

# Tariff-Jumping and the Form of FDI: Firm Level Evidence

Ayça Tekin-Koru \*

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## Abstract

This paper carries out an empirical analysis with rich, firm-level data on the activities of Swedish multinationals around the globe in manufacturing sectors from 1987 to 1998 to test the main conjectures of traditional trade and recent views of the effects of trade costs on foreign entry. The results of the empirical analysis show almost no evidence of tariff-jumping foreign entry. On the contrary, high tariffs reduce the likelihood of cross-border M&As as conjectured by recent studies. At best, tariff-jumping is a possibility in the case of greenfield FDI or for large, multiple affiliate firms doing business in low-tech industries.

*Keywords:* foreign direct investment, entry modes, and tariff-jumping

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\* Department of Economics, Oregon State University, 303 Ballard Extension Hall, Corvallis, OR 97331-3612. I would like to thank Peter Neary, Bruce Blonigen, Per-Johan Norbäck, Ronald Davies, Shawna Grosskopf and Rolf Färe for their valuable comments. I am also grateful to John Pomery, Marie Thursby and David Hummels who have provided helpful advice on earlier versions. I am indebted to Lars Persson and Roger Svensson at IUI, Stockholm, Sweden, for their help in reaching and understanding the data. This paper has benefited from discussions in International Atlantic Economic Conference and European Trade Study Group Conference. I thank the Center of International Business Education and Research and Purdue Research Foundation, both at Purdue University, for their generous support. The usual disclaimer applies.

# 1. Introduction

Multinational corporations (MNCs) undertake foreign direct investment (FDI) in different formats: A multinational may enter a host market by acquiring/merging with an already existing local firm (cross-border merger and acquisitions (M&As)) or by establishing a new venture (greenfield FDI). In the traditional trade literature, the latter has been implicitly assumed as the only way to expand production in another country. However, recent data show that cross-border M&As have a more than negligible role in foreign market access by multinational firms. For example, the share of total M&As in world FDI flows has increased from 52% in 1987 to 83% in 2000 and then declined for a brief period at the beginning of the new millennium.<sup>1</sup> In 2006, FDI flows reached \$880 billion reflecting renewed strength in M&A activity, albeit still below the record value in 2000. For developed countries, where acquisition targets are abundant, the share of cross-border M&As has risen to nearly 100% in 2000 from 62% in 1987. Yet, cross-border M&As as a mode of foreign entry have received relatively little attention in the trade literature until recently.

In this paper, I investigate empirically the role of trade costs in the entry mode choice of MNCs. If trade costs are capable of altering foreign entry mode outcomes, then any political action which changes these costs will tilt the equilibrium towards one of the modes -let be it cross-border M&As or greenfield FDI. This is important because different entry modes have differing degrees of impact on the inter/intra-firm resource transfers. These transfers cause industrial restructuring which in turn alters the income distribution in the host country through its effect on factor prices.<sup>2</sup> As a result, aggregate welfare may shift at the country level. Where does this leave us? Considering the massive trade liberalization waves of

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<sup>1</sup> See World Investment Report (2007).

<sup>2</sup> Neary (2007), Bertrand and Zitouna (2006), and Jovanovic and Rousseau (2008) have recent theory pieces focusing on different aspects of industry restructuring after M&As. See Andrade and Stafford (2004) and Breinlich (2008) for latest related empirical work.

recent decades and the dominance of sales of foreign affiliates (\$25,177 billion in 2006) over global exports (\$14,120 billion in 2006), it becomes absolutely necessary to rethink the effects of freer trade not only on trade flows, but also on the FDI flows channeled through different modes of entry with mode-specific consequences for the countries hosting considerable amounts of FDI.<sup>3</sup>

This paper contributes to the existing literature by carrying out an empirical analysis with rich, firm-level data on the activities of Swedish MNCs around the globe in manufacturing sectors from 1987 to 1998 to test the main conjectures of traditional trade and IO views of the effects of trade costs on foreign entry. In a nutshell, traditional view does not differentiate between entry modes and predicts more entry the higher the tariffs, whereas IO view posits that high tariffs discourage entry realized as M&As. Among the traditional view and the IO view which one dominates is fundamentally an empirical question and this paper attempts to answer it.

The main innovations present in this paper are as follows: First, I include all three foreign access strategies (cross-border M&As, greenfield FDI and exporting) in the analysis, which differs from many studies that only include two of the strategies at a time. Second, I employ a different definition of horizontal investments. In particular, I use the composition of affiliate sales to single out horizontal investments rather than industry classifications. Third, I split my sample using R&D intensity of the host industry, firm size and affiliate numbers, which provide additional identifying hypotheses. Fourth, I apply the multivariate probit model to account for the correlation between different entry strategies, which reduces the inconsistency of the estimators significantly.

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<sup>3</sup> See World Investment Report (2007) for the affiliate sales and global exports information.

The results of the empirical analysis show almost no evidence of tariff-jumping foreign entry. On the contrary, high tariffs reduce the likelihood of cross-border M&As. Thus, cross-border M&As and exports are complements rather than substitutes as proposed by Neary (2007). At best, tariff-jumping is a possibility in case of greenfield FDI or for large, multiple affiliate firms doing business in low-tech industries. This last conclusion is somewhat similar to the one made by Blonigen (2002) in that he suggests that tariff-jumping is only a realistic option for multinational firms from industrialized countries which tend to be endowed with bigger size and more international experience. These results all together confirm the findings of the recent literature with an IO angle on the effects of tariffs on FDI and add to it by testing a number of extensions of this view.

The paper continues as follows. In the next section, I describe my motivation and testable conjectures. In section 3, I present a comprehensive assessment of the data since it is the novelty of this paper. Section 4 and 5 contain the empirical methodology and the results, respectively. I conclude in Section 6.

## **2. Motivation and testable conjectures**

### **2.1. Tariff-jumping and entry modes in the literature**

**Traditional view.** If you woke a trade economist in the dead of night and asked “Do high tariffs make investing abroad more likely?”, her immediate response would be “Absolutely.” This has long been the tradition in international trade. In this literature, firms serve foreign markets either by exporting or by producing in that market. When trade costs get higher, exporting becomes more expensive. To avoid paying high tariffs, firms choose investing abroad; hence the term *tariff-jumping*.

The earliest prominent example of the tariff-jumping related empirical work in the literature is the one by Brainard (1997), who has provided support for the tariff-jumping motive by using industry level data for U.S. multinationals. She found that the share of FDI increased relative to exports the higher the trade barriers; however, she reported the effect being much weaker in explaining the level of affiliate sales and the probability of observing any affiliate sales.

Brainard's results in regards to the effects of trade costs on FDI are very similar to the conclusions of the well-known *knowledge capital model* (Markusen, 2002). Predictions of this model over the structure of FDI are highly nonlinear in the relevant country and industry characteristics. Horizontal multinationals are found to be dominant if countries are similar in size and relative endowments and if transport costs are high. This is indeed the traditional *tariff-jumping* motive: If transport costs are low, a firm might rather export than produce in both countries.

