Is FDI Indeed Tariff-Jumping? Firm-Level Evidence

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Abstract

This paper attempts to shed light on greenfield FDI and cross-border M&A as distinct FDI modes of entry. The paper first develops a simple model of this decision process to derive testable predictions and then examines these predictions using firm level data on Swedish multinational corporations. The paper uses an interesting data base and offers new insights into the choice of the different entry modes. The main contribution of the paper is that evidence for tariff-jumping is lacking. In addition, firm-specific assets have no effect on cross-border M&A in the estimation.

Keywords: foreign direct investment, tariff-jumping, Sweden

JEL Classification : F21, F23, L2.

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1. Introduction

Multinational corporations (MNCs) typically are large entities that operate or have investments in several different countries. These corporations undertake Foreign Direct Investment (FDI) in different formats: A MNC may enter a host market by acquiring an already existing local firm (cross-border mergers and acquisitions) or by establishing a new venture (greenfield FDI). Recent data shows that over the past decade most of the growth in international production has been via cross border mergers and acquisitions (cross-border M&A).[1] The share of total cross-border M&A in world FDI flows has increased from 52% in 1987 to 83% in 1999. These figures vary considerably between developed and developing countries. For the former, the ratio is higher, having risen to nearly 100% in 1999 from 62% in 1987. Yet, surprisingly, the international trade literature on cross-border M&A is meager.

Until recently almost any discussion of MNCs has turned to the fundamental question: "Why multinational?" The interaction of trade barriers, firm specific assets, labor costs, proximity to the consumer and many other factors are used to answer this question. The MNC literature has considered the effects of these factors mainly in the context of whether or not to produce overseas but not in the context of specific types of FDI. Two strands of this literature are particularly relevant to this study. The first one suggests that one of the primary motives behind FDI is tariff-jumping and makes no distinction between cross-border M&A and greenfield FDI.[2] The second strand includes the knowledge capital models of FDI which again treat cross-border M&A and greenfield FDI as perfect substitutes.[3]

Cross-border M&A and greenfield FDI, however, are unlikely candidates for being perfect substitutes for most firms seeking foreign market access. While cross-border M&A provide rapid access to a foreign market with increased market power and a means

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[1] See World Investment Report (2000).

[2] The proximity-concentration hypothesis (Krugman, 1983; Horstmann and Markusen, 1992 and Brainard, 1993a) postulates that firms are more likely to expand production horizontally overseas the higher are trade barriers and transport costs. The predictions of these papers differ considerably from the traditional trade theory explanations of Helpman (1984), Markusen (1984) and Ethier and Horn (1990) which suggest that firms undertake vertical FDI to exploit the factor price differences associated with different relative factor supplies.

[3] The proprietary ownership of firm-specific assets and intensive use of knowledge capital are considered as another reason for the existence of MNCs. These assets are most profitably exploited internally for reasons such as asymmetric information, moral hazard and technology diffusion. FDI versus non-FDI modes of entry, specifically exporting or licensing versus Greenfield FDI have been the focus of many papers including Horstmann and Markusen (1987b, 1996), Markusen and Venables (1996a, 1998) and Ethier and Markusen (1996).

of exploiting the synergies between the buyer and the seller firms, greenfield FDI offers the most profitable internal utilization of firm specific assets (R&D, marketing expenditures, scientific and technical workers, product newness and complexity and product differentiation) for reasons including moral hazard and technology diffusion.

The objective of this paper is to analyze the variations in modes of foreign market access by offering a straightforward model of FDI that involves both cross-border M&A and greenfield FDI as distinct entry modes. We then test the findings of the theory by employing a unique firm-level data set located in Sweden.

Two closely related studies are Horn and Persson (2001) and Norbäck and Persson (2004). The former proves that in an international merger formation game without greenfield FDI domestic firms have incentives to merge in the presence of sufficiently high trade barriers in order to prevent international mergers. The latter shows that low greenfield costs and low trade costs induce cross-border M&A in a mixed international oligopoly, where state assets are sold at auction. As do these studies, the present paper endogenizes the acquisition price. By contrast, however, we portray a foreign market entry mechanism in which the acquisition price is determined through bi-lateral Nash bargaining and present an empirical analysis using a confidential firm-level database.

In addition to greenfield FDI and cross-border M&A, the model allows for exporting as another alternative for foreign market access. Exporting involves tariff and transportation costs, in other words, trade costs. One of the key advantages of FDI over exporting is that the MNC avoids trade costs. This is the traditional *tariff-jumping* argument. As we show, this is not necessarily the case for cross-border M&A. To this end, we consider a two-country partial equilibrium model with a homogeneous good. At the outset, there exist a finite number of identical local firms in the host country and a MNC. In the first stage, the MNC chooses its mode of entry. It can be cross-border M&A (A), greenfield FDI (G) or exporting (E). Acquisition price is determined endogenously through a bilateral Nash bargaining process rather than taken as given. The model incorporates both trade costs and firm specific assets as distinct determinants of modes of foreign market access. The second stage of the game involves the product market interaction.

The solution of the model reveals that cross-border M&A may not always be tariff-jumping. The MNC pays a linear combination of the reservation price of its own and that of the local firm. These reservation prices depend on the payoffs to both parties from a potential exporting scenario. As trade costs increase, the reservation prices of both the multinational and the local firm increase making the cross-border M&A more expensive for the multinational. Another interesting result is related to the firm-specific assets. Higher levels of these assets increase the likelihood of greenfield FDI when compared to both exporting and cross-border M&A. At moderate to high trade costs, an increase in cost asymmetry may increase the likelihood of cross-border M&A as well.

The second phase of the current study is to test these findings against real world data. In spite of the scarcity of firm-level data and the reliance on imperfect measures, empirical work on the choice of entry mode has started to emerge (Caves and Mehra (1984), Yamawaki (1994), O'Huallachain and Reid (1997) and McCloughan and Stone (1998)). This line of literature has also encompassed studies at the company level (Blomstrom and Zejan (1991), Andersson and Svensson (1994) and Smarzynska (2000)). However, none of these papers has explored the impact of trade costs on cross-border M&A to the best of the author's knowledge. The current study, therefore, can be considered as the first attempt to address this issue by using firm-level data.

The data is one of the most important components of the present study. As mentioned in Markusen (2002) the determinants and consequences of direct investment are confused with those of portfolio capital investments in most of the FDI data sources. Much data exists on direct investment stocks and flows, but very little exists on what the MNCs actually produced and traded and almost none on multinational affiliate production activities. This paper tests the theory propositions by using a confidential database available only inside the building of IUI (Industriens UtredningsInstitut), an independent non-profit research institution in Stockholm, Sweden. IUI data is based on surveys sent to all Swedish MNCs approximately every four years since 1960s (1965, 1970, 1974, 1978, 1986, 1990, 1994, 1998 and 2002) and has achieved a remarkable 80-90% response rate due to its success in keeping the information confidential. The survey contains detailed information on the parent company as well as the operations of each individual foreign affiliate.

