Asymmetric effects of trade costs on entry modes: Firm level evidence

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Abstract

Standard foreign direct investment (FDI) theory suggests that falling trade costs should discourage horizontal FDI. Most FDI is horizontal. Yet, the world witnessed an FDI boom in 1990s, a period of striking falls in trade barriers. 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 shed light on this apparent conflict. The analysis is based on the predictions of a recent literature with an industrial organization (IO) angle: Trade costs have asymmetric effects on foreign expansion modes. This view posits that falling trade costs encourage entry realized as mergers and acquisitions (M&As), one of the potential explanations for the conflict between received theory and recent trends in FDI. Empirical results confirm the findings of this recent literature and add to it by testing its extensions.

JEL Classification: *F21, F23, L2*
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1 Introduction

Standard foreign direct investment (FDI) theory gets its momentum from the so-called proximity-concentration trade-off. Firms invest overseas when benefits of doing so outweigh the loss of scale economies from serving foreign markets from the home country. A natural conclusion is that falling trade costs should discourage horizontal FDI. Most FDI is horizontal not vertical. Yet, the world witnessed an FDI boom in 1990s, a period of striking falls in trade barriers; hence the paradox.

Neary (2009) provides an excellent discussion of this conflict and offers two possible resolutions: First, intra-bloc trade liberalization encourages horizontal FDI in trading blocs since foreign firms can use one of the member countries as an export-platform to serve the entire region. Second, the now-dominant way of conducting FDI, cross-border mergers and acquisitions (M&As) increase rather than decrease with falling trade costs. The latter, which I will call the industrial organization (IO) view from now on, is the central thrust of the current paper.

Multinational enterprises (MNEs) undertake foreign direct investment in different formats: Cross-border M&As, greenfield FDI, joint ventures, partial acquisitions, and different forms of low-equity commitment such as sales offices, licensing, research centers, etc. In this paper, a multinational may enter a host market by acquiring/merging with an already existing local firm (cross-border M&As) or by establishing a new venture (greenfield FDI). Alternative is to serve the foreign market with exporting, which could potentially capture the low-equity modes of foreign expansion.[1]

In standard FDI theory, greenfield FDI is 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.[2] 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 FDI literature until recently.

In this paper, I investigate empirically the role of trade costs in the entry mode choice of MNEs.

[1] Due to lack of data, the gray area between wholly owned operations and exports could not be included in the analysis in this paper.

[2] See World Investment Report (2007).

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.[3] As a result, aggregate welfare may shift at the country level. Considering the massive trade liberalization waves of 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.[4]

This paper contributes to the existing literature by carrying out an empirical analysis with rich, firm-level data on the activities of Swedish MNEs around the globe in manufacturing sectors from 1987 to 1998. The analysis is based on the predictions of the IO view about the role of trade costs on foreign expansion. This view posits that falling trade costs encourage entry realized as M&As, one of the potential explanations for the conflict between received theory and recent trends in FDI.

First, I offer a simple theoretical framework to motivate the empirical analysis. Two hypotheses are generated: (i) Falling trade costs discourage greenfield FDI and encourage cross-border M&As and exporting, and (ii) Higher bargaining power measured by international experience dampens the effect of trade costs on modes of entry. Trade liberalization increases the FDI undertaken not only by large, productive and diversified firms but also small, less productive and naive ones, too. These results lend themselves to empirical testing.

Main innovations present in the empirical part 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 apply the multivariate probit model to account for the correlation between different entry strategies, which reduces the inconsistency of the estimators significantly.

Results of the empirical analysis show that falling trade costs increase the likelihood of cross-border M&As as conjectured by recent studies. Entry mode decision of an MNE is a complex one and there are many asymmetries involved when it comes to the impact of trade costs on

[3] Neary (2007), Bertrand and Zitouna (2006), and Jovanovic and Rousseau (2008) are recent theory papers focusing on different aspects of industry restructuring after M&As. See Andrade and Stafford (2004) and Breinlich (2008) for latest related empirical work.

[4] See World Investment Report (2007) for the affiliate sales and global exports information.

this decision. First, cross-border M&As and exporting are complements not substitutes in their response to trade costs. Second, M&As are even more severely affected by changes in trade costs than exports. Third, firms with bigger size or many foreign affiliates are more immune to changes in trade costs, whereas small, single affiliate firms are severely affected. These results confirm the findings of the recent literature with an IO angle on the effects of trade costs 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 present the background material in a manner closely related to Neary (2009). In Section 3, I lay out a very simple model and present the testable hypotheses generated from it. In section 4, I discuss the econometric analysis. Sections 5 reports the results and I conclude in Section 6.

2 Background

2.1 Horizontal FDI

The theory of horizontal FDI originates from the idea of proximity-concentration trade-off. It is now standard in the FDI literature and needs no extended discussion here.[5] The idea is elegant and simple indeed. 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. Across time, sectors and space falling trade costs encourage exports over FDI.

There is indeed considerable but not overwhelming econometric evidence for the proximity-concentration trade-off. Brainard (1997) provides support for the tariff-jumping motive by using industry level data for U.S. multinationals. She finds that the share of FDI increases relative to exports the higher the trade barriers; however, she reports 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.

[5] See Markusen (2002, Chapter 2) or Barba Navaretti and Venables (2004, Chapter 3) for detailed discussions of the model.

2.2 Vertical FDI

The theory of vertical FDI originated by Helpman (1984) postulates that incentives for vertical fragmentation arise from international differences in factor endowments when stages of production differ in their factor intensities. The simplest version of the model assumes two production stages: headquarter services located in the parent country and production located in the most profitable location. Ignoring the demand in the host country, the firm can remain domestic and serve its home market from its parent plant.[6] It incurs high factor costs but no trade costs. Alternatively, the firm can engage in FDI and export all its output back home. In that case, it incurs lower factor costs accompanied by trade costs. In short, the model presents a tension between factor price differences and trade costs. Lower trade costs encourage FDI in contrast to the horizontal FDI model.

Turning to empirical evidence, the applications of the knowledge capital model rejects the vertical model in favor of horizontal one. Examples of studies within this line of literature are Carr, Markusen and Maskus (2001), Markusen and Maskus (2001b) and Blonigen, Davies and Head (2003). Firm-level studies such as Braconier and Ekholm (2000) and Yeaple (2003b) present mixed evidence for vertical FDI.