Empirical applications of the knowledge capital model have rejected the models assuming low trade costs (the vertical model) in favor of models in which tariff-jumping issues arose. Examples of studies within this line of literature are Carr, Markusen and Maskus (2001), Markusen and Maskus (2001b) and Blonigen, Davies and Head (2003). One common denominator of all these studies including Brainard (1997) is that none used firm-level data and none made the distinction between different entry modes. In essence, they all implicitly assumed greenfield FDI.

**IO view.** What would be the answer of an IO economist to the above question under the same circumstances? It would be an unfaltering "It depends." Indeed, there appeared a number of studies in recent years providing theoretical models with a fresh IO approach to answer this question. Görg (2000) [greenfield vs. M&As], Horn and Persson (2001) [export

vs. M&As], Bjorvatn (2004) [export vs. greenfield vs. M&As], Norbäck and Persson (2004) [export vs. greenfield vs. M&As] and Tekin-Koru (2009) [export vs. greenfield vs. M&As] provide theoretical models to this effect. Different from the traditional view, these studies consider the possibility of different modes of serving a foreign market and come to a conclusion that high trade costs do not inevitably induce more FDI. In fact, if anything, trade barriers make cross-border M&As less likely in these models.

Horn and Persson (2001) show that in an international merger formation game without greenfield FDI domestic firms have an incentive to merge in the presence of sufficiently high trade barriers in order to prevent international mergers. Norbäck and Persson (2004) confirm that low greenfield costs and low trade costs induce cross-border acquisitions in a mixed international oligopoly, where state assets are sold at auction. Similar to these studies, Tekin-Koru (2009) shows that in the case of cross-border M&As higher tariffs may act as an entry barrier by raising the reservation price of the acquisition target which is endogenized through Nash bargaining.

A natural extension of this line of thought is the favorable impact of economic integration (declining tariffs) on M&A activity around the globe. This idea is formalized in Bjorvatn (2004) and Neary (2007). The former is very similar to Horn and Persson in spirit. Neary's model, on the other hand, is unique in the sense that it has a unifying approach between the trade and IO views. His conclusion is as follows: Without cost synergies the pattern of cross-border M&As which results from economic integration follows that of comparative advantage in the sense that more efficient firms acquire less efficient foreign rivals. He predicts that cross-border M&As and exports are complements rather than substitutes.

**Recent empirical work.** Blonigen (2002) investigates the possibility of tariff-jumping by using firm level data on antidumping duties. He finds quite modest tariff-jumping responses suggesting that tariff-jumping is only a realistic option for multinational firms from industrialized countries. Hizjen, Görg and Manchin (2008) provide empirical evidence by using firm level data augmented to industry level for 23 OECD countries for the period 1990–2001. They distinguish horizontal and non-horizontal M&As and find that the impact of trade costs is less negative for horizontal mergers, which they interpret as being consistent with the tariff-jumping argument. Breinlich (2008) shows that trade liberalization through the Canada–United States Free Trade Agreement increased domestic Canadian M&A activity significantly whereas there is no robust link between tariff reductions and either domestic U.S. or cross-border M&As.

## **2.2. Testable conjectures**

There are two main testable conjectures derived from the arguments put forward above. First, the traditional view suggests that an increase in tariffs induces market-seeking (horizontal) cross-border investments. There is no distinction between different entry modes. Second, the IO view proposes that an increase in tariffs reduces cross-border M&As. There are immediate corollaries to this proposition: One, MNCs tariff-jump -if at all they do at all- with GF not with M&As. Two, exporting and M&As are complements, not substitutes.

There are also a number of other conjectures derived from the IO view that can be tested: First, an increase in tariffs reduces M&As conducted by small firms more compared to large firms. Large firms are endowed with higher productivity according to the recent heterogeneity literature (Melitz, 2003), which gives them a higher bargaining power. As the bargaining power of the MNC increases, the reservation price of the acquisition target – which increases in tariffs- gets smaller. In other words, the negative effect of tariffs on

M&As is counteracted by the increasing bargaining strength of the large MNC. So, the effect of tariffs on large firm M&A activity is not as pronounced.

Second, an increase in tariffs reduces M&As conducted by single affiliate firms markedly compared to multi-affiliate firms. Multi-affiliate MNCs have better and wider distribution networks around the globe and most importantly more international experience. Therefore, the M&As conducted by these firms might be less affected by high tariffs.

Third, M&As high-tech industries are more negatively affected by rising tariffs. When acquiring in high-tech industries, the technology transfers are mainly from the acquired firm to the MNC, or both firms are technological equals and are looking forward to the synergies created through the merger of different aspects of their technologies. Both of these will reduce the bargaining power of the MNC and thus increase the acquisition price even further in the face of increasing tariffs.

### **3. Data and definitions**

#### **3.1. Patterns**

The dataset is composed of observations on the cross-border activities of Swedish MNCs in 45 countries during three distinct time periods: 1987-90, 1991-94 and 1995-98. The company-level data used in this study have been collected by *the Research Institute of Industrial Economics (RIIE) in Stockholm, Sweden* about every fourth year since 1960. The data include all Swedish MNCs in manufacturing industry and contain detailed information on each majority owned foreign manufacturing affiliate. I use only the most recent years since the survey questions have changed dramatically over time.

The country-level data are collected from the *International Financial Statistics* of IMF, the *IMD World Competitiveness Yearbook*, the *World Development Indicators Database* of the World Bank, the *STAN Database* of OECD and the *Trains Database* of UNCTAD.

Table 1 summarizes the number of foreign entry transactions by Swedish MNCs between 1987 and 1998. I distinguish between cross-border M&As and greenfield FDI as well as the location of these investments in broad regional categories. When scrutinizing this table, several remarks can be made. First, as can be observed in the bottom half of Table 1, in each time period foreign entry is very small when compared to no FDI including exporting, which is true for an overwhelming majority of MNCs around the globe. However, among the two entry modes the total number of M&As is substantially higher than that of greenfield FDI in all three time periods. M&As are almost 4.7 times as greenfield FDI in 1987-1990, 2.5 times in 1991-1994 and 2.3 times in 1995-1998.

This brings me to my second remark. There is a puzzling, steady decline both in the number and the relative importance of M&As over the years. Diminishing number of firms surveyed or survey response rate over the years are the first two culprits one can think of, however, neither have progressively declined. For example, the number of firms fluctuates over the years from 115 to 131 to 90. Ekholm and Hesselman (2000) who wrote the first report about the 1998 survey also made the same comment. This is puzzling because 1990s was an era of trade liberalization and unprecedented M&As growth around the globe. If anything, this should bias the results against the IO view.

Third, observe the top half of Table 1. A majority of investments are in Western Europe followed by major non-European OECD countries. Both M&As and greenfield FDI in these two regions are higher than all the other regions together. The common denominator of all these countries is their level of development. As stated in Navaretti and Venables (2004), FDI goes predominantly to advanced countries, even though the share of developing

countries has been rising. Developed countries offer a large and growing demand coupled with ease of finding sub-contractors and distribution channels all of which favor entry.

Fourth and last, developed countries supply a higher number of high quality acquisition targets. Table 1 shows that Swedish MNCs have considerably higher M&As in Western Europe and major non-European OECD countries. The preferred mode of entry in developing countries is greenfield FDI, however. The share of greenfield FDI in all entry modes (calculated by using the last two columns of the top half of Table 1) in developing countries is 47%, whereas it is only 19% in the developed countries.