The empirical analysis employs multinomial logit, multivariate probit and binary logit specifications to estimate the determinants of over 100 Swedish MNCs' foreign market entry decisions across a panel of 45 countries between the years 1987 and 1998. The result of the empirical analysis supports the theoretical results: (i) Tariff rate has a significant and negative impact on cross-border M&A in contrast to the tariff-jumping arguments. (ii) As the R&D intensity of the MNC increases the likelihood of greenfield FDI increases and the likelihood of the other outcomes decreases. In the estimation, cost asymmetry is found to have no effect on cross-border M&A. (iii) Firms with previous presence in the host country are more likely to acquire a local firm. The likelihood of exporting/no-entry falls if the MNC has previous affiliates in the local market. (iv) Market size has a positive and significant effect on cross-border M&A and greenfield FDI.

The paper proceeds as follows: In section two, a simple theoretical model is developed. Section three lays out the empirical framework employed and includes a discussion of results. This is followed by concluding remarks.

2. The model

There are two countries in the model, the host and the parent. A MNC from the parent country considers entering the host country market. The demand for the homogeneous good Q in the host country is determined by a linear demand function.

$$Q = 1 - P \tag{1}$$

where P denotes the market price in the host country. There are *n-1* identical local firms in the host country ($n \geq 2$). The multinational firm m has three entry strategies: acquisition of one of the local firms (A); establishment of a wholly owned subsidiary, in other words greenfield FDI (G); and exporting from the parent country (E) to the host. Total profits generated under each entry strategy s for a representative local firm ℓ and for the multinational firm m are given respectively by

$$\begin{aligned} \Pi_m^s &= \pi_m^s - F^s = (P - c_m^s) q_m^s - F^s \\ \Pi_\ell^s &= \pi_\ell^s = (P - c_\ell^s) q_\ell^s \end{aligned} \tag{2}$$

where $s = \{A,\ G,\ E\}$, π is the operating profits from sales and q is the output produced by each firm. The marginal production cost for a representative local firm is $c_\ell^s = c_\ell$, for $\forall s$. The marginal production cost for the MNC, on the other hand, differs across entry strategies, i.e. $c_m^A = c_\ell,\ c_m^G = c_\ell - \delta,\ c_m^E = c_\ell - \delta + \tau$. It is assumed that firm m possesses firm-specific assets, such as technology, marketing and management capabilities. The firm specific assets provide cost savings of δ, where $\delta \in (0,1)$, for firm m. Firm m enjoys these production cost savings in greenfield FDI and exporting regimes. However, cross-border M&A may involve other motivations such as rapid access to a new technology or a new market with reduced competition compared to the other entry strategies. Therefore, in the case of an acquisition, the MNC is assumed to continue with the production technology of the acquired firm, c_ℓ where $c_\ell \in (0,1)$. Under an exporting regime, there is an additional per unit trade cost (τ) where $\tau \in (0,1)$, for firm *m*. In case of greenfield FDI, there exists an exogenous fixed cost (F^G) and the entry cost related to cross-border M&A is F^A.

2.1. The game

In the first stage, firm *m* chooses its mode of entry. Since the choice of timing between cross-border M&A and greenfield FDI is not clear in the entry game, the choice of overseas investment mode is simultaneous. The acquisition price (F^A) is endogenized through a simple bilateral Nash bargaining process.

In this game, the acquiring firm (firm *m*) and the target firm (firm ℓ) seek to split a total value π_m^A, which they can achieve if and only if they agree on a specific division. Since all the local incumbents are identical, it does not make any difference which one the MNC chooses as the acquisition target. If there is no agreement between the chosen target and the MNC, then there will be no other agreement between the MNC and the remaining local firms due to symmetry. In this case, the MNC opts for the next best alternative among exporting and greenfield FDI. The following payoffs, thus, can be called *No-Agreement* (N) payoffs, in other words backstop payoffs:

$$\begin{aligned} \Pi_m^N &= \max\left\{\Pi_m^G, \Pi_m^E\right\} \\ \Pi_\ell^N &= \left\{\Pi_\ell^E \Big|_{\Pi_m^N=\Pi_m^E}, \Pi_\ell^G \Big|_{\Pi_m^N=\Pi_m^G}\right\} \end{aligned} \tag{3}$$

For the solution of this bargaining procedure, it should be assumed that there is a positive surplus $(\pi_m^A - \Pi_m^N - \Pi_\ell^N > 0)$ from agreement. If this were not the case, the whole bargaining process would be unlikely because each side would just take up its outside opportunity and receives its *No-agreement* payoff. Next, consider the following rule coming from the solution of bi-lateral Nash-bargaining process.

Rule 1. *Given* $\alpha \geq 0$ *each party is to be given its No-agreement payoff plus a share of the surplus, a fraction* α *for firm m and a fraction* $(1-\alpha)$ *for firm* ℓ *.*

Writing Π_m^A and Π_ℓ^A for the amounts that firm m and firm ℓ receive, Rule 1 can be translated as

$$\begin{aligned}\Pi_m^A &= \Pi_m^N + \alpha(\pi_m^A - \Pi_m^N - \Pi_\ell^N) = \pi_m^A - F^A \\ \Pi_\ell^A &= \Pi_\ell^N + (1-\alpha)(\pi_m^A - \Pi_m^N - \Pi_\ell^N) = F^A\end{aligned} \tag{4}$$

Define the reservation price of the buying party as $R_m = \pi_m^A - \Pi_m^N$ and that of the selling party as $R_\ell = \Pi_\ell^N$. Then, one can arrive at the acquisition price by solving the equations in (4) for F^A:

$$F^A = (1-\alpha)R_m + \alpha R_\ell \tag{5}$$

When $\alpha = 1$, firm m has all the bargaining power implying that $F^A = R_\ell$. When $\alpha = 0$, on the other hand firm m has no bargaining power and thus the cross-border M&A price is the same as its reservation price, i.e. $F^A = R_m$.

The second stage of the game involves the product market where firms compete á la Cournot. The equilibrium output levels and total profits of all firms are reported in the Appendix. Finally, production and sales also take place with firms moving simultaneously. The game is solved for Nash equilibria in pure strategies. Each equilibrium point is assumed to have equal probability.