2.3 Export-platform FDI

The idea behind the export-platform FDI is more complex than both the horizontal and vertical FDI models. Motta and Norman (1996), Neary (2002), Yeaple (2003a), Ekholm, Forslid and Markusen (2007) and Grossman, Helpman and Szeidl (2006) are just a few studies addressing the export-platform FDI. This type of FDI is usually taken to refer to a situation where the output of a foreign affiliate is largely exported to a third country rather than sold in the host country.

Different from mainstream FDI models, export-platform FDI models include at least three countries with complex integration strategies. Two countries form a trading bloc lowering the intra-bloc trade costs. External trade barriers remain more or less the same as before. One generic result of these models is that intra-bloc trade liberalization encourages horizontal FDI in trading blocs since foreign firms can use one of the member countries as an export-platform to serve the entire region.

Head and Mayer (2004) analyze the determinants of location choices by Japanese firms in Europe. They find that Japanese FDI in Europe is encouraged by market potential which can be

[6] If the host country market is not negligible, then there are both horizontal and vertical motives. This makes the negative impact of trade costs on FDI weaker.

interpreted evidence for export-platform FDI or agglomeration effects. Blonigen, Davies, Waddell and Naughton (2007) report clearer evidence for export-platform FDI by using spatial econometric techniques to measure the distance effects beyond adjacent countries. Among their findings is that bigger market size in neighboring countries increases U.S. FDI. Chen (2009) and Tekin-Koru and Waldkirch (2010) provide additional empirical evidence that regional integration raises FDI in general and export-platform FDI in particular in European Union and NAFTA countries, respectively.

2.4 Cross-border M&As

In the literature I have discussed so far greenfield FDI is implicitly assumed to be the only way to expand production in another country. However, recent data show that an overwhelming majority of overseas investments are in the form of cross-border M&As. In recognition of this trend, a number of studies drawing on the principles of industrial organization literature have appeared. This new strand builds market power considerations and efficiency gains through technological progress and scale economies into an FDI model by explicitly considering cross-border M&As. 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. These studies 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 here is the favorable impact of trade liberalization on M&A activity around the globe. This idea is formalized in Bjorvatn (2004) and Neary (2007). The former is similar to Horn and Persson in spirit yet the modeling approach and the mechanisms differ. Neary's model, on the other hand, is unique in the sense that it has a unifying approach between the traditional FDI 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.

Turning to 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 number of M&As in 19 manufacturing industries in 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.

Briefly, there are many ways of explaining the paradox of simultaneous existence of trade liberalization and increased FDI. This paper attempts to shed light on this seemingly apparent paradox by providing empirical evidence on the predictions of the IO view.

3 Trade costs and the form of FDI–A theoretical framework

In this section I will show that trade barriers can have asymmetric effects on FDI depending on the mode of entry into a foreign market. First, cross-border M&As can be encouraged not discouraged by falling trade costs. Second, this effect can be different for different types of multinational firms. To highlight these effects, in what follows I introduce a toy model of mode of foreign entry in two stages based on Tekin-Koru (2009) that develops a model on technology transfers in case of different foreign entry modes. The model adopted in this paper employs the most basic setting in Tekin-Koru (2009) where there are no technology transfers in case of M&As to highlight the impact of trade costs on entry decision.

In the first stage, entry mode decision is made and product market interaction takes place in the second stage. I will try to trim the model down to its bare essentials, focus on the assumptions, and present results in their simplest forms.

Setting. Consider a potential multinational firm m from the parent country seeking to determine the optimal mode of serving industry j in host country k with n identical local firms where $n \geq 2$.

Three foreign market penetration strategies (s) are considered. The multinational can conduct a greenfield FDI (G), acquire one of the local firms (A) or simply export (E) to the host.

Marginal cost of production for a representative local firm ℓ is $c_\ell^s = c$, where $c \in (0,1)$ for $\forall s \in \{A, G, E\}$. Following Blonigen (1997) and Nocke and Yeaple (2007) I assume that firm m is endowed with firm-specific assets (such as human capital of employees, patents, blueprints and procedures) which provide an ownership advantage over other potential firms and cost savings of $\delta \in (0, c)$. It is assumed that firm m utilizes its technology to the full extent in a wholly owned subsidiary and produces at a marginal cost of $c_m^G = c - \delta$ since the greenfield FDI offers the most successful internalization of the technology in the firm as discussed in Caves (2007). In case of an M&A, the marginal cost is $c_m^A = c - \gamma\delta$ where $\gamma \in [0, c/\delta)$ as in Tekin-Koru (2009). Here, I assume that $\gamma = 0$, in other words, either the transferred technology is completely useless or no technology is transferred to the acquired entity. It is helpful to examine this simple case to highlight the impact of trade costs on the entry decision which is the main focus of the present paper.[7] In essence, the marginal cost of the acquired entity is the same as the local competitors, $c_m^A = c$.[8] In case of exporting there are added trade costs $\tau \in (0, c)$, so $c_m^E = c - \delta + \tau$.

The fixed costs of production change with the mode of entry also. Zero fixed costs are assumed for the case of exporting. In the case of greenfield FDI, there is a given fixed cost of entry F^G, and in the case of M&As the initial sum to be incurred or the acquisition price F^A, is endogenously determined by a simple bargaining process.

We can now state firm m's profits from alternative ways of serving the market:

$$\begin{aligned} \Pi_m^A &= \pi_m^A(\underset{-}{c}; \underset{-}{n-1}) - F^A \\ \Pi_m^G &= \pi_m^G(\underset{-}{c}, \underset{+}{\delta}; \underset{-}{n}) - F^G \\ \Pi_m^E &= \pi_m^E(\underset{-}{c}, \underset{+}{\delta}, \underset{-}{\tau}; \underset{-}{n}) \end{aligned} \tag{1}$$

The signs under arguments indicate that operating profits π, are decreasing in own production and trade costs and the number of firms, and increasing in the production cost savings provided by the

[7] In case of positive technology transfers, results related to trade costs still hold but the proofs become more complicated. See Tekin-Koru (2009) for more detail.