Next, I examine the sectoral composition of entry modes. In the dataset, Swedish manufacturing MNCs operate in 33 industries. These industries (under 15 broad categories, mostly consistent with ISIC, Rev.3) are reported in the Appendix. Table 3 presents the number of cross-border M&As and greenfield FDI along with the average tariff levels by these broad industry categories. Fabricated metal products, chemicals, paper products and electrical machinery are the sectors with highest foreign entry. These sectors reflect the comparative advantage of Sweden. Beyond that, however, observe that average tariff in these industries are not the highest, which warrants some further exploration.

Figure 1 shows the kernel density diagram of tariff rate. The solid line signifies cross-border M&As and the dashed line greenfield FDI. The density of M&As is much higher than both greenfield FDI at lower values of tariff rate and gets dominated by greenfield FDI at higher tariff rates. Interestingly enough M&As completely disappear for tariff rates greater than 22%. This observation supplies some suggestive evidence for the hypothesis that acquisitions are not tariff-jumping.

### 3.2. Definitions

For the present analysis I adopt the definitions of cross-border M&As and greenfield FDI as in the RIIE survey. More particularly, RIIE asks the following four questions to each foreign affiliate: (1) From what year has the affiliate been a production company of the group? (2) Was the affiliate a sales company of the group before the year mentioned above? (3) Did the affiliate operate as a production company of another group before the year mentioned above? (4) Was the affiliate a state-owned company before the year mentioned above? If the answers to last three questions are all negative, then the investment is classified as a *greenfield FDI*. If the answer to question 3 is affirmative, then it is a *cross-border M&A*.<sup>4</sup>

The theories discussed above refer explicitly to the so-called *horizontal* FDI: FDI made in order to produce a final good for sales in the host country. There are other types of FDI which are ignored in these theoretical set-ups such as production in the host country to export back to the parent country or elsewhere. These can be called *vertical* and *export platform* FDI, respectively. This is the convention that I adopt in this paper.

Hizjen et al. (2008) also make a distinction between horizontal and non-horizontal mergers. Nevertheless, they do not consider greenfield FDI. They define horizontal M&As as mergers between firms within the same industry, whereas non-horizontal M&As as mergers between firms in different industries. This is a reasonable way of differentiating; yet, given that the Swedish data has more detail than industry classifications, I use the composition of affiliate sales to single out horizontal investments.

Figure 2 shows the sales composition of Swedish MNCs for all newly established foreign affiliates between 1987 and 1998. On average, 71% of the affiliate production is for local sales, 21% for exports to third countries and 8% for exports back to Sweden. The majority of investments seem to be horizontal. Vertical FDI is negligible but there is a noteworthy

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<sup>4</sup> The frequency of affiliates born from sales companies of the group and the state-owned enterprise acquisitions is low.

level of export platform FDI. When the local country is used as an export platform, it is not clear whether the MNC hurts the local incumbents by entering. If that is the case, in other words, if the local incumbent is also an exporter to the same third country, then higher trade costs are expected to drive up the acquisition price as in the horizontal FDI scenario. Otherwise, the effect of the host country tariff on the export platform FDI is not that clear-cut. Taking all this and the theories discussed in Section 2 into consideration, I only include newly established affiliates for which the share of production for the local market is more than 75% of their total production.<sup>5</sup>

## 4. Empirical methodology

### 4.1. Empirical model

When a MNC considers entering an overseas market via greenfield FDI (GF) or cross-border M&As (M&A) (or exporting (EX), whenever the data is available), 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:

$$Y_{ijks} = \beta_0 + \beta_1 \text{TARIFF}_{jkt} + \beta_2 \text{MOBILE}_{ijkt} + \beta_3 \text{NONMOBILE}_{ijkt} + \beta_4 \text{FIRMSIZE}_{ijkt} + \beta_5 \text{NOAFF}_{ijkt} \\ + \beta_6 \text{GDP}_{kt} + \beta_7 \text{GDPCAP}_{kt} + \beta_8 \text{TEL}_{kt} + \beta_9 \text{IPR}_{kt} + \beta_{10} \text{UNIV}_{kt} + \varepsilon_i + \varepsilon_j + \varepsilon_t + \varepsilon_{ijks}$$

where  $Y_{ijks}$  is the entry strategy  $s$  chosen by firm  $i$  in industry  $j$  in country  $k$  during time period  $t$ . Summary statistics are presented in Table 3.

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<sup>5</sup> Results using the entire sample, which are excluded for brevity and available upon request, are very similar to the ones reported in this paper since horizontal investments dominate the sample. Moreover, since the likelihood functions were never concave when running estimations with vertical and platform investments due to small sample sizes, I was not able to get any results for those types of investments.

### **Core variable**

TARIFF represents the most favored nation tariff rate. The TRAINS database of UNCTAD reports the import tariffs by industry which can be mapped into the 10-digit level in Harmonized System. These figures are converted first into the 4-digit ISIC (Rev.3) by using relevant concordances.<sup>6</sup> Then, the newly obtained figures are mapped into the 2-digit RIIIE industry classification by using concordances provided by the *Statistics Sweden*.

### **Firm characteristics**

*Firm specific skills.* As Markusen (2002) points out, multinationals arise from the use of knowledge capital, a broad term that includes human capital of employees, patents, blueprints and procedures, which are called *firm specific skills*.

Multinationals can reduce their production costs through the extensive use of these skills some of which can be provided to additional plants without reducing their value in existing plants. I call these *mobile skills* after Nocke and Yeaple (2007) and use R&D intensity (MOBILE) as a proxy. MOBILE is the MNC's total R&D expenditures divided by total sales at the end of each time period. 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. Thus, I expect R&D to affect greenfield FDI positively.

Some skills, on the other hand, are not moveable and specific to the host country, such as distribution networks, connections to local bureaucracy, and knowledge of local business culture. These are called *non-mobile skills*. Having previous experience in the host country endows the MNC with these skills; hence, I use a variable called NONMOBILE (the number of the previous affiliates of the MNC in the host country) to represent non-mobile skills. There is a well-established international business literature drawing attention to the

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<sup>6</sup> Concordances are provided by Jon Haveman on <http://www.macalester.edu/research/economics/page/haveman/Trade.Resources/tradeconcordances.html>

differential impact of non-mobile skills on entry modes.<sup>7</sup> Previous experience increases the local knowledge and connections of the MNC and thus may foster greenfield FDI over cross-border M&As. On the other hand, it may also promote M&As because experienced MNCs are able to monitor their partners more effectively.<sup>8</sup> Therefore, the expected sign is ambiguous.

*Size.* The recent trade literature on firm heterogeneity (Melitz, 2003 and Helpman et al. 2004) highlights the important role of within-sector firm productivity differences in explaining FDI. Only the most productive firms engage in foreign activities, and the most productive firms happen to be the large ones. Therefore, I include a variable named FIRMSIZE in my estimations and measure it by total number of employees of the MNC around the globe. The expected sign for both entry modes is positive.