2.2. The equilibrium

This section presents the analysis of how trade costs, production cost asymmetries and bargaining strength affect the acquisition price equilibrium, profits and thus the choice of entry mode. Now consider the characterization of the equilibrium. A set of non-negativity constraints are imposed since this model looks only at the interior solutions where both the local incumbents and the multinational are active in the product market under each different entry strategy[4].

The MNC makes its entry decision in the following way. In the case where the best alternative to a negotiated agreement is exporting, firm m chooses cross-border M&A over exports if the payoff from cross-border M&A is higher than that from exporting. On the other hand, in the case where the best alternative is greenfield FDI, firm m chooses cross-border M&A if the payoff from M&A is higher than that from greenfield FDI. The final decision in regard to entry mode, henceforth, will be the outcome of the relative

[4] See Appendix for the identification of non-negativity constraints.

magnitudes of and the interrelations among trade costs, cost asymmetry and the relative bargaining power of the parties. The following rule summarizes the decision making process of the MNC:

Rule 2. *Let the non-negativity constraints be binding. The equilibrium strategy is then*

$$\begin{cases} \textit{cross-border M\&A} & \textit{if} \quad \max\left\{\Pi_m^A, \Pi_m^E\right\} = \Pi_m^A \\ \textit{exporting} & \textit{otherwise} \end{cases} \Bigg| \, \Pi_m^N = \Pi_m^E$$
$$\begin{cases} \textit{cross-border M\&A} & \textit{if} \quad \max\left\{\Pi_m^A, \Pi_m^G\right\} = \Pi_m^A \\ \textit{greenfield FDI} & \textit{otherwise} \end{cases} \Bigg| \, \Pi_m^N = \Pi_m^G \qquad (6)$$

In the next step, the comparative statics analysis is used to investigate the impact of the parameters of this system on the final entry decision. The following three propositions summarize the main comparative statics results derived from this model.

Proposition 1. *Given* $\alpha > 0$ *the likelihood of cross-border M&A increases as the bargaining power* (α) *of firm m increases relative to that of the target firm.*
Proof. See Appendix. ■

An increase in the bargaining strength of the MNC changes the acquisition price in favor of the acquirer. Greater bargaining power makes it cheaper for the MNC to buy the local firm. Therefore, cross-border M&A become more likely.

Proposition 2. *A higher production cost asymmetry* (δ) *increases the profitability of all entry strategies. However, greenfield FDI becomes more likely compared to both exporting and croos-border M&A.*
Proof. See Appendix. ■

Recall from the introduction that the multinationals arise from the use of knowledge capital, a broad term that includes human capital of the employees, patents, blueprints and procedures, which are called firm specific assets. The multinational can reduce its production costs through the extensive use of these assets which can be provided to additional plants without reducing their value in existing plants, i.e. they have certain public good characteristics.

Proposition 2 states that a change in the cost asymmetry affects the profitability of all entry strategies in the same direction. However, one may be affected more when compared to the other. Increases in the cost asymmetry (δ) favor greenfield FDI more than exporting. Even though firm m, the multinational, enjoys the same amount of cost savings in both of these entry modes, the existence of trade costs in a possible exporting scenario makes greenfield FDI more profitable.

The impact of a change in δ on cross-border M&A, on the other hand, may not be as obvious. For example, an increase in cost asymmetry (δ) decreases the likelihood of cross-border M&A if the next best alternative is greenfield FDI. As δ increases the reservation prices of both the multinational and the local firm decrease making the cross-border M&A cheaper for the multinational. However, the profitability of the greenfield FDI increases more due to the direct effect of this change on the greenfield payoff.

Proposition 3. *Let* $\Pi_m^N = \Pi_m^E$*. Higher trade costs* (τ) *reduce the profitability of both cross-border M&A and exporting. However, cross-border M&A may become less likely compared to exporting if* $\tau - \delta > (^{n-1}/_{n^2+1})(1-c_\ell)$.

Proof. See Appendix. ■

Proposition 3 is perhaps the most interesting result from this model. What it underlines is that high trade costs diminish cross-border M&A when exporting is the next best alternative. This may seem counterintuitive at first since a higher degree of protection is expected to favor entry. This is most commonly referred to as tariff-jumping FDI. However, the proposition is consistent with the fact that the acquisition price is actually a function of trade costs. Firm m, the multinational pays a linear combination of the reservation price of its own and that of the local firm. These reservation prices are functions of the payoffs to both parties from a potential exporting scenario. As τ increases, the reservation prices of both the multinational and the local firm increase making the cross-border M&A more expensive for the multinational. Therefore, when trade costs are high, firm m is less likely to acquire.

Another result pointed out in the second part of the proposition is that, under certain circumstances, as trade costs increase cross-border M&A become less likely compared to exporting. In other words, in the existence of moderate to high trade costs (high τ levels) and/or similar levels of firm-specific assets between the MNC and the local firms (low δ levels), increasing trade costs reduce the likelihood of cross-border M&A more than that of exporting. Then, cross-border M&A may not always be tariff jumping.

3. The empirical framework

This section shows how the theoretical set-up from the previous section is used to reach an estimating equation. In addition, it provides a detailed discussion of the data, its sources and limitations. Finally, it concludes with a discussion of results.

The paper adheres to the most general setting where the firm decides if and how to enter, since the choice of timing between cross-border M&A and greenfield FDI is not always clear. When a MNC considers entering an overseas market via greenfield FDI or cross-border M&A or exporting, it will opt for the alternative with the highest expected rate of return. For a potential entrant the probability of selecting one of these alternatives is a function of the expected rate of return, which depends on the parameters of the model presented in the last section:

$$Pr(Y_{ikts}) = f(\tau_{zkt}, \delta_{ikt}, \alpha_{ikt}, \mathrm{M}_{kt}) \tag{7}$$

where Y_{ikts} is the entry strategy *s* chosen by firm *i* in country *k* during time period *t*. δ_{ikt} *and* α_{ikt} are cost asymmetry between firm i and the local firms and bargaining strength of firm *i* in country *k* at time *t*, respectively. τ_{zkt} is trade costs in industry *z* and M_{kt} is the size of the market in country *k* at time *t*.

Initial estimates are from a standard multinomial logit MNL specification. However, a major concern is that a multinomial logit model assumes that the odds ratios are independent of the other alternatives. This is called the Independence of Irrelevant Alternatives (IIA) which follows from the initial assumption that the disturbances are independent and homoscedastic. To test the IIA assumption, a classic test proposed by Hausman and McFadden (1984) is used. The idea behind the Hausman test is that if a subset of the choice set is truly irrelevant, omitting it from the model altogether will not change the parameter estimates systematically. The test statistics is as follows:

$$\chi^2 = (\hat{\beta}_r - \hat{\beta}_f)'[\hat{V}_r - \hat{V}_f]^{-1}(\hat{\beta}_r - \hat{\beta}_f) \tag{8}$$

where r indicates the estimators based on the restricted subset, f indicates the estimators based on the full set of choices, and $\hat{V}_r$ *and* $\hat{V}_f$ are the respective estimates of the asymptotic covariance matrices.