[8] There are two, non-exclusive arguments to defend a zero technology transfer in the case of an M&A. "First, with acquisitions, the multinational acquires existing assets and 'inherits' a labor force. Both the machinery and personnel (workers and management) may not be suitable for the exploitation of the multinational's assets. Second, the multinational may decide not to deploy its firm specific assets in the host country for the fear that they may diffuse to competitors, e.g. via personnel movements (as in Siotis 1999). Either one or both of these motives provide a justification for the multinational's choice to use the existing technology in the host market." (Tekin-Koru, 2009, p.560)

ownership of firm-specific assets.

The foundation of the proximity-concentration trade-off and what it implies are immediately clear. Higher fixed costs favor exporting over greenfield FDI, whereas higher trade costs favor greenfield FDI over exporting. It is a simple yet powerful result. It is also a result oblivious to the possibility of a cross-border M&A whose initial cost can be different for different levels of trade costs. Thus, it is worth teasing out the riches that come with an M&A.

Bargaining. In the first stage of the game, firms m and ℓ seek to split a total surplus if and only if they agree on a specific division.[9] If there is no agreement, then each party would take up its outside opportunity. When exporting is the best alternative to an M&A form firm m ($\max\left\{\Pi_m^E, \Pi_m^G\right\} = \Pi_m^E$), the multinational prefers an M&A if the payoff from that is greater than the payoff from exporting. Similarly, when greenfield FDI is the best alternative to an M&A ($\max\left\{\Pi_m^E, \Pi_m^G\right\} = \Pi_m^G$), the multinational prefers an M&A if the payoff from that is greater than the payoff from greenfield FDI.

Let F^A be proportional to the payoff from the outside opportunity, namely the reservation price of the selling party R_ℓ^A and inversely proportional to the bargaining strength $\alpha \in (0,1)$ of the buying party:

$$F^A = \frac{R_\ell^A}{\alpha} \tag{2}$$

where

$$R_\ell^A = \begin{cases} \Pi_\ell^E(\underset{-}{c}, \underset{-}{\delta}, \underset{+}{\tau}; \underset{-}{n}) & \text{if } \max\left\{\Pi_m^E, \Pi_m^G\right\} = \Pi_m^E \\ \Pi_\ell^G(\underset{-}{c}, \underset{-}{\delta}; \underset{-}{n}) & \text{if } \max\left\{\Pi_m^E, \Pi_m^G\right\} = \Pi_m^G \end{cases} \tag{3}$$

Comparative statics. Let me now discuss how trade costs may affect the multinational's foreign investment decision. It is obvious from expression (1) that greenfield FDI payoff Π_m^G is not affected by a change in trade costs τ, whereas exporting payoff Π_m^E declines in τ. Thus, falling trade costs encourage exporting. The effect of trade costs on cross-border M&As is not immediately clear, however. The following hypotheses can be obtained from this simple model to illustrate how trade costs may have an asymmetric effect on a multinational's entry mode decision:

Hypothesis 1 *Falling trade costs discourage greenfield FDI and encourage cross-border M&As and exporting.*

[9] Salant, Switzer and Reynolds (1983) state that a merger between two firms is not profitable in an industry with more than two identical firms. Neary (2007) shows that unless costs are very similar bilateral mergers are indeed profitable. Tekin-Koru (2009) notices that for firm ℓ the relevant options are M&As with $n-1$ firms, or exports or greenfield FDI with n firms. There is no surplus in the Salant et al. (1983) sense, however, the alternative to an M&A is to have an additional firm active in the market. Therefore, here I will assume that bilateral M&As are profitable.

The cross-border M&A payoff is not affected if the next best alternative to a negotiated agreement is greenfield FDI. However, if exporting is the next best alternative, then differentiating Π_m^A with respect to trade costs τ gives

$$\frac{d\Pi_m^A}{d\tau} = -\frac{dF^A}{d\tau} = -\underbrace{\frac{d\Pi_\ell^E}{d\tau}}_{+} \times \underbrace{\frac{1}{\alpha}}_{+} < 0 \tag{4}$$

Notice that the acquisition price F^A is proportional to the reservation price of the local firm R_ℓ^A. When exporting is the next best alternative to a negotiated agreement, falling trade costs reduce the profitability of the local incumbent in a likely exporting scenario Π_ℓ^E. Hence, the reservation price of the local firm declines. This makes a cross-border M&A a less expensive choice for the multinational. Therefore, falling trade costs encourage FDI if it is in the form of an M&A. This result is in line with Horn and Persson (2001), Norbäck and Persson (2004), Bjorvatn (2004) and Neary (2007). While exporting and greenfield FDI remain to be substitutes, exporting and cross-border M&As are complements.

Furthermore, if $\left|\frac{d\Pi_\ell^E}{d\tau}\right| \geq \left|\frac{d\Pi_m^E}{d\tau}\right|$, then falling trade costs encourage M&As even more so than exports. This last enunciation holds as long as the local incumbent is more sensitive to trade costs than the multinational. Indeed this may be the case if the two firms are similarly productive (low δ) and trade costs are not negligible (high τ). A major implication of this result is that broader globalization should promote FDI rather than relegate it.

Hypothesis 2 *Falling trade costs induce relatively more M&As by multinationals with less bargaining power.*

Due to a decline in the reservation price of the acquisition target, falling trade costs make M&As cheaper for all firms compared to the high trade cost regime. Nevertheless, it is relatively more so for firms with much less bargaining power. To see this, let us differentiate expression (4) with respect to α:

$$\frac{d^2\Pi_m^A}{d\tau d\alpha} = -\frac{d^2F^A}{d\tau d\alpha} = \underbrace{\frac{\partial\Pi_\ell^E}{\partial\tau}}_{+} \times \underbrace{\frac{1}{\alpha^2}}_{+} > 0 \tag{5}$$

Imagine a multinational with very low α. This will make the acquisition price F^A much higher for this particular firm. Falling trade costs will reduce the reservation price of the acquisition target. Since the final acquisition price is inversely proportional to the bargaining strength of the multinational, relative decline in the acquisition price will be much more pronounced for this type