*International experience.* A broad international experience fosters FDI by MNCs (Caves, 2007). Following the literature, I measure experience by the number of MNC's foreign affiliates (NOAFF). The expected sign for both entry modes is positive.

### **Country characteristics**

*Resources and institutions.* Market size (measured by GDP), infrastructure (measured by telephone mainlines per one million people, TEL), skill level of the labor force in the host country (measured by the share of university graduates in the population, UNIV) are all well-known determinants of entry and are expected to favor both kinds of entry (Brainard (1997), Carr et al. (2001)). One variable which is likely to have a differential impact on entry modes is the intellectual property right protection (measured by an index showing if intellectual property rights are adequately enforced, IPR). If intellectual property is well

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<sup>7</sup> See Anderson and Gatignon (1986), Davidson and McFetridge (1984, 1985) and Anand (2002).

<sup>8</sup> Note that NONMOBILE may also represent effects other than non-mobile skills such as the competitive effects. If the MNC already has affiliates in the host country, it may not want to hurt itself by increasing the competition through a new venture and thus may incline more towards M&As which eliminate rivals.

protected in a country then the MNCs are more likely to enter by greenfield FDI where the technology transfers and thus the fear of technology theft is highest. The effect of IPR on cross-border M&As is ambiguous. There might be different degrees of technology transfers in case of M&As which is beyond the scope of this paper (Tekin-Koru, 2009).

*Hospitability to FDI.* I use trade openness (share of trade volume in GDP, OPEN) as a proxy for the hospitability of the host country to FDI. OPEN is expected to positively affect both entry modes.

*Availability of acquisition targets.* GDP per capita is used to account for the availability of acquisition targets in the host country. Even though it is easier to find sub-contractors and distribution channels in developed countries, which in fact favors entry, another important issue is that a developed country supplies a bigger number of more high quality acquisition targets. It is harder to find suitable acquisition targets in less developed countries. Therefore acquisitions are expected to be more favorable in countries with high GDPCAP.

## **4.2. Econometric specification**

The nested logit model is the most appropriate econometric method to use since the MNC first decides whether to enter a foreign market and then chooses the mode of entry. However, the data does not involve any choice specific attributes (variables specific to each entry mode, such as the cost of M&As or greenfield fixed costs), which makes implementing the nested logit model impossible. Therefore, the paper adheres to the most general setting where the firm decides if and how to enter.<sup>9</sup>

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 next best econometric model is a multivariate probit

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<sup>9</sup> At first a multinomial logit model is employed. Yet, the independence of irrelevant alternatives test has failed. Results are available upon request.

because it allows a flexible pattern of conditional covariance among the latent utilities of alternatives.

Consider the S-equation multivariate probit model:

$$y_{is}^* = \beta'_{is} X_s + \varepsilon_{is}, \quad s = 1, \dots, S$$

$$y_{is} = 1 \text{ if } y_{is}^* > 0 \text{ and } 0 \text{ otherwise}$$

$\varepsilon_{is}$ ,  $s = 1, \dots, S$  are error terms distributed as multivariate normal, each with a mean of zero, and variance-covariance matrix  $V$ , where  $V$  has values of 1 on the leading diagonal and correlations  $\rho_{jk} = \rho_{kj}$  as off-diagonal elements.

The model has a structure similar to that of a seemingly unrelated regression model, except that the dependent variables are binary indicators. The commonly used univariate and bivariate probit models correspond to the cases when  $S = 1$  and 2.

The  $y_{is}$  represents outcomes for  $S$  different choices at the same point in time. In this paper, I use both the bivariate probit and the trivariate probit. When the bivariate probit is used there are two binary variables,  $y_{i1}$  and  $y_{i2}$ . The MNC has two choices: M&A ( $y_{i1}=1$  and  $y_{i2}=0$ ) and GF ( $y_{i1}=0$  and  $y_{i2}=1$ ). When the trivariate probit is used there are three binary variables,  $y_{i1}$ ,  $y_{i2}$ , and  $y_{i3}$ . The MNC has three choices: M&A ( $y_{i1}=1$ ,  $y_{i2}=0$ ,  $y_{i3}=0$ ), GF ( $y_{i1}=0$ ,  $y_{i2}=1$ ,  $y_{i3}=0$ ) and EX ( $y_{i1}=0$ ,  $y_{i2}=0$ ,  $y_{i3}=1$ ).

Applications of multivariate probit models in higher dimensions ( $S>2$ ) have been limited until recently due to the fact that 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 is tested by using an LR test to explore the existence of nesting possibilities if any.

## 5. Results

### 5.1. Cross-border M&As versus greenfield FDI

I begin with the bivariate probit estimates of tariff effects on new entry by Swedish multinationals through cross-border M&As and greenfield FDI, because the use of bivariate probit model provides the benefit of being able to calculate the marginal effects for each entry strategy.<sup>10</sup> The outside option is no FDI. The first two columns in Table 4 present the coefficient estimates whereas the last two columns include the marginal effects of explanatory variables on the success probability of each strategy. All regressions include a constant, time and industry fixed effects. Wald  $\chi^2$  is 454.1 indicating a good fit. Correlation coefficient  $\rho$  is significant revealing that M&As and GF are not independent from each other as strategies.

TARIFF is significant and negative in the M&A equation (column 1) and positive yet insignificant in the GF equation (column 2), revealing that higher tariffs reduce the likelihood of cross-border M&As by Swedish multinationals. This significant and negative tariff effect is a new result. Previously in the literature, researchers generally find a significant positive effect of trade costs on multinational entry without differentiating

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<sup>10</sup> The computationally cumbersome multivariate probit model module written by Capellari and Jenkins (2003) in STATA does not involve marginal effects computations. Capellari and Jenkins (2003) present a comparison of bivariate probit (maximum likelihood estimation) to their multivariate probit (simulated maximum likelihood estimation) analysis and come to a conclusion that as long as the number of random draws and the sample size are large enough the two methods yield very similar predictions. Since these two conditions are satisfied in the estimations in this paper, I use bivariate probit estimation to give a flavor of the economic size of the estimates.

between different entry modes using aggregate data.<sup>11</sup> These are the extensions of the traditional view.

On the IO view front, two recent studies investigate M&As: Hijzen et al (2008) and Breinlich (2008). Both concentrate on the number of M&As in an industry, whereas I use a single firm's choice of M&As or GF as my starting point. The former find that the impact of bilateral trade costs is less negative or even positive the higher the share of horizontal mergers is in total mergers. They interpret this as tariff-jumping motivations playing some role in explaining horizontal mergers. The latter finds no robust evidence of the effects of tariff reductions in the cross-border M&A activity.

Here, I show that tariffs have an adverse effect on the probability of cross-border M&As and a positive but insignificant effect on greenfield FDI. This might be the case when the MNCs tariff-jump with GF but not M&As. Since GF result is not significant, this interpretation might be a long shot, yet the M&A result is strikingly different from the previous literature providing some evidence for the IO view. Rising tariffs make acquisition targets more expensive and thus reduce the likelihood of cross-border M&As. The other side of the coin is even more interesting in this time and era of globalization. Reductions in tariffs increase the likelihood of M&As by foreign firms.