The standard Hausman test has a number of limitations. The test statistic may be undefined because the estimated variance-covariance matrix does not satisfy the required asymptotic properties of the test. Thus, a generalized Hausman specification test through seemingly unrelated regression is used next to test the IIA assumption. The difference between the two tests is due to the use of a different estimator of the variance of the difference of the estimates. The latter test statistic is as follows:

$$\chi^2 = (\hat{\beta}_r - \hat{\beta}_f)'[\hat{V}_r - \widehat{\text{cov}}_{r,f} - \widehat{\text{cov}}_{f,r} + \hat{V}_f]^{-1}(\hat{\beta}_r - \hat{\beta}_f) \tag{9}$$

Accounting for correlation can be very important in qualitative response models such as the one in the current study, since controlling for it can reduce the inconsistency of the estimators significantly. Hence, the most suitable econometric model is a multivariate probit because it allows a flexible pattern of conditional covariance among the latent utilities of alternatives.

Consider three binary variables $y_1,\ y_2\ and\ y_3$. The MNC has three choices: cross-border M&A ($y_1 = 1, y_2 = 0, y_3 = 0$), greenfield FDI ($y_1 = 0, y_2 = 1, y_3 = 0$) and exporting ($y_1 = 0, y_2 = 0, y_3 = 1$). The trivariate probit model supposes that

$$Y_{ikts} = \left\{ y_1 = \begin{cases} 1 & \text{if X}\beta{+}\varepsilon_1{>}0 \\ 0 & \text{otherwise} \end{cases},\ y_2 = \begin{cases} 1 & \text{if X}\gamma{+}\varepsilon_2{>}0 \\ 0 & \text{otherwise} \end{cases},\ y_3 = \begin{cases} 1 & \text{if X}\theta{+}\varepsilon_3{>}0 \\ 0 & \text{otherwise} \end{cases} \right\} \tag{10}$$

with

$$\left(\varepsilon_1\ \varepsilon_2\ \varepsilon_3\right) \sim N(0,\Sigma), \qquad \sigma_{ij} = \begin{cases} 1 & \text{i=j} \\ \rho_{\text{ij}} & \text{i} \neq \text{j} \end{cases} \tag{11}$$

For identification purposes the variances of the epsilons must equal 1. Evaluation of the likelihood function necessitates the computation of trivariate normal integrals. For instance, the probability of observing M&A ($y_1 = 1,\ y_2 = 0,\ y_3 = 0$) is as follows:

$$\Pr[y_1 = 1, y_2 = 0, y_3 = 0] = \int_{X\beta}^{\infty}\int_{-\infty}^{X\gamma}\int_{-\infty}^{X\theta} \phi_3(\varepsilon_1,\varepsilon_2,\varepsilon_3;\rho_1,\rho_2,\rho_3)\ \mathrm{d}\varepsilon_3\mathrm{d}\varepsilon_2\mathrm{d}\varepsilon_1 \tag{12}$$

where $\phi_3(.)$ is the trivariate normal probability density function, and ρ_{ij} is the correlation coefficient between ε_i and ε_j.

The applications of multivariate probit models have been limited until recently due to the fact that the required integrations of the multivariate normal density over subsets of Euclidian space are computationally burdensome. However, the development of the highly accurate GHK (Geweke-Hajivassiliou-Keane) probability simulator opened a gate for the applications. In this paper, the simulated maximum likelihood method using a GHK simulator is adopted, since it is found to be superior to the other simulation based models in Geweke, Keane and Runkle (1994). Then the independence of residuals ε_1, ε_2 and ε_3 is tested by using an LR test to explore the existence of nesting possibilities if any.

Finally, the robustness of the estimation results for cross-border M&A and greenfield FDI is checked by means of standard bi-logit estimation.

3.1. Data

The data set is composed of observations on the cross-border activities of Swedish MNCs in 45 different countries during three distinct time periods: 1987-90, 1991-94 and 1995-98[5]. For a list of countries used in this study, see Table 1.

The main variable of interest, *Mode of Entry (Y),* shows the entry strategy chosen by Swedish MNCs in 45 countries during the time period 1987-1998. Since the questionnaire does not include a specific question on the parent company exports targeting different countries until the last survey, firm-level data on the exporting outcome is missing. Therefore, the dependent variable is specified as cross-border mergers and acquisitions (A), greenfield FDI (G) and otherwise (O).

This variable is qualitative in nature. In the MNL model, Y takes the value of 1 for cross-border M&A, 2 for greenfield FDI and 0 otherwise. In the multivariate probit model, it takes the value of $(y_1 = 1,\ y_2 = 0,\ y_3 = 0)$ for cross-border M&A, $(y_1 = 0,\ y_2 = 1,\ y_3 = 0)$ for greenfield FDI and $(y_1 = 0,\ y_2 = 0,\ y_3 = 1)$ otherwise. If the MNC undertook both cross-border M&A and greenfield FDI during a certain time period, Y takes the values y_1 or y_2 depending on how the majority of affiliates were established. If exactly half of the establishments were greenfield investments, Y is assigned the value of y_2, which does not occur more than a few cases in the entire database. Each affiliate is included only once, at the time when it joined the parent. In the binary choice model, Y takes the value of 1 for M&A, 0 for greenfield FDI.

[5] The company-level data used in this study has been collected by *the Industrial Institute for Economics and Social Research (IUI) in Stockholm, Sweden* about every fourth year since 1960s. It includes all Swedish MNCs in manufacturing industry and contains detailed information on each majority owned foreign manufacturing affiliate. The country-level data is collected from the *International Financial Statistics* and *Trains Database* of UNCTAD.

Table 2 reports the entry characteristics of Swedish MNCs. The percentage of cross-border M&A and greenfield FDI among all foreign entry modes is no more than 5%, however, almost 80% of these consist of cross-border M&A. Although the recent worldwide increase in FDI seems to be more related to cross-border M&A than greenfield FDI (UNCTAD, 2000), the relative importance of cross-border M&A as an entry mode has remained more or less constant during 1990s in Sweden.