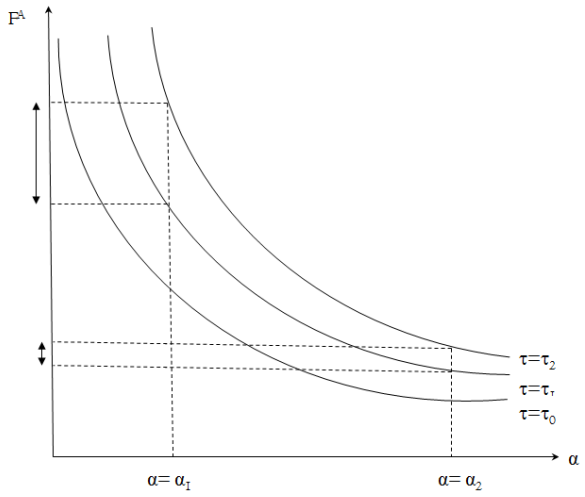

Figure 1: Bargaining Strength, Trade costs and M&As

of firm. All this can be illustrated in (F^A, α) space as in Figure 1. It is the isogram of F^A and α for different values of trade costs τ. Notice that F^A is decreasing in α and lower contours represent falling trade costs. Also notice that when trade costs decline from τ_2 to τ_1, for lower bargaining strengths $\alpha = \alpha_1$ the decline in F^A is much higher compared to the decline for higher bargaining strengths $\alpha = \alpha_2$.

Implications of this hypothesis is clear: Trade liberalization increases the FDI undertaken not only by large, productive and diversified firms that are supposedly strong bargainers but also small, less productive and naive ones, too. The results of this section lend themselves to empirical testing and I now turn to a discussion of the empirical analysis and the dataset.

4 Econometric analysis

The theoretical framework presented in the previous section suggests that trade costs can have asymmetric effects on different ways of serving a foreign market. The following econometric analysis provides the impact of trade costs on foreign entry modes by using a sample of Swedish multinational firms.

4.1 Econometric model

Hypothesis 1 in the previous section states that trade costs have asymmetric effects on a multinational's mode of foreign expansion. While greenfield FDI declines with falling trade costs, cross-

border M&As and exporting are encouraged. Put it differently, exporting and cross-border M&As are complements rather than substitutes. I use the following specification to test these predictions:

$$y_{ijkt;s} = \beta_{0;s} + \beta_{1;s}\tau_{jkt} + \boldsymbol{\beta}'_{2;s}\mathbf{x}_{it} + \boldsymbol{\beta}'_{3;s}\mathbf{x}_{kt} + \varepsilon_{ijkt;s} \tag{6}$$

where $y_{ijkt;s}$ is a binary indicator if firm i's entry into industry j in country k during time period t in the form of $s \in \{A, G, E\}$, τ_{jkt} denotes trade costs, $\mathbf{x}_{it}$ is a vector of firm-specific variables, and $\mathbf{x}_{kt}$ is a vector of country-specific variables. I also include time, industry and country fixed effects in all specifications to account for the effect of unobservables.[10]

Hypothesis 2 involves asymmetry. In the face of rapid trade liberalization, multinationals without much bargaining power conduct relatively more M&As. To test this prediction I include an interaction term of trade costs and bargaining power in expression (6):

$$y_{ijkt;s} = \beta_{0;s} + \beta_{1;s}\tau_{jkt} + \beta_{2;s}\tau_{jkt}\alpha_{it} + \boldsymbol{\beta}'_{3;s}\mathbf{x}_{it} + \boldsymbol{\beta}'_{4;s}\mathbf{x}_{kt} + \varepsilon_{ijkt;s} \tag{7}$$

The nested logit model is the most appropriate econometric method to use since the MNE first figures out the next best alternative to a negotiated agreement and then enters. 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.[11]

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

Applications of multivariate probit models in higher dimensions 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 Geweke-Hajivassiliou-Keane (GHK) probability simulator opened a gate for the applications. In this paper,

[10] In a study like the current one, more industry-specific variables would be preferred, in particular a measure of concentration in industry j in country k during time period t. OECD STAN database offers concentration measures for a limited number of OECD countries. I used these in my early regressions without much success due to too many missing observations and small sample sizes.

[11] At first a multinomial logit model is employed. Yet, the independence of irrelevant alternatives test has failed. Results are available upon request.

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).

In this paper, I use both the bivariate probit and the multivariate probit models. I begin with the bivariate probit model, because it provides the benefit of being able to calculate the marginal effects for each entry strategy.[12] First, I estimate tariff effects on FDI (M&A and greenfield together) versus exporting, because it would provide a useful comparison to some of the existing literature that does not take different entry modes into account. When the bivariate probit is used for the choice between FDI and exporting, there are two equations (one for FDI and one for exporting) and two binary dependent variables, $y_{ijkt;FDI}$ (1 if there is FDI and 0 otherwise) and $y_{ijkt;E}$ (1 if there is exporting and 0 otherwise). If the MNE chooses FDI, then $y_{ijkt;FDI} = 1$ and $y_{ijkt;E} = 0$. If the MNE chooses exporting, then $y_{ijkt;FDI} = 0$ and $y_{ijkt;E} = 1$.

Then, I turn to bivariate probit estimates of tariff effects on new entry by Swedish multinationals through cross-border M&As and greenfield FDI. Again, there are two equations (one for M&As and one for greenfield investments) and two binary dependent variables, $y_{ijkt;A}$ (1 if there is an M&A and 0 otherwise) and $y_{ijkt;G}$.(1 if there is a greenfield investment and 0 otherwise). If the MNE chooses A, then $y_{ijkt;A} = 1$ and $y_{ijkt;G} = 0$. If the MNE chooses G, then $y_{ijkt;A} = 0$ and $y_{ijkt;G} = 1$.

Lastly, when the multivariate probit is used there are three equations (one for A, one for G and one for E) and three binary variables, $y_{ijkt;A}$, (1 if there is A and 0 otherwise) $y_{ijkt;G}$ (1 if there is G and 0 otherwise) and $y_{ijkt;E}$ (1 if there is E and 0 otherwise). If the MNE chooses A, then ($y_{ijkt;A} = 1$, $y_{ijkt;G} = 0$, $y_{ijkt;E} = 0$), if the MNE chooses G, then ($y_{ijkt;A} = 0$, $y_{ijkt;G} = 1$, $y_{ijkt;E} = 0$) or if the MNE chooses E, then ($y_{ijkt;A} = 0$, $y_{ijkt;G} = 0$, $y_{ijkt;E} = 1$).

$\varepsilon_{ijkt;s}$ denotes 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 ρ 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 independence of residuals is tested by using an LR test to explore the existence of nesting possibilities if any.

[12] 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.