Calculating the marginal effect shows that an infinitesimal increase in TARIFF reduces the probability of a cross-border M&A by 7.3%. Although this is not large in absolute magnitude, compared to the probability evaluated at the sample mean of 1.5% (given as success probability in the bottom of Table 4), this is nevertheless economically meaningful.

Turning to other coefficient estimates in the first two columns of Table 4, size of the MNC (FIRMSIZE), international experience (NOAFF), market size (GDP) and labor skill in

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<sup>11</sup> See Blonigen et al. (2003) for a recent review of this literature.

the host country (UNIV) increase the likelihood of both kinds of entry. All of these have relatively small marginal effects on the mode of entry.

Mobile skills of the multinational (MOBILE) significantly reduces the likelihood of M&As with a marginal effect of -8.4%. As expected, MOBILE increases the odds in favor of GF with a marginal effect of 5.7%. Immobile skills (IMMOBILE) measured as the number of previous affiliates in the host country have no effect on GF probability; however, they significantly increase the likelihood of M&As. While the availability of acquisition targets and the host country infrastructure proxied respectively by GDPCAP and TEL increase the odds in favor of M&As, the intellectual property right protection (IPR) in the host country increases the likelihood of GF.

## **5.2. Exporting versus cross-border M&As versus greenfield FDI**

As discussed in Section 2.1, in the IO view, exporting is the outside option to cross-border M&As and/or GF investments. I therefore turn to the estimation of the determinants of these three to test the conjectures summarized in Section 2.2. Table 5 reports the multivariate probit estimates of tariff effects on the probability of conducting M&As, GF or EX. The basic specification is reported in first three columns, whereas the last three columns present the extended specification where a number of other firm and country level controls as well as time and industry fixed effects are included. Wald  $\chi^2$  for the former is 1173.2 and for the latter is 1325.8 indicating a good fit. Notice that the number of observations is smaller than the bivariate probit estimation. This is because the RIIE survey, when asking about the exports of the parent firms in Sweden, lists a number of countries where the Swedish MNC may be exporting rather than leaving it open to the surveyed.

Also notice that the correlation coefficient between M&A and GF,  $\rho_{MAGF}$ , is insignificant, whereas that between M&A and EX,  $\rho_{MAEX}$ , and GF and EX,  $\rho_{GFEX}$ , are both significantly

different from zero. This suggests a nested structure where first the decision of foreign entry is made and then the mode of entry is chosen. However, as stated earlier, the use of a nested logit models is impossible due to the lack of choice specific attributes in the dataset.

In line with the main conjecture from the IO view (Horn and Persson (2001) and Norbäck and Persson (2004)), the variable of interest, TARIFF, decreases the likelihood of M&As both in the basic and in the extended specifications. The odds of EX also declines in TARIFF, which suggests that cross-border M&As and exporting complements rather than substitutes as discussed in Neary (2007). It is worth recognizing that although it is not significant, TARIFF carries the traditional theory predicted positive coefficient in GF equations in every case in this paper. Notice that addition of other controls does not change the TARIFF coefficient in any significant way in any of the equations, which constitutes a robustness check for this main result.

Most of the other covariates exhibit their expected signs, though some are insignificant. Throughout almost all equations FIRMSIZE and NOAFF have significant positive signs, pointing out that Swedish MNCs with bigger size and more market experience have a higher chance of entering new markets to serve those markets. In short, the degree of multinationality matters. While NONMOBILE always favors M&As, MOBILE increases the odds of GF. This suggest that Swedish MNCs endowed with higher levels of non-mobile skills such as connections to local bureaucracy or knowledge of local business culture prefer cross-border M&As to greenfield FDI. On the other hand, Swedish MNCs with abundant mobile skills such as blueprints, copyrights or product novelty favor vice versa. GDPCAP, the level of host country development signifying the availability of acquisition targets, matters for the M&As but not for GF. A better prevention of intellectual property theft (IPR) in the host country improves the odds in favor of GF. A skilled labor force in the host country (UNIV) increases the likelihood of M&As more compared to GF.

To explore these results more deeply, I examine whether the tariff effects vary across different types of firms and industries.<sup>12</sup> To this effect I first estimate the multivariate probit for large versus small firms. If a Swedish parent has 1000 or more employees then I categorize it as a large firm, otherwise it is small. The first three columns of Table 6 report the estimation results for large firms, whereas the last three present those for small firms.

As conjectured, large firms are not affected by tariffs, whereas TARIFF increases the odds against M&As conducted by small firms. Notice the coefficient carried by TARIFF is -4.34 in the fourth column of Table 6 which almost doubles the one reported in the pooled sample in Table 5. This suggests that an increase in tariffs reduces M&As conducted by small firms more compared to large firms. Lower productivity levels realized in the smaller firms (Melitz, 2003) may reduce the bargaining power of the MNC (Tekin-Koru, 2009). Around the bargaining table, in the face of rising tariffs, a small sized MNC without so much bargaining strength would meet with an even higher ask price from the acquisition target in the host country, which in turn reduces the likelihood of M&As more compared to large firms with more resources.

Next, I report the estimation results for single-affiliate versus multiple-affiliate MNCs in Table 7. The first three columns report the estimation results for single affiliate Swedish MNCs whereas the last three present those for multiple affiliate ones.

As TARIFF gets higher, Swedish MNCs with a single foreign affiliate are much less likely to conduct a cross-border M&A. The coefficient in front of TARIFF is significant and highly negative for these firms, whereas it is insignificant for multi-affiliate firms. Multi-affiliate MNCs have better and wider distribution networks around the globe and most importantly more international experience. Therefore, the M&As conducted by these firms might be less

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<sup>12</sup> I also experimented with different cuts of the data, e.g. by host country development level and by region, however, many of these results are not reasonable due to extraordinarily large number of zeroes in the dependent variable and small sample sizes. Nevertheless, I offer these upon request.

affected by high tariffs. This result matches the last one presented in Table 6. In a nutshell, size and the degree of multinationality matter for how severe the effect of tariffs will be on the mode of entry.

Lastly, I turn my attention to the estimation of high R&D versus low R&D industries in the host countries. I use the categorization adopted by OECD STAN database. Manufacture of chemicals, machinery and equipment, and transport equipment are considered as high R&D industries. The rest is categorized as low R&D industries. The first three columns of Table 8 report the estimation results for high R&D and the last three present those for low R&D industries.

An increase in TARIFF reduces the likelihood of cross-border M&As in both type of industries, however, the effect is more pronounced in high R&D industries in the host country. This suggests that potential technology transfers are important for tariff effects. When acquiring in high-tech industries, the technology is transferred mainly from the acquired firm to the MNC. Sometimes both firms are technological equals and are looking forward to the synergies created through the merger of different aspects of their technologies. Both of these cases would reduce the bargaining power of the MNC and thus increase the acquisition price even further in the face of increasing tariffs. Therefore, the MNC in a high-tech sector may find itself conducting less and less M&As as the tariffs increase.