R&D Intensity is used as a measure of firm-specific assets *(δ).* It is the MNC's total R&D expenditures divided by total sales at the end of each time period. Another variable encountered in the theoretical model is bargaining power. Bargaining power of the MNC *(α)* is measured by its previous experience in the host country, namely *Previous Affiliates.* If the MNC has a manufacturing affiliate in the host country k at the beginning of time period t, the dummy variable takes the value of 1, and 0 otherwise. *Capital Intensity* (capital expenditures divided by the number of workers) and *Optimal Plant Size* (the average number of employees in the MNC's foreign affiliates at the end of each time period) are also used as measures of firm-specific assets and of bargaining power, respectively.

Gross Domestic Product is used as a measure of the market size *(M).* Two distinct measures are used for the *Trade Costs (τ)*; the most favored nation tariff rate and distance. The version of TRAINS data used in this study gives the import tariffs for industries which can be mapped into the 10-digit level in Harmonized System. These figures are converted first into the 4-digit ISIC (rev2) by using the concordances[6]. Finally, the newly obtained figures are mapped into the 2-digit IUI industry classification by using concordances provided by *Statistics Sweden.* For further details, see the summary statistics in Table 3.

3.2. Results

Tables 4-6 report the multinomial logit, multivariate probit and binary logit estimates of the determinants of Swedish MNCs' foreign market entry decisions across a balanced panel of 45 countries between the years 1987 and 1998. Each table contains four separate regressions using different proxies for the same variable. In regression (1), trade costs are measured by the tariff rate, firm-specific assets by R&D intensity and the bargaining power of the MNC by previous affiliates. Regression (2) measures the trade costs by distance. Firm-specific assets are measured by capital-intensity in regression (3) and the

[6] Concordances are provided by Jon Haveman on http://www.eiit.org/Protection

bargaining power is measured by optimal plant size in regression (4). Many of the coefficients have the expected sign and are statistically significant across the three specifications. Region and industry dummies are generally found to be insignificant for all model specifications and are not reported for brevity.

3.2.1. Multinomial logit

The results of the multinomial logit estimation and the Hausman test statistics performed to test independence of irrelevant alternatives (IIA) are reported in Table 4. The first, second and third columns in each regression category show the estimation results and the Hausman test statistics for the binary choices between (A and O), (G and O) and (A and G), respectively.

Evidence for tariff-jumping is lacking. In all four regressions an increasing tariff rate lowers the likelihood of acquisitions which is in contrast to the tariff-jumping arguments. For the choice between (A and G), the tariff rate has a negative and statistically significant coefficient. The level of significance increases for the choice between (A and O). One plausible explanation is suggested by the theoretical model presented in this paper. Higher trade costs may put the local firm in a stronger bargaining position and therefore can decrease the likelihood of acquisitions. On the other hand, although not highly significant, the coefficient of the tariff rate, for the choice between (G and O), indicates that greenfield FDI also may not be a tariff-jumping investment. Interestingly, in regression (2), when distance is used as a measure of trade costs greenfield FDI is found to be declining in trade costs.

The effect of firm-specific assets on the mode of entry in each estimating equation is as expected. High-tech firms are more dependent on their own technology creation and production technology and as a result are more likely to enter by greenfield FDI. Firm-specific assets are found to be insignificant for the choice between A and O. In regression (3), firm-specific assets are measured by capital intensity and results with this proxy tend to be weaker compared to R&D intensity. Perhaps capital intensity may be a less specific proxy for firm-specific assets.

Two proxies are used to measure for the bargaining strength of the MNC: Previous affiliates and optimal plant size. Regression (4) reports results with optimal plant size. Both of these measures are found to increase the likelihood of acquisitions against other entry strategies. GDP has a positive and significant effect on cross-border M&A and greenfield FDI. A bigger host country market reduces the likelihood of other outcomes when compared to FDI.

The lower half of Table 4 shows the IIA test results. The standard Hausman test statistic is found be undefined when A is excluded from regressions (1) and (4) and when either A or G excluded from regressions (2) and (3). Thus, a generalized Hausman specification test through seemingly unrelated regression is used to test the IIA assumption. In all four regressions, the exclusion of A from the choice set causes a systematic difference in the parameter estimates at 10% significance level when compared to the estimates from the full choice set.

3.2.2. Multivariate probit

A multivariate probit specification is used to account for the correlation. The estimation results by the method of simulated maximum likelihood and LR statistic performed to test the independence of residuals are reported in Table 5. As can be observed in the lower half of the table, in all four regressions ρ_{AO} is found to be significant, indicating a correlation in residuals. However, this time the parameter estimates are unbiased and consistent.

Signs of almost all parameter estimates are in line with the theory. In regression (1), the tariff rate has a significantly negative effect on A and an insignificant negative impact on G suggesting no evidence for tariff-jumping in case of cross-border M&A. The likelihood of the third choice O gets higher as tariff rate increases, however. There are a number of potential explanations for why this may be true. The first explanation is due to the theory. Since the profitability of the MNC decreases in trade costs in both exporting and cross-border M&A cases, the strategy more heavily affected by trade costs will become less likely as an equilibrium outcome. If, for example, the MNC and the local firms are similar in endowments of firm-specific assets i.e. the difference $\tau - \delta$ is large enough, then an increase in trade costs favors exporting in a decision between A and E. Second, since the questionnaire does not include a specific question on the parent company exports targeting different countries until the last survey, firm-level data on exporting outcome is missing. Thus, choice O includes both exporting and no-entry. If no-entry dominates exporting within the third choice O, then an increase in tariff-rate can completely prohibit foreign market access.

In line with theory, R&D intensity has a significant positive effect on G and a significant negative impact on O. The multinational can reduce its production cost through the extensive use of these assets which can be provided to additional plants without reducing the value of them in existing plants. A parallel explanation for this phenomenon is due to Andersson and Svensson (1994), who argue that high-tech firms are more dependent on their own technology creation and production technology and are thus more likely to enter by greenfield FDI. The significant sign of previous affiliates indicates that this increases the likelihood of A and reduces that of O. Finally, the positive coefficient on GNP suggests that bigger market size favors entry.

Regression (2) in Table 5 substitutes distance for tariff rate. All parameters preserve the sign and significance results in regression (1) but the effect of distance of G. As distance increases, the likelihood of greenfield FDI decreases suggesting evidence against tariff-jumping. Next, regression (2) replaces R&D intensity with capital intensity. Sign and significance of this variable deteriorates most probably for reasons explained in the multinomial logit specification. Last, optimal plant size is used as a measure of bargaining strength in regression (4). This variable is found to have a significant positive impact on entry indicating that the large size of a firm makes it to easier establish foreign affiliates regardless of the type of entry.

Table 6 shows the results of the bi-logit specification. Under each regression equation, the first column shows the estimation results and the second column reports the elasticities. GDP, capital intensity and optimal plant size are found to be insignificant. The major results are unchanged. Tariff rate, distance, previous affiliates and R&D intensity do not change sign or significance when compared to the results from other specifications. Therefore, one can interpret the logit estimation as another robustness check.