4.2 The dependent variable

In this section, I discuss the definition of entry modes used in the empirical setting and provide detailed information on the dependent variable. The dataset is composed of observations on the cross-border activities of Swedish MNEs in 42 countries during three distinct time periods: 1987-90, 1991-94 and 1995-98. The choice of countries is determined by the availability of the trade cost measure and control variables (described in the next section). The firm-level data used in this study have been collected from a questionnaire sent to Swedish MNEs by the Research Institute of Industrial Economics (RIIE) in Stockholm, Sweden about every fourth year since 1970s. The data include all Swedish MNEs in manufacturing industry and contain detailed information such as employment, production, R&D and entry modes on each majority owned foreign manufacturing affiliate. I use only the most recent years since the survey questions have changed dramatically over time.

The data do not include exporter-only firms or purely domestic Swedish firms. However, the model presented in Section 3 is applicable investigating how an already existing multinational firm expands in a new host country (or in an expanding host country). There is a great deal of variation in the degree of multinationality in the data. More than half of the firms are single affiliate multinationals. An overwhelming majority of firms have foreign operations in just a few countries. When a new opportunity to serve a host country arises, this chance may come to a multinational active in another market. Therefore, the data might still capture the model quite well.

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.[13]

The theory presented in Section 3 and the IO view 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 models such as production in the host country to export

[13] The frequency of affiliates born from sales companies of the group and the state-owned enterprise acquisitions is low.

Figure 2: Sale composition of Swedish MNEs: All newly established affiliates, 1987-1998

back to the parent country or elsewhere. These can be called vertical and export platform FDI, respectively. In this paper, I take this difference into account.

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 have 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 MNEs 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. In Figure 2 vertical FDI is negligible but there is a noteworthy level of export platform FDI. When the local country is used as an export platform, it is not clear whether the MNE 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 falling trade costs are expected to reduce 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 IO theories discussed in Section 2 and 3 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.[14]

[14]Results using the entire sample, which are excluded for brevity and available upon request, are very similar to

Table 1: Entry characteristics of Swedish MNEs by regions

	1987-1990		1991-1994		1995-1998		All periods	
	A	G	A	G	A	G	A	G
Western Europe	107	21	63	16	42	7	212	44
Major Non-European OECD	18	5	9	3	10	2	37	10
Eastern Europe and Russia	0	0	8	8	2	5	10	13
South and Central America	3	0	2	1	6	2	11	3
Asia / Africa	0	0	2	3	8	6	10	9

	1987-1990	1991-1994	1995-1998	All periods
Cross-border M&A	128	84	68	280
Greenfield FDI	26	31	22	79
Exporting	1120	1358	902	3380

Now I turn to entry mode patterns of Swedish MNEs. Table 1 summarizes the number of foreign entry transactions by Swedish MNEs 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 small when compared to exporting, which is true for an overwhelming majority of MNEs 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 4.9 times as greenfield FDI in 1987-1990, 2.7 times in 1991-1994 and 3.1 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 rates over the years are the first two culprits one can think of, however, neither have progressively declined. For example, the number of firms responded fluctuates over the years from 115 to 131 to 97. Ekholm and Hesselman (2000) who wrote the first report about the 1998 survey also made the same comment. One plausible explanation is the possibility of some Swedish MNEs cease to be multinationals and revert back to exporting due to lower trade costs. Then, they would presumably be no longer in the sample. This would imply an underestimation of the effect of trade costs on M&A activity. Because the survey does not involve questions related to exit, this point cannot be adequately addressed. If anything, this decline in the number of firms

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 sensible results for those types of investments.

and foreign entry should bias results against the IO view. Another explanation is the possibility that the number of targets is fixed and as more FDI happens, the availability of targets declines, driving up their price, reducing M&As relative to greenfield investment.

Third, observe the top half of Table 1. An overwhelming 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 Barba 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 MNEs have considerably higher M&As in Western Europe and major non-European OECD countries. The preferred mode of entry in developing countries is not as clear, 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 45%, whereas it is only 18% in developed countries.

4.3 Measuring trade costs

In this study I consider two components of trade costs: trade barriers and transportation costs. The latter is proxied by *Distance* measured using the great circle formula. This formula approximates the shape of the earth as a sphere and calculates the minimum distance along the surface between Sweden and a foreign country.[15] As a measure of transportation costs I expect it to have a positive impact on M&As and a negative impact on greenfield FDI. However, distance also proxies for the possibilities of personal contact between managers and customers and cultural differences across countries. These tend to reduce transfers of information and the establishment of trust. Therefore, distance may negatively affect all types of FDI.

Trade barriers measure *Tariff* is constructed by using data from UNCTAD-TRAINS data put together by Jon Haveman under the "Ultimate Trade Barrier Catalog".[16] It includes information on

[15] Results are similar with geographic centers formula and thus not reported for brevity. This may be due to the fact that majority of Swedish affiliates are in Western Europe with small countries where this is likely not much of an issue.

[16] I am indebted to Jon Haveman for his work on trade barriers. See http://r0.unctad.org/trains_new/index.shtm for information on the UNCTAD TRAINS database and http://www.eiit.org/Resources.html for detailed information on the Ultimate Trade Barrier Catalog.

tariff, nontariff barriers (NTBs) and trade data at the six-digit HS industry level for 103 countries. I compute unweighted and weighted averages at the four-digit ISIC (Rev.3) industry level where the largest share of the affiliate production takes place. Then, I map these figures into the two-digit RIIE industry level by using concordances provided by the Statistics Sweden. I only report results for the unweighted tariff means to maximize the number of observations in regressions.

I also compute NTBs as a measure of trade barriers for Swedish MNEs. However, the aggregation of NTBs to two-digit RIIE industry level is very ad hoc since NTB is an indicator variable (with an overwhelming majority of 1s as opposed to 0s) pointing out only the existence of a certain type of trade restriction. There is no information on the extent of its use. As can be expected the regressions using the NTBs at this aggregation level do not give any robust results and therefore I do not report them here.