## **6. Conclusion**

In this paper, I attempt to disentangle the tariff effects on entry mode decision by carrying out an empirical analysis with a rich, firm-level data on the activities of Swedish MNCs around the globe in manufacturing sectors from 1987 to 1998 to test the main conjectures of traditional trade and IO views of the effects of trade costs on foreign entry. In a nutshell,

traditional view does not differentiate between entry modes and predicts more entry the higher the tariffs, whereas IO view posits that high tariffs discourage entry realized as M&As. Among the traditional view and IO view which one dominates is fundamentally an empirical question and this paper is an endeavor to answer it.

The panorama of the results presented in the previous section shows almost no evidence of tariff-jumping foreign entry. On the contrary, high tariffs reduce the likelihood of cross-border M&As as conjectured by recent studies with an IO angle. At best, tariff-jumping is a possibility in case of greenfield FDI or for large, multiple affiliate firms doing business in low-tech industries.

It is my hope that this analysis sheds some light onto the debate on the effects of tariffs on FDI, in particular the mode of foreign entry. Considering the massive globalization efforts around the world we witness each passing day these findings may have important implication for developing countries in particular. Freer trade does not necessarily mean a lower level of foreign investment in the country. Quite the opposite, through cross border M&As these countries can sustain a steady level of foreign investments as long as legal restrictions on foreign M&As are relaxed in a responsible way.

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Table 1. Entry Characteristics of Swedish MNCs

	<b>1987-1990</b>		<b>1991-1994</b>		<b>1995-1998</b>		<b>All periods</b>	
	<b>M&amp;A</b>	<b>GF</b>	<b>M&amp;A</b>	<b>GF</b>	<b>M&amp;A</b>	<b>GF</b>	<b>M&amp;A</b>	<b>GF</b>
Western Europe	129	22	72	18	45	12	246	52
Major Non-European OECD	23	8	12	4	11	4	46	16
Eastern Europe and Russia	0	0	11	11	2	7	13	18
South and Central America	5	0	2	1	8	3	15	4
Asia / Pacific	3	4	4	6	9	7	16	17
Africa	0	0	1	1	0	0	1	1
	<b>1987-1990</b>		<b>1991-1994</b>		<b>1995-1998</b>		<b>All periods</b>	
Cross-border M&A	160		102		75		337	
Greenfield FDI	34		41		33		108	
No FDI (including Exporting)	5,071		5,752		3,942		14,765	
# of countries	45		45		45		45	
# of Swedish MNC s	115		131		90			

Table 2. Number of Cross-border M&As, Greenfield FDI and Average Tariffs by Industry, 1987-1998

<b>Industry</b>	<b>Cross-border M&amp;As</b>	<b>Greenfield FDI</b>	<b>Average Tariff (%)</b>
Food and beverages	17	6	12.1
Textile, apparel and leather	4	4	15.2
Furniture	4	1	13.9
Wood and wood products	10	3	7.4
Paper and paper products	44	9	9.7
Chemicals, plastic, and petroleum	53	21	10.9
Non-metallic mineral products	14	3	9.0
Basic metal	8	5	3.5
Fabricated metal products	71	13	11.0
Office machines and computers	24	6	7.9
Non-electrical machinery and equipment	26	3	9.0
Electrical machinery, appliances and supplies	37	15	9.8
Professional, scientific, optical products	1	1	8.0
Transport equipment	15	10	7.8
Other manufacturing	9	8	--

Table 3. Summary Statistics

<b>Variable</b>	<b>Unit</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b><u>Firm:</u></b>					
TARIFF	#	0.102	0.109	0	0.844
MOBILE	#	0.022	0.032	0	0.263
NONMOBILE	#	0.084	0.525	0	14
FIRMSIZE	in thousands	5.360	15.769	0.044	150.892
NOAFF	#	6.426	15.105	1	125
<b><u>Country:</u></b>					
GDP	in trillions of \$	0.539	1.236	0.002	8.790
GDPCAP	in thousands of \$	13.332	11.1342	0.303	39.037
OPEN	#	0.694	0.539	0.1104	3.365
TEL	per one million people	0.322	0.202	0.006	0.684
IPR	#	6.029	1.637	1.580	8.767
UNIV	%	2.655	1.266	0.437	6.337

Table 4. Entry Mode Choice of Swedish MNCs, 1987-1998  
 Estimation Results Using Bivariate Probit Model

Regressors	Dependent Variable: Entry Mode			
	Coefficient Estimates		Marginal Effects	
	M&A	GF	M&A	GF
TARIFF	-1.938*** (0.744)	0.021 (0.655)	-0.073*** (0.027)	0.0003 (0.010)
MOBILE	-2.245* (1.227)	3.679*** (1.221)	-0.084* (0.046)	0.057*** (0.019)
NONMOBILE	0.126*** (0.040)	-0.136 (0.083)	0.005*** (0.002)	-0.002 (0.001)
FIRMSIZE	0.009*** (0.002)	0.010*** (0.003)	0.0003*** (0.0001)	0.0002*** (0.00005)
NOAFF	0.014*** (0.002)	0.009*** (0.003)	0.0005*** (0.00009)	0.0001** (0.00005)
GDP	0.083*** (0.025)	0.082** (0.035)	0.003*** (0.001)	0.001** (0.0006)
GDPCAP	0.013* (0.008)	-0.001 (0.012)	0.0005* (0.003)	-0.00002 (0.0002)
OPEN	-0.181 (0.146)	-0.224 (0.206)	-0.007 (0.006)	-0.003 (0.003)
TEL	1.728** (0.675)	0.807 (0.949)	0.065** (0.025)	0.012 (0.014)
IPR	0.052 (0.046)	0.111* (0.063)	0.002 (0.002)	0.002 (0.001)
UNIV	0.228*** (0.050)	0.139* (0.072)	0.009*** (0.002)	0.002* (0.001)
Observations	7669			
Wald $\chi^2$	454.1			
Success Probability			0.015	0.005
<u>Correlation Coefficient</u>				
$\rho$	-0.786			
<u>Residual Independence Test</u>				
$\chi^2$	11.242			
Prob> $\chi^2$ , p-value	0.001			

Notes: Standard errors are in parentheses; \*\*\*, \*\*, \* denote significance at the 1, 5, and 10 percent level, respectively; all regressions include a constant, time and industry fixed effects.

Table 5. Entry Mode Choice of Swedish MNCs, 1987-1998  
Estimation Results Using Multivariate Probit Model