4. Concluding remarks

The inadequacy of traditional theories of FDI to differentiate cross-border M&A from greenfield FDI motivates the current study. While anecdotal and empirical evidence has supported the idea that greenfield FDI and cross-border M&A are not perfect substitutes, few formal theories for this differentiation have been presented and previous empirical evidence has been mixed. This paper attempts to shed light on greenfield FDI and cross-border M&A as distinct FDI modes of entry. The paper first develops a simple model of this decision process to derive testable predictions and then examines these predictions using firm level data on Swedish multinational corporations over 1987-1998 time period. The paper uses an interesting data base and offers new insights into the choice of the different entry modes.

The paper improves and complements the existing literature in several ways. The main contribution of the paper is that evidence that M&A is driven by tariff-jumping is lacking. A potential explanation is that higher trade costs may put the local firm in a stronger bargaining position and therefore decrease the likelihood of acquisitions. Another result is that as the technological sophistication of the MNC increases the likelihood of greenfield FDI increases, whereas the likelihood of an exporting outcome decreases. In the estimation, the cost asymmetry is found to have no effect on cross-border M&A.

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Appendix

Combining (1) and (2), total profits of the MNC (firm m) and a representative local firm in the host country (firm ℓ) can be expressed respectively as

$$\begin{aligned} \Pi_m^s &= (1 - Q^s - c_m^s) q_m^s - F^s \\ \Pi_\ell^s &= (1 - Q^s - c_\ell^s) q_\ell^s \end{aligned} \tag{A.1}$$

where $Q^s = \sum_{\ell=1}^{n-1} q_\ell + q_m$ and s={A, E, G}.

Maximizing (A.1) with respect to q_m^s and q_ℓ^s in that order and solving for q_m^s and q_ℓ^s in the first order conditions gives the equilibrium profit levels for each firm as

$$\begin{aligned} \Pi_m^s &= (q_m^s)^2 - F^s \\ \Pi_\ell^s &= (q_\ell^s)^2 \end{aligned} \tag{A.2}$$

where

$$\begin{aligned} q_m^G &= \frac{1-c_\ell+n\delta}{n+1} & q_\ell^G &= \frac{1-c_\ell-\delta}{n+1} \\ q_m^E &= \frac{1-c_\ell-n\tau+n\delta}{n+1} & q_\ell^E &= \frac{1-c_\ell+\tau-\delta}{n+1} \\ q_m^A &= \frac{1-c_\ell}{n} \end{aligned} \tag{A.3}$$

Non-negativity Constraints. Under each different entry strategy firm m and firm ℓ coexist in the product market as long as $\tau < \hat{\tau},\ F^G < \hat{F}^G$ *and* $\delta < \hat{\delta}$. Firms stay in the market as long as it is profitable to do so, i.e. $\Pi_m^s > 0$ and $\Pi_\ell^s > 0$.

- Profitable exports for firm m requires

$$\tau < \frac{1-c_\ell}{n} + \delta \equiv \hat{\tau} \tag{A.4}$$

  which defines the critical level of trade cost above which exporting becomes an unprofitable mode of entry for firm m.

- Consider next the condition for profitable greenfield FDI for firm m, which can be expressed as

$$F^G < \frac{(1-c_\ell+n\delta)^2}{(n+1)^2} \equiv \hat{F}^G \tag{A.5}$$

  (A.5) defines the critical level of greenfield start-up costs for firm m in case of a greenfield FDI.

- Having a positive payoff for firm ℓ in case of and exporting regime calls for

$$\delta < 1 - c_\ell + \tau \equiv \overline{\delta} \tag{A.6}$$

  which identifies the critical level of variable cost advantage above which local firm ℓ exits the market. Next, consider then the condition for a positive payoff for firm ℓ in case of a greenfield FDI regime:

$$\delta < 1 - c_\ell \equiv \hat{\delta} \tag{A.7}$$

  Since $\tau \in (0,1)$ and $c_\ell \in (0,1)$, between (A.6) and (A.7), the latter becomes the binding condition.

Proof of Proposition 1. An increase in the bargaining strength of firm m relative to firm ℓ increases the likelihood of cross-border M&A compared to the other modes of entry if and only if the following conditions holds:

$$\frac{\partial \Pi_m^A}{\partial \alpha} > \frac{\partial \Pi_m^s}{\partial \alpha} \tag{A.8}$$

(A.8) can be written as

$$\frac{\partial \pi_m^A}{\partial \alpha} - \frac{\partial F^A}{\partial \alpha} > \frac{\partial \Pi_m^s}{\partial \alpha} \tag{A.9}$$

which simplifies to

$$R_m - R_\ell > 0 \tag{A.10}$$

(A.10) is true by assumption. For the solution of this bargaining procedure, it should be assumed that there is a positive surplus from agreement ($\pi_m^A - \Pi_m^N - \Pi_\ell^N > 0$) where $R_m = \pi_m^A - \Pi_m^N$ and $R_\ell = \Pi_\ell^N$. If this were not the case, the whole bargaining process would be unlikely because each side just take up its outside opportunity and gets its No-agreement payoff.

Proof of Proposition 2.

- The profitability of all entry strategies for firm m increases in δ.

$$\frac{\partial \Pi_m^G}{\partial \delta} = \frac{2n(1 - c_\ell + n\delta)}{(n+1)^2} > 0, \text{ for } c_\ell \in (0,1) \tag{A.11}$$

$$\frac{\partial \Pi_m^E}{\partial \delta} = \frac{2n(1 - c_\ell + n\delta - n\tau)}{(n+1)^2} > 0, \text{ for } \tau < \hat{\tau} \tag{A.12}$$

$$\frac{\partial \Pi_m^A}{\partial \delta} = \frac{\partial \pi_m^A}{\partial \delta} - \frac{\partial F^A}{\partial \delta} = \alpha \frac{\partial \pi_m^A}{\partial \delta} + (1-\alpha)\frac{\partial \Pi_m^N}{\partial \delta} - \alpha \frac{\partial \Pi_\ell^N}{\partial \delta} > 0 \tag{A.13}$$

  In (A.13), $N=\{E,G\}$ and $\frac{\partial \pi_m^A}{\partial \delta} = 0$, $\frac{\partial \Pi_m^N}{\partial \delta} > 0$, $\frac{\partial \Pi_\ell^N}{\partial \delta} < 0$ for $\delta < \hat{\delta}$.