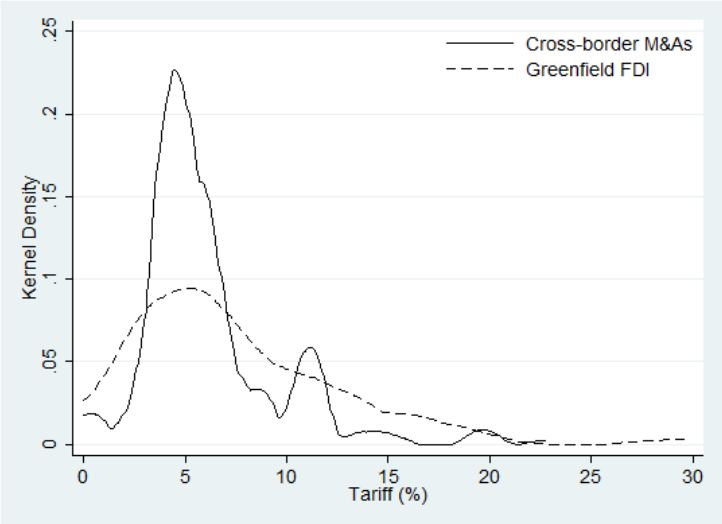

Figure 3: Kernel density of *Tariff* by entry modes

Figure 3 shows the kernel density diagram of *Tariff*. The solid line signifies cross-border M&As and the dashed line greenfield FDI. The density of M&As is much higher than greenfield FDI at lower values of *Tariff* and gets dominated by greenfield FDI at higher values of *Tariff*. Notice that M&As completely disappear for tariff rates greater than 22%. This observation provides some suggestive evidence for the hypothesis that acquisitions are discouraged by rising tariffs.

Table 2 lists all countries included in the sample, their average tariff rate, distance from Sweden, the number of firms producing there in 1998, and the sum of all Swedish M&As and greenfield FDIs in the sample period. Table 2 does not reveal much about the relationship between trade costs and

Table 2: The sample of countries, 1987-1998

Country	Average Tariff %	Distance 1000 km	No. of firms 1998	No. of A	No. of G
Germany	5.8	1.119	28	41	11
UK	5.8	1.436	26	28	4
USA	4.3	6.336	26	29	6
Denmark	5.8	0.523	25	29	3
Poland	10.5	0.810	21	4	10
France	5.8	1.546	20	16	6
Finland	5.7	0.400	18	16	7
Netherlands	5.8	1.128	16	12	0
Spain	5.8	2.595	15	9	1
Italy	5.8	1.653	15	20	3
Norway	5.5	0.417	14	16	3
Belgium	5.8	1.285	14	8	1
Brazil	17.5	10.904	12	6	2
Canada	8.5	6.345	8	4	3
Austria	8.6	1.244	8	8	3
China	34.2	7.788	8	2	5
India	29.5	6.765	7	3	1
Mexico	15.2	9.603	6	5	1
Australia	9.1	15.588	4	3	0
Hungary	9.7	1.319	4	4	1
Russia	11.4	1.227	4	2	2
Malaysia	13.9	9.354	4	0	1
Japan	16.1	8.193	4	1	1
Czech Republic	8.2	1.054	4	0	0
Greece	5.8	2.409	1-3	1	0
Portugal	5.8	2.992	1-3	5	1
Korea	8.5	7.453	1-3	2	0
South Africa	9.5	9.524	1-3	1	1
Philippines	20.5	9.341	1-3	0	0
Ireland	5.8	1.633	1-3	2	0
Argentina	12.9	12.541	1-3	0	0
Thailand	23.3	8.276	1-3	0	0
Turkey	8.9	2.175	1-3	0	1
Colombia	13.2	9.691	1-3	0	0
Taiwan	9.9	8.346	1-3	0	0
Indonesia	12.3	10.521	1-3	1	0
Slovenia	5.7	1.494	0	0	0
New Zealand	6.7	17.002	0	0	0
Chile	10.9	13.067	0	0	0
Venezuela	13.5	8.724	0	0	0
Iceland	4.2	2.142	0	0	0
Israel	10.1	1.227	0	0	0

form of FDI. The bottom of table shows many countries with very high tariff rates and low levels of Swedish entry. The top part shows low tariff rates coupled with high degrees of M&As. However, this may simply reflect that Swedish multinationals mainly invest in developed European countries which also have lower tariff rates and a low degree of remoteness than the average country.

Last, I examine the sectoral composition of entry modes. In the dataset, Swedish manufacturing MNEs 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,

Table 3: Entry modes and average tariffs by industry, 1987-1998

Industry	Cross-border M&As	Greenfield FDI	Average Tariff (%)
Food and beverages	15	6	12.1
Textile, apparel and leather	2	3	15.2
Furniture	4	1	13.9
Wood and wood products	10	2	7.4
Paper and paper products	38	6	9.7
Chemicals, plastic, and petroleum	34	16	10.9
Non-metallic mineral products	14	3	9.0
Basic metal	2	1	3.5
Fabricated metal products	67	9	11.0
Office machines and computers	16	4	7.9
Non-electrical machinery and equipment	22	1	9.0
Electrical machinery, appliances and supplies	34	12	9.8
Professional, scientific, optical products	1	1	8.0
Transport equipment	15	10	7.8
Other manufacturing	6	3	

observe that average tariff in these industries are not the highest, which warrants some further exploration.

4.4 Firm characteristics

The model provided in Section 3 is a highly stylized one and its raison d'être is to provide a framework for the empirical analysis. The controls used in the regressions hereafter are inspired both from this simple model and the broader FDI literature.

Firm-specific assets. 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 assets.

Multinationals can reduce their production costs through extensive use of these assets some of which can be provided to additional plants without reducing their value in existing plants. I use R&D intensity as a proxy. *R&D Intensity* is the MNE's total R&D expenditures divided by total sales at the end of each time period.[17] 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 -pointed out by the theory in Section 3 as well.

Bargaining strength. Market share of the firm is the most widely used bargaining power measure in the empirical IO literature. There is a lack of data with broad industry and country coverage for the market share of a multinational in industry j in country k in time t. The next best alternative

[17] I also used marketing intensity as a measure of firms specific assets for robustness. The results are similar and available upon request.

is using the market concentration in industry j in country k in time t. OECD STAN database offers concentration measures for a limited number of countries and sectors from 1980 to 2000. I used these in my early regressions without much success due to many missing observations and small sample sizes.