Regressors	Dependent Variable: Entry Mode					
	Basic Specification			Extended Specification		
	M&A	GF	EX	M&A	GF	EX
TARIFF	-2.749*** (0.756)	0.049 (0.904)	-2.450*** (0.308)	-2.300** (0.918)	0.169 (1.195)	-2.172*** (0.345)
MOBILE	0.299*** (0.044)	0.013 (0.066)	0.134*** (0.030)	-4.134*** (1.362)	3.437** (1.361)	7.530*** (0.671)
NONMOBILE	-2.196** (1.100)	4.686*** (1.059)	8.998*** (0.635)	0.092* (0.048)	-0.180* (0.094)	0.065* (0.037)
FIRMSIZE				0.004 (0.003)	0.007* (0.003*)	0.012*** (0.002)
NOAFF				0.016*** (0.003)	0.012*** (0.004)	-0.001 (0.002)
GDP	0.029 (0.018)	0.058** (0.029)	-0.055*** (0.012)	0.081*** (0.029)	0.055 (0.045)	-0.054*** (0.015)
GDPCAP	0.023*** (0.005)	0.009 (0.007)	0.045*** (0.002)	0.007 (0.009)	0.004 (0.014)	0.033*** (0.004)
OPEN				-0.012 (0.163)	-0.406 (0.297)	-0.261*** (0.073)
TEL				1.115 (0.705)	-0.039 (1.098)	1.247*** (0.312)
IPR				0.067 (0.049)	0.132* (0.075)	0.046* (0.023)
UNIV				0.149*** (0.052)	0.092 (0.081)	-0.136*** (0.023)
TIME		No			Yes	
INDUSTRY		No			Yes	
Observations		5879			5589	
Wald $\chi^2$		1173.2			1325.84	
<u>Correlation Coefficients</u>						
$\rho_{MAGF}$		0.210** (0.083)			0.121 (0.083)	
$\rho_{MAEX}$		-0.724*** (0.034)			-0.745*** (0.032)	
$\rho_{GFEX}$		-0.471*** (0.061)			-0.426*** (0.060)	
<u>Residual Independence Test</u>						
$\chi^2$		361.75			395.71	
Prob> $\chi^2$ , 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, time and industry fixed effects.

Table 6. Entry Mode Choice of Swedish MNCs by Firm Size, 1987-1998  
Estimation Results Using Multivariate Probit Model

Regressors	Dependent Variable: Entry Mode					
	Large Firm			Small Firm		
	M&A	GF	EX	M&A	GF	EX
TARIFF	0.657 (1.256)	0.334 (1.843)	-1.429* (0.775)	-4.340*** (1.499)	0.231 (2.064)	-2.598*** (0.482)
MOBILE	-2.966** (1.358)	2.079 (1.469)	6.704*** (0.807)	-5.997* (3.084)	7.614** (3.637)	6.523*** (1.104)
NONMOBILE	0.083* (0.049)	-0.144 (0.099)	0.021 (0.039)	-0.195 (0.235)	0.015 (0.361)	0.735*** (0.124)
FIRMSIZE	0.001 (0.003)	0.008** (0.004)	0.006*** (0.002)	0.033 (0.227)	-0.272 (0.394)	0.522*** (0.103)
NOAFF	0.013*** (0.003)	0.008** (0.004)	-0.003 (0.002)	0.135*** (0.030)	0.082 (0.055)	-0.036* (0.020)
GDP	0.135*** (0.040)	0.031 (0.065)	-0.039 (0.027)	0.047 (0.045)	0.059 (0.074)	-0.070*** (0.019)
GDPCAP	-0.007 (0.012)	0.004 (0.019)	0.020** (0.008)	0.022* (0.013)	0.012 (0.022)	0.038*** (0.006)
OPEN	0.060 (0.223)	-0.352 (0.374)	-0.047 (0.126)	0.056 (0.256)	-0.552 (0.562)	-0.387*** (0.093)
TEL	1.503* (0.937)	-0.182 (1.431)	1.470*** (0.522)	1.883* (1.170)	0.434 (2.059)	1.291*** (0.408)
IPR	0.165** (0.066)	0.141 (0.096)	-0.033 (0.039)	-0.030 (0.077)	0.124 (0.135)	0.114*** (0.030)
UNIV	0.186*** (0.070)	0.100 (0.108)	-0.098** (0.040)	0.139* (0.080)	0.084 (0.137)	-0.153*** (0.030)
Observations	1817			3772		
Wald $\chi^2$	458.67			775.17		
<u>Correlation Coefficients</u>						
$\rho_{MAG}$	0.223** (0.095)			0.176 (0.139)		
$\rho_{MAE}$	-0.893*** (0.028)			-0.577*** (0.057)		
$\rho_{GE}$	-0.530*** (0.076)			-0.2777*** (0.091)		
<u>Residual Independence Test</u>						
$\chi^2$	333.50			97.56		
Prob> $\chi^2$ , 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, time and industry fixed effects.

Table 7. Entry Mode Choice of Swedish MNCs by Number of Affiliates, 1987-1998  
Estimation Results Using Multivariate Probit Model

Regressors	Dependent Variable: Entry Mode					
	Single Affiliate Firms			Multiple Affiliate Firms		
	M&A	GF	EX	M&A	GF	EX
TARIFF	-5.045*** (1.608)	3.197 (2.550)	-2.414*** (0.468)	-0.052 (1.151)	1.401 (1.528)	-1.782*** (0.531)
MOBILE	-2.361 (2.302)	3.689 (3.520)	5.683*** (0.947)	-6.100*** (1.786)	5.372** (2.099)	8.003*** (1.192)
NONMOBILE	-0.227 (0.291)	-3.445 (149.424)	0.664*** (0.135)	0.092* (0.049)	-0.133 (0.094)	0.049 (0.039)
FIRMSIZE	0.049 (0.063)	-0.056 (0.112)	0.168*** (0.031)	0.001 (0.003)	0.004 (0.004)	0.007*** (0.002)
NOAFF	0.199* (0.119)	0.409** (0.189)	-0.038 (0.052)	0.011*** (0.003)	0.008** (0.004)	-0.003 (0.002)
GDP	0.033 (0.047)	0.134 (0.097)	-0.050*** (0.019)	0.119*** (0.038)	0.033 (0.060)	-0.074*** (0.027)
GDPCAP	0.029** (0.014)	0.013 (0.023)	0.037*** (0.006)	-0.006 (0.012)	0.000 (0.019)	0.025*** (0.007)
OPEN	-0.215 (0.297)	-0.205 (0.582)	-0.326*** (0.093)	0.169 (0.208)	-0.414 (0.379)	-0.215* (0.120)
TEL	0.976 (1.297)	1.664 (2.313)	1.279*** (0.406)	1.691* (0.894)	-0.371 (1.438)	1.301** (0.513)
IPR	0.054 (0.086)	0.049 (0.144)	0.097*** (0.030)	0.105* (0.062)	0.173* (0.097)	-0.018 (0.038)
UNIV	0.098 (0.086)	0.272 (0.197)	-0.134*** (0.029)	0.179*** (0.067)	-0.016 (0.100)	-0.140*** (0.039)
Observations		3739			1850	
Wald $\chi^2$		732.62			473.62	
<u>Correlation Coefficients</u>						
$\rho_{MAG}$		0.127 (0.149)			0.173* (0.099)	
$\rho_{MAE}$		-0.590*** (0.057)			-0.871*** (0.028)	
$\rho_{GE}$		-0.289*** (0.098)			-0.530*** (0.078)	
<u>Residual Independence Test</u>						
$\chi^2$		94.48			331.48	
Prob> $\chi^2$ , 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, time and industry fixed effects.