- For greenfield FDI to be more likely when compared to other modes of entry the necessary conditions are:
  - $\frac{\partial \Pi_m^G}{\partial \delta} > \frac{\partial \Pi_m^E}{\partial \delta}$ which is true given (A.11) and (A.12).
  - $\frac{\partial \Pi_m^G}{\partial \delta} > \frac{\partial \Pi_m^A}{\partial \delta}$ which can written as

$$\frac{\partial \Pi_m^G}{\partial \delta} > (1-\alpha)\frac{\partial \Pi_m^G}{\partial \delta} - \alpha \frac{\partial \Pi_\ell^G}{\partial \delta} \tag{A.14}$$

    which simplifies to

$$(n-1)(1-c_\ell) + (n^2+1)\delta > 0 \tag{A.15}$$

    which is true since $\delta \in (0,1)$ and $c_\ell \in (0,1)$.

Proof of Proposition 3. Let $\max\left\{\Pi_m^G, \Pi_m^E\right\} = \Pi_m^E$.

- The profitability of both cross-border M&A and exporting decreases in τ.

$$\frac{\partial \Pi_m^E}{\partial \tau} = -\frac{2n(1 - c_\ell + n\delta - n\tau)}{(n+1)^2} < 0, \text{ for } \tau < \overset{\wedge}{\tau} \tag{A.16}$$

$$\frac{\partial \Pi_m^A}{\partial \tau} = \frac{\partial \pi_m^A}{\partial \tau} - \frac{\partial F^A}{\partial \tau} = \alpha \frac{\partial \pi_m^A}{\partial \tau} + (1-\alpha)\frac{\partial \Pi_m^E}{\partial \tau} - \alpha \frac{\partial \Pi_\ell^E}{\partial \tau} < 0 \tag{A.17}$$

In (A.24), $\frac{\partial \pi_m^A}{\partial \tau} = 0$, $\frac{\partial \Pi_m^E}{\partial \tau} < 0$, $\frac{\partial \Pi_\ell^E}{\partial \tau} > 0$ for $\delta < \overset{\wedge}{\delta}$.

- The second part of the proposition is true if and only if

$$\frac{\partial \Pi_m^A}{\partial \tau} < \frac{\partial \Pi_m^E}{\partial \tau} \tag{A.18}$$

which can written as

$$(1-\alpha)\frac{\partial \Pi_m^E}{\partial \tau} - \alpha \frac{\partial \Pi_\ell^E}{\partial \tau} < \frac{\partial \Pi_m^E}{\partial \tau} \tag{A.19}$$

which is true if $\tau - \delta > ({}^{n-1}\!/_{n^2+1})(1 - c_\ell)$.

Table 1. Countries Grouped by Regions

Western Europe	*Major Non-European OECD Countries*	*Former Eastern Europe and Russia*	*South and Central America*	*Asia*	*Africa*
Belgium	USA	Poland	Argentina	Israel	South Africa
France	Canada	Czech Republic	Brazil	India	
Italy	Japan	Hungary	Chile	Thailand	
The Netherlands	Australia	Slovenia	Colombia	Malaysia	
Germany	New Zealand	Russia	Venezuela	Singapore	
United Kingdom			Mexico	Indonesia	
Ireland				Philippines	
Denmark				China	
Spain				Taiwan	
Portugal				Hong Kong	
Greece				Korea	
Finland					
Austria					
Switzerland					
Norway					
Iceland					
Turkey					

Table 2. Entry Characteristics of Swedish MNCs

	1987-1990	*1991-1994*	*1995-1998*	*All periods*
Acquisition	160	102	79	341
Greenfield	38	41	34	113
Otherwise	5,157	5,798	4,117	15,072
# of countries	45	45	45	45
# of Swedish MNCs	120	132	100	

Table 3. Summary Statistics

	Units	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Tariff rate	%	10.12	10.82	0	84.36
Distance	1,000 km	5.522	4.521	0.4	17.00
*R&D intensity**	share	0.315	0.455	0	3.26
Capital intensity#	share	1.454	4.078	0	67.53
Previous affiliates	#	0.086	0.523	0	14
Optimal plant size▫	#	258	391.2	1	2,685
GDP	$billion	0.544	1.245	0.0016	8.790

* R&D intensity is measured as the share of R&D expenditures in total sales.

Capital intensity is measured as capital expenditures per worker.

▫ Optimal plant size is the average number of employees in MNC's foreign affiliates at the end of each time period

Table 4. Estimation Results Using Multinomial Logit Model

	Dependent Variable: Entry Mode					
	(1)			(2)		
Regressors	A vs. O	G vs. O	A vs. G	A vs. O	G vs. O	A vs. G
Tariff (τ)	-0.066***	-0.004	-0.062***			
	(0.013)	(0.013)	(0.018)			
Distance (τ)				-0.213***	-0.141***	-0.072*
				(0.023)	(0.030)	(0.037)
R&D intensity (δ)	7.804	88.91***	-81.11***	7.592	66.59***	-58.99***
	(13.65)	(14.52)	(19.48)	(12.41)	(12.51)	(17.27)
Previous affiliates (α)	0.671***	0.388**	0.283*	0.569***	0.359***	0.240**
	(0.068)	(0.012)	(0.156)	(0.054)	(0.110)	(0.108)
GDP (M)	0.158***	0.224***	-0.067	0.309***	0.253***	0.056
	(0.031)	(0.052)	(0.058)	(0.031)	(0.049)	(0.056)
Observations		8,970			14,521	
LR χ^2		254.5			494.3	
Prob> χ^2 , p-value		0.000			0.000	
<u>IIA Test Results</u>						
$H_0 : \beta_r = \beta_f$	r={A,O }	r={G,O }	r={A,G}	r={A,O }	r={G,O }	r={A,G}
Hausman Test						
χ^2	2.49	-2.00	1.19	-5.65	-7.10	3.68
Prob> χ^2 , p-value	0.477		0.754			0.159
Generalized IIA Test						
χ^2	5.82	8.32	4.29	6.80	8.95	8.98
Prob> χ^2 , p-value	0.213	0.081	0.368	0.147	0.062	0.062

Notes: Standard errors are in parentheses; ***, **, * denote significance at the 1, 5, and 10 percent level, respectively; all regressions include a constant (not reported).