Starting back with Anderson and Gatignon (1986), in the international business and management strategy literatures (See Gatignon and Anderson (1988), Davidson and McFetridge (1984, 1985) and Anand (2002)), international experience has been cited as an indicator of low levels of internal uncertainty and greater confidence in business dealings and thus stronger bargaining positions around the negotiation table. Therefore, in this paper, I assume that multinationals with more international experience are stronger bargainers. I use both dimensions of experience: previous experience in the host country measured by the number of the previous affiliates of the MNE in the host country, *Affhost* and previous experience in the world markets measured by the number of the previous affiliates of the MNE all around world, *Affworld*.

Affhost carries information about the local knowledge of the firm that is specific to the host country, such as distribution networks, connections to local bureaucracy, and knowledge of local business culture. Note that *Affhost* may also represent competitive effects or the bargaining strength. If the MNE 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. There is a well-established international business literature drawing attention to the differential impact of this variable on entry modes. Previous experience increases the local knowledge and connections of the MNE and thus may foster greenfield FDI over cross-border M&As. On the other hand, it may also promote M&As because experienced MNEs are able to monitor their partners more effectively. Therefore, the expected sign is positive for both entry strategies yet the strength of this effect on each entry mode is ambiguous.

Affworld represents a broad international experience that fosters FDI by MNEs (Caves, 2007). The expected sign for this variable for both entry modes is positive. However, I expect a stronger positive for cross-border M&As since international experience is anticipated to boost the bargaining strength and thus the probability of M&As. I also use firm size measured by total employment in the firm as an indicator of the bargaining strength (results not reported in the paper due to brevity but available upon request), since larger firms with deep pockets are considered to be more experienced and stronger bargainers (See Caves, 2007).

4.5 Country characteristics

The country-level data are collected from the International Financial Statistics of IMF, the International Country Risk Group, and the World Development Indicators Database of the World Bank.

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, *Skill*), trade openness (share of trade volume in GDP, *Open*) are all well-known determinants of entry and are expected to favor both kinds of entry (Brainard (1997), Carr et al. (2001)).

GDP per capita is used to account for the availability of acquisition targets in the host country because it is a broad measure of general level of development. Even though it is easier to find subcontractors 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 *GDP/capita*.

Not only the tariff and transportation costs reductions but also other aspects of liberalization that are potentially relevant for FDI and exports should be accounted for. For example, product market regulations have been liberalized in many OECD countries, and, more generally, other aspects related to the "cost of doing business" have fallen over time. If these are correlated with tariffs (which is likely) this would bias the results. Data from the World Bank "Doing Business" database is unfortunately only available after 2004. To control for these aspects of liberalization and also the fixed costs greenfield FDI I use International Country Risk Group index *ICRG* to measure the general investment climate, rule of law, and bureaucracy quality.

Summary statistics and a correlations table are provided in the Appendix.

5 Results

5.1 FDI versus exporting

I begin with the bivariate probit estimates of tariff effects on both types of FDI by Swedish multinationals, since it puts the results in perspective with respect to the existing literature with no distinction between cross-border M&As and greenfield FDI. The first two columns in Table 4 present the coefficient estimates whereas the last two columns include the marginal effects of explanatory

Table 4: FDI VERSUS EXPORTING

	Bivariate Probit			
	Estimates		*Marginal effects*	
Entry mode	FDI	E	FDI	E
Tariff	1.460*	-2.318***	0.103*	-0.415***
	(0.762)	(0.367)	(0.053)	(0.145)
R&D Intensity	-0.243	-8.532***	-0.017	-0.667***
	(0.898)	(0.661)	(0.063)	(0.261)
Affhost	0.085*	0.056	0.006*	0.022*
	(0.049)	(0.036)	(0.003)	(0.012)
Affworld	0.016***	0.005*	0.001***	0.002*
	(0.0001)	(0.028)	(0.0001)	(0.001)
GDP	0.088***	-0.048***	0.006***	-0.019***
	(0.026)	(0.015)	(0.002)	(0.006)
GDP/capita	0.004	0.031***	0.0003	0.012***
	(0.008)	(0.004)	(0.0005)	(0.002)
Open	-0.078	0.262***	-0.005	0.0103***
	(0.147)	(0.074)	(0.010)	(0.029)
Tel	0.837*	1.246**	0.059*	0.492***
	(0.518)	(0.052)	(0.033)	(0.125)
ICRG	0.101**	0.058**	0.007**	0.023**
	(0.042)	(0.023)	(0.003)	(0.009)
Skill	0.143***	-0.136***	0.010***	-0.054***
	(0.046)	(0.024)	(0.003)	(0.009)
Observations	5589			
Wald χ^2	1271			
Success prob.			0.03	0.44
ρ	-0.942			
LR test of	532.9			
indep. of eq.	(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, country, and industry fixed effects.

variables on the success probability of each strategy. All regressions include a constant, time, country, and industry fixed effects. Wald χ^2 is 1271 indicating a good fit. Correlation coefficient ρ is significant revealing that FDI and E are not independent from each other as strategies.

Tariff is barely significant and positive in equation FDI (column 1) and negative and significant in equation E (column 2), revealing that falling trade costs discourage FDI by Swedish multinationals. This is in line with the tariff-jumping argument in the previous literature where researchers generally have found a significant positive effect of trade costs on multinational entry without differentiating between different entry modes using aggregate data.[18]

Calculating the marginal effects shows that an infinitesimal increase in *Tariff* increase the probability of FDI by 10.3%. Although this is not large in absolute magnitude, compared to the probability evaluated at the sample mean of 3% (given as success probability in the bottom of

[18] See Blonigen et al. (2003) for a recent review of this literature.

Table 4), this is nevertheless economically meaningful. However, recall that the estimate is only significant at 10% level. This may be driven by the use of firm level data as opposed to the previous studies. This may also point out a need to differentiate between the FDI modes of entry, which is done in the next section.

Turning to other coefficient estimates in the first two columns of Table 4, host country experience (*Affhost*), international experience (*Affworld*), infrastructure (*Tel*) and investment climate in the host country (*ICRG*) increase the likelihood of both strategies. All of these have relatively small marginal effects on the mode of entry except for *Tel* with a magnitude of 49.2%.

R&D Intensity of the multinational significantly reduces the likelihood of E with a marginal effect of -66.7%. Experience in the host country (*Affhost*) measured as the number of previous affiliates in the host country have no effect on probability of exporting however, it increases the likelihood of FDI. Broader international experience (*Affworld*) measured as the number of previous affiliates in the world increases the likelihood of both FDI and exporting. The marginal effects are rather small.

