>1500</th>
<th>2000</th>
<th>2500</th>
<th>3000</th>
<th>3500</th>
<th>4000</th>
<th>4500</th>
<th>5000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M_f(n(i))$</td>
<td>$-0.257^{***}$</td>
<td>$-0.335^{***}$</td>
<td>$-0.318^{***}$</td>
<td>$-0.306^{***}$</td>
<td>$-0.308^{***}$</td>
<td>$-0.326^{***}$</td>
<td>$-0.328^{***}$</td>
<td>$-0.340^{***}$</td>
</tr>
<tr>
<td></td>
<td>$\hat{\rho}$</td>
<td>0.120</td>
<td>0.206</td>
<td>0.194</td>
<td>0.193</td>
<td>0.195</td>
<td>0.199</td>
<td>0.197</td>
<td>0.206</td>
</tr>
<tr>
<td></td>
<td>Distance</td>
<td>$-0.284^{***}$</td>
<td>$-0.290^{***}$</td>
<td>$-0.291^{***}$</td>
<td>$-0.289^{***}$</td>
<td>$-0.269^{***}$</td>
<td>$-0.235^{***}$</td>
<td>$-0.236^{***}$</td>
<td>$-0.229^{***}$</td>
</tr>
<tr>
<td></td>
<td>Tariff</td>
<td>$-0.105$</td>
<td>$-0.137$</td>
<td>$-0.117$</td>
<td>$-0.072$</td>
<td>$-0.074$</td>
<td>$-0.069$</td>
<td>$-0.060$</td>
<td>$-0.051$</td>
</tr>
<tr>
<td></td>
<td>Import Freedom</td>
<td>$0.17^{**}$</td>
<td>$0.190^{**}$</td>
<td>$-0.213^{**}$</td>
<td>$-0.226^{**}$</td>
<td>$-0.240^{**}$</td>
<td>$-0.238^{**}$</td>
<td>$-0.229^{**}$</td>
<td>$-0.213^{**}$</td>
</tr>
<tr>
<td></td>
<td>GDP</td>
<td>$0.334^{***}$</td>
<td>$0.317^{***}$</td>
<td>$0.329^{***}$</td>
<td>$0.333^{***}$</td>
<td>$0.332^{***}$</td>
<td>$0.324^{***}$</td>
<td>$0.323^{***}$</td>
<td>$0.324^{***}$</td>
</tr>
<tr>
<td></td>
<td>GDP per Capita</td>
<td>$0.374^{***}$</td>
<td>$0.075^{*}$</td>
<td>$0.075^{*}$</td>
<td>$0.075^{*}$</td>
<td>$0.075^{*}$</td>
<td>$0.076^{*}$</td>
<td>$0.076^{*}$</td>
<td>$0.076^{*}$</td>
</tr>
<tr>
<td></td>
<td>Contiguity</td>
<td>$-0.188$</td>
<td>$-0.364$</td>
<td>$-0.371$</td>
<td>$-0.369$</td>
<td>$-0.350$</td>
<td>$-0.347$</td>
<td>$-0.343$</td>
<td>$-0.349$</td>
</tr>
<tr>
<td></td>
<td>Colony</td>
<td>$0.874^{***}$</td>
<td>$0.903^{***}$</td>
<td>$0.877^{***}$</td>
<td>$0.830^{***}$</td>
<td>$0.801^{***}$</td>
<td>$0.873^{***}$</td>
<td>$0.854^{***}$</td>
<td>$0.827^{***}$</td>
</tr>
<tr>
<td></td>
<td>French</td>
<td>0.051</td>
<td>$-0.052$</td>
<td>$-0.075$</td>
<td>$-0.102$</td>
<td>$-0.108$</td>
<td>$-0.142$</td>
<td>$-0.154$</td>
<td>$-0.163$</td>
</tr>
<tr>
<td></td>
<td>Private Credit</td>
<td>$-0.075$</td>
<td>$-0.094$</td>
<td>$-0.109$</td>
<td>$-0.094$</td>
<td>$-0.098$</td>
<td>$-0.095$</td>
<td>$-0.107$</td>
<td>$-0.129$</td>
</tr>
<tr>
<td></td>
<td>Surr. Mkt. Potential</td>
<td>$-0.363$</td>
<td>$-0.231$</td>
<td>$-0.190$</td>
<td>$-0.144$</td>
<td>$-0.120$</td>
<td>$-0.047$</td>
<td>$-0.062$</td>
<td>$-0.054$</td>
</tr>
</tbody>
</table>

Notes: $^{***} p < 0.01$, $^{**} p < 0.05$, $^{*} p < 0.1$. Standard errors are clustered at the firm level.