Table 4, continued. Estimation Results Using Multinomial Logit Model

	Dependent Variable: Entry Mode					
	(3)			(4)		
Regressors	A vs. O	G vs. O	A vs. G	A vs. O	G vs. O	A vs. G
Tariff (τ)	-0.067***	-0.011	-0.056***	-0.072***	-0.006	-0.065***
	(0.013)	(0.013)	(0.018)	(0.013)	(0.013)	(0.018)
R&D intensity (δ)				-15.11	68.82***	-83.92***
				(14.94)	(17.46)	(22.51)
Capital intensity (δ)	0.345	2.766**	-2.421			
	(1.522)	(1.319)	(1.967)			
Previous affiliates (α)	0.691***	0.444***	0.248*			
	(0.068)	(0.141)	(0.140)			
Optimal plant size(α)				0.0008***	0.0007***	0.0001
				(0.0001)	(0.0002)	(0.0002)
GDP (M)	0.153***	0.208***	-0.054	0.212***	0.247***	-0.035
	(0.029)	(0.051)	(0.057)	(0.028)	(0.051)	(0.056)
Observations		9,247			8,940	
LR χ^2		239.1			192.3	
Prob> χ^2 , p-value		0.000			0.000	
IIA Test Results						
$H_0 : \beta_r = \beta_f$	r={A,O }	r={G,O }	r={A,G}	r={A,O }	r={G,O }	r={A,G}
Hausman Test						
χ^2	-6.99	-4.17	1.97	0.13	-0.66	0.20
Prob> χ^2 , p-value			0.578	0.973		0.904
Generalized IIA Test						
χ^2	3.44	19.61	6.64	3.41	7.07	1.40
Prob> χ^2 , p-value	0.487	0.001	0.156	0.491	0.132	0.844

Notes: Standard errors are in parentheses; ***, **, * denote significance at the 1, 5, and 10 percent level, respectively; all regressions include a constant (not reported).

Table 5. Estimation Results Using Multivariate Probit Model

	Dependent Variable: Entry Mode					
Regressors	(1)			(2)		
	A	G	O	A	G	O
Tariff (τ)	-0.029***	-0.004	0.018***			
	(0.006)	(0.005)	(0.004)			
Distance (τ)				-0.073***	-0.048***	0.073***
				(0.008)	(0.009)	(0.007)
R&D intensity (δ)	2.181	33.39***	-16.89***	2.142	28.11***	-13.94***
	(5.996)	(6.429)	(4.901)	(5.344)	(5.149)	(4.248)
Previous affiliates (α)	0.353***	0.081	-0.342***	0.309***	0.076**	-0.329***
	(0.036)	(0.056)	(0.035)	(0.026)	(0.034)	(0.033)
GDP (M)	0.075***	0.077***	-0.088***	0.125***	0.094***	-0.131***
	(0.015)	(0.022)	(0.014)	(0.014)	(0.020)	(0.013)
Observations		8,970			14,521	
LR χ^2		453.6			697.9	
Prob> χ^2 , p-value		0.000			0.000	
Correlation Coefficients						
ρ_{AG}		-0.031			0.028	
		(0.124)			(0.033)	
ρ_{AO}		-0.006***			-0.001*	
		(0.002)			(0.0007)	
ρ_{GO}		-0.0002			-0.002**	
		(0.002)			(0.0009)	
Residual Independence Test						
χ^2		15.45			7.973	
Prob> χ^2 , p-value		0.001			0.047	

Notes: Standard errors are in parentheses; ***, **, * denote significance at the 1, 5, and 10 percent level, respectively; all regressions include a constant (not reported).

Table 5, continued. Estimation Results Using Multivariate Probit Model

	Dependent Variable: Entry Mode					
Regressors	(3)			(4)		
	A	G	O	A	G	O
Tariff (τ)	-0.031***	-0.008	0.019***	-0.034***	-0.006	0.021***
	(0.005)	(0.006)	(0.004)	(0.006)	(0.005)	(0.004)
R&D intensity (δ)				-6.397	25.74***	-6.486
				(6.506)	(7.221)	(5.549)
Capital intensity (δ)	0.395	1.027*	-0.680			
	(0.643)	(0.592)	(0.509)			
Previous affiliates (α)	0.359***	0.084	-0.355***			
	(0.035)	(0.055)	(0.035)			
Optimal plant size (α)				0.0003***	0.0002***	-0.0004***
				(0.00006)	(0.00009)	(0.0006)
GDP (M)	0.073***	0.071***	-0.084***	0.103***	0.085***	-0.113***
	(0.015)	(0.002)	(0.013)	(0.014)	(0.021)	(0.013)
Observations		9,247			8,940	
LR χ^2		439.9			350.0	
Prob> χ^2 , p-value		0.000			0.000	
Correlation Coefficients						
ρ_{AG}		-0.003			-0.007	
		(0.125)			(0.113)	
ρ_{AO}		-0.008***			-0.008***	
		(0.002)			(0.002)	
ρ_{GO}		-0.002			0.0005	
		(0.003)			(0.0021)	
Residual Independence Test						
χ^2		19.12			17.08	
Prob> χ^2 , p-value		0.000			0.000	

Notes: Standard errors are in parentheses; ***, **, * denote significance at the 1, 5, and 10 percent level, respectively; all regressions include a constant (not reported).

Table 6. Estimation Results Using Bi-Logit Model

	Dependent Variable: Entry Mode Cross-border M&A vs. Greenfield FDI			
Regressors	(1)		(2)	
	Estimates	Elasticities	Estimates	Elasticities
Tariff (τ)	-0.057**	-0.008**		
	(0.025)	(0.004)		
Distance (τ)			-0.047	-0.008
			(0.032)	(0.010)
R&D intensity (δ)	-81.36***	-12.89***	-72.54***	-12.39***
	(22.51)	(3.604)	(20.52)	(3.558)
Previous affiliates (α)	0.411**	0.065**	0.430***	0.074***
	(1.989)	(0.029)	(0.162)	(0.025)
GDP (M)	-0.098	-0.016	0.055	0.009
	(0.069)	(0.010)	(0.065)	(0.010)
Observations	333		433	
LR χ^2	29.37		32.93	
Prob> χ^2 , p-value	0.000		0.000	

Regressors	(3)		(4)	
	Estimates	Elasticities	Estimates	Elasticities
Tariff (τ)	-0.059**	-0.009**	-0.059**	-0.009**
	(0.023)	(0.004)	(0.025)	(0.004)
R&D intensity (δ)			-88.83***	-14.64***
			(26.68)	(4.395)
Capital intensity (δ)	-6.438	-1.024		
	(4.497)	(0.715)		
Previous affiliates (α)	0.409**	0.065**		
	(0.197)	(0.029)		
Optimal plant size (α)			0.0002	0.00003
			(0.0003)	(0.00005)
GDP (M)	-0.097	-0.015	-0.053	-0.008
	(0.068)	(0.010)	(0.068)	(0.010)
Observations	345		333	
LR χ^2	18.74		22.66	
Prob> χ^2 , p-value	0.000		0.000	

Notes: Standard errors are in parentheses; ***, **, * denote significance at the 1, 5, and 10 percent level, respectively; all regressions include a constant (not reported).