Table 8. Entry Mode Choice of Swedish MNCs by Industry R&D Intensity, 1987-1998  
Estimation Results Using Multivariate Probit Model

Regressors	Dependent Variable: Entry Mode					
	High R&D Industry			Low R&D Industry		
	M&A	GF	EX	M&A	GF	EX
TARIFF	-5.560** (2.568)	1.892 (2.133)	-2.049** (0.818)	-1.856* (1.012)	1.406 (1.667)	-2.138*** (0.391)
MOBILE	-1.385 (1.565)	4.410** (1.721)	3.875*** (0.751)	-15.148*** (4.239)	-2.653 (5.770)	17.307*** (1.563)
NONMOBILE	0.066 (0.098)	-0.122 (0.165)	-0.001 (0.070)	0.111* (0.057)	-0.211 (0.134)	0.061 (0.044)
FIRMSIZE	0.002 (0.004)	0.007 (0.005)	0.010*** (0.003)	0.010* (0.005)	-0.008 (0.013)	0.013*** (0.004)
NOAFF	0.010 (0.007)	0.008 (0.010)	0.009* (0.005)	0.017*** (0.003)	0.018*** (0.006)	-0.003 (0.003)
GDP	0.081* (0.049)	0.071 (0.069)	-0.046* (0.026)	0.074** (0.037)	0.047 (0.065)	-0.045** (0.019)
GDPCAP	0.020 (0.017)	-0.012 (0.021)	0.029*** (0.008)	0.006 (0.010)	0.011 (0.020)	0.032*** (0.005)
OPEN	-0.190 (0.301)	-0.456 (0.564)	-0.573*** (0.127)	0.029 (0.200)	-0.313 (0.368)	-0.091 (0.090)
TEL	-0.716 (1.385)	1.904 (1.753)	0.980* (0.578)	1.765** (0.865)	-1.064 (1.558)	1.564*** (0.389)
IPR	0.086 (0.083)	-0.030 (0.124)	0.054 (0.038)	0.052 (0.061)	0.265** (0.105)	0.066** (0.030)
UNIV	0.075 (0.093)	0.046 (0.114)	-0.101** (0.040)	0.188*** (0.065)	0.138 (0.124)	-0.163*** (0.029)
Observations	1831			3758		
Wald $\chi^2$	457.37			852.85		
<u>Correlation Coefficients</u>						
$\rho_{MAGF}$	0.224* (0.114)			0.045 (0.119)		
$\rho_{MAEX}$	-0.801*** (0.045)			-0.675*** (0.045)		
$\rho_{GFEX}$	-0.587*** (0.086)			-0.416*** (0.091)		
<u>Residual Independence Test</u>						
$\chi^2$	184.06			196.98		
Prob> $\chi^2$ , 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, time and industry fixed effects.

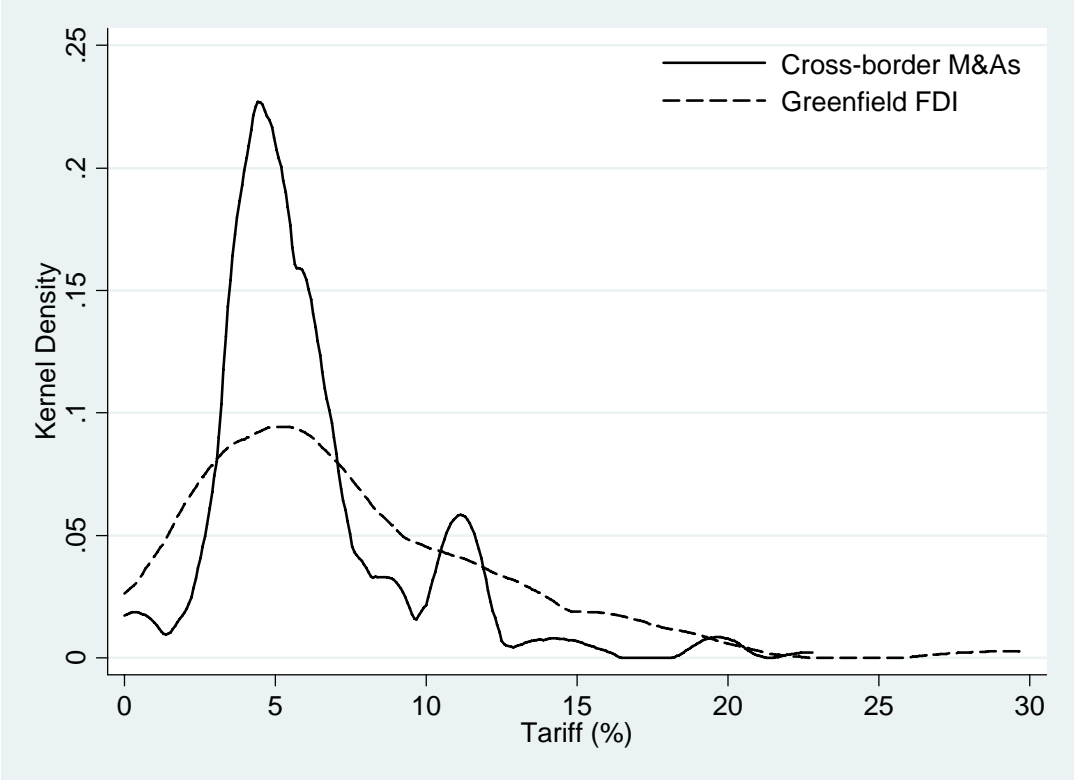


Figure 1. Kernel Density of Tariff by Entry Modes



Figure 2. Sale Composition of Swedish MNCs: All Newly Established Affiliates, 1987-1998

## Appendix

RIIE Code	Industry
	<b>Manufacture of food and beverages</b>
1.1	Food manufactures
1.2	Beverage manufactures
	<b>Textile, apparel and leather</b>
2.1	Textiles
2.2	Apparel
2.3	Leather and Footwear
11.3	<b>Furniture</b>
11.2	<b>Wood and wood products</b> (excluding furniture)
	<b>Manufacture of paper and paper products</b>
3.1	Pulp and Paper
3.2	Paperboard and Fine Paper
4.0	Paper Products
	<b>Manufacture of chemicals, plastic products, and petroleum</b>
5.4	Petroleum refineries and manufacture of products of petroleum and coal
5.1	Basic chemicals
5.2	Colors, glue, matches and cleansers
5.3	Drugs and medicines, pharmaceutical chemicals and botanical products
5.5	Rubber products
5.6	Plastic products
11.4	<b>Non-metallic mineral products</b> (except products of petroleum and coal)
	<b>Basic metal industries</b>
6.1	Iron and steel basic industries
6.2	Non-ferrous metal basic industries
	<b>Manufacture of fabricated metal products</b> (except machinery and equipment)
7.1	Tools
7.2	Metal constructions
7.3	Other fabricated metal products (except machinery and equipment)
8.1	<b>Office machines and computers</b>
	<b>Manufacture of non-electrical machinery and equipment</b>
8.2	Machinery for agriculture and forestry, machine tools and other special machinery
8.3	Other non-electrical machinery, weapons and ammunition
	<b>Electrical machinery, apparatus, appliances and supplies</b>
9.1	Motors, generators and transformers
9.2	Telecommunication equipment, radio and TV
9.3	Electrical household appliances and supplies
9.4	Other electrical machinery and equipment
11.1	<b>Professional, scientific, measuring and controlling equipment, photographic and optical products</b>
	<b>Manufacture of transport equipment</b>
10.1	Motor vehicles
10.2	Other transport equipment
15.0	<b>Other manufacturing industry</b>