5.2 Cross-border M&As versus greenfield FDI

Before estimating the full model, I turn to 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. The first two columns in Table 5 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, country, and industry fixed effects. Wald χ^2 is 323 indicating a good fit. Correlation coefficient ρ is significant revealing that A and G are not independent from each other as strategies.

Tariff is significant and negative in equation A (column 1) and positive yet insignificant in equation G (column 2), revealing that falling trade costs encourage cross-border M&As by Swedish multinationals. This significant and negative tariff effect is a new result.

Among recent studies are Hijzen et al (2008) and Breinlich (2008) who investigate cross-border M&As in depth. Both concentrate on the number of M&As in an industry, whereas I use a single firm's choice of M&As or greenfield FDI 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

Table 5: Cross-border MAs versus Greenfield FDI

	Bivariate Probit			
	Estimates		*Marginal effects*	
Entry mode	A	G	A	G
Tariff	-2.25**	0.148	-0.115**	0.002
	(0.955)	(1.19)	(0.047)	(0.019)
R&D Intensity	-1.99	5.58***	-0.102	0.089***
	(1.26)	(1.13)	(0.064)	(0.020)
Affhost	0.103**	-0.159*	0.005**	-0.003*
	(0.044)	(0.094)	(0.002)	(0.002)
Affworld	0.019***	0.015***	0.001***	0.0002***
	(0.003)	(0.003)	(0.0001)	(0.00005)
GDP	0.079***	0.048	0.004***	0.0007
	(0.029)	(0.044)	(0.001)	(0.0007)
GDP/capita	0.011	0.007	0.0005	0.0001
	(0.009)	(0.014)	(0.0004)	(0.0002)
Open	-0.144	0.496*	-0.007	0.008*
	0.168	(0.294)	(0.008)	(0.005)
Tel	1.24*	0.045	0.063*	-0.0007
	(0.749)	(1.11)	(0.038)	(0.005)
ICRG	0.083*	0.148**	0.004*	0.002**
	(0.050)	(0.075)	(0.002)	(0.001)
Skill	0.201***	0.114	0.010***	0.002
	(0.055)	(0.082)	(0.003)	(0.001)
Observations	5589			
Wald χ^2	323			
Success prob.			0.02	0.005
ρ	-0.542			
LR test of	7.02			
indep. of eq.	(0.008)			

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

horizontal mergers. The latter finds no robust evidence of the effects of tariff reductions in the cross-border M&A activity.

Bivariate probit results indicate that trade costs 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 MNEs tariff-jump with G but not A. Since this result is not significant, this interpretation might be a long shot, yet the result for A is strikingly different from the previous literature providing some evidence for the IO view. Falling tariffs make acquisition targets less expensive and thus increase the likelihood of cross-border M&As.

Calculating the marginal effects shows that an infinitesimal increase in *Tariff* reduces the probability of a cross-border M&A by 11.5%. Again, although this seems small in absolute magnitude, compared to the probability evaluated at the sample mean of 2% (given as success probability in the bottom of Table 5), this is economically meaningful.

Turning to other coefficient estimates in the first two columns of Table 5, host country experience of the MNE (*Affhost*), international experience (*Affworld*), market size (*GDP*) and labor skill in the host country (*Skill*) increase the likelihood of both kinds of entry. All of these have relatively small marginal effects on the mode of entry.

Firm-specific assets measured by *R&D Intensity* reduce the likelihood of A. As expected, *R&D Intensity* increases the odds in favor of G with a marginal effect of 8.9%. While the host country infrastructure and the skill level of the labor force in the host country, respectively proxied by *Skill* and *Tel* increase the odds in favor of M&As. Investment climate (*ICRG*) in the host country increases the likelihood of both entry modes.

5.3 Exporting versus cross-border M&As versus greenfield FDI

Table 6 reports the multivariate probit estimates of effects of trade costs on the probability of conducting A, G or E. The first three columns report the baseline specification without the interaction terms as in Equation (6), whereas the last three columns present results with the interaction terms as in Equation (7). Wald χ^2 for the first specification is 1280 and for the second is 1295 indicating a good fit.

Also notice that the correlation coefficient between A and G (ρ_{AG}) is almost insignificant, whereas that between A and E (ρ_{AE}) and G and E (ρ_{GE}), 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 Table 6, in line with Hypothesis 1 and the main conjecture from the IO view, the variable of interest, *Tariff*, decreases the likelihood of cross-border M&As. The odds of E also declines in *Tariff*, which suggests that cross-border M&As and exporting are 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 equation G in column 2.

The effect of tariff barriers is negative for both cross-border M&As and exporting, supporting Hypothesis 1 from the theory. Interestingly though, the adverse effect of trade costs measured as tariffs is somewhat stronger for cross-border M&As. In other words, trade liberalization can induce more cross-border M&As than exporting. This is a new result.

Most of the other covariates exhibit their expected signs, though some are insignificant. Throughout almost all equations *Affworld* have significant positive signs for both cross-border M&As and

Table 6: Exporting versus cross-border MAs versus greenfield FDI (Tariffs)

	Multivariate Probit					
	Baseline			*Interactions*		
Entry mode	A	G	E	A	G	E
Tariff	-2.38***	0.115	-2.23***	-2.62***	0.599	-2.90***
	(0.918)	(1.18)	(0.347)	(0.991)	(1.35)	(0.381)
R&D Intensity	-2.72**	4.70***	8.75***	-2.73**	4.67***	8.70***
	(1.18)	(1.16)	(0.647)	(1.18)	(1.15)	(0.646)
Affhost	0.097**	-0.174**	0.060	0.168**	-0.130*	-0.048
	(0.049)	(0.087)	(0.037)	(0.092)	(0.059)	(0.077)
Affworld	0.017***	0.015***	0.007***	0.166***	0.012***	0.001
	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)
Tariff x *Affhost*				1.42**	0.573	2.37*
				(0.732)	(2.94)	(1.21)
Tariff x *Affworld*				0.016**	0.029*	0.087***
				(0.008)	(0.012)	(0.024)
GDP	0.082***	0.058	-0.053***	0.081***	0.054	-0.052***
	(0.029)	(0.045)	(0.015)	(0.0.29)	(0.045)	(0.015)
GDP/capita	0.008	0.003	-0.033***	0.008	0.005	-0.033***
	(0.009)	(0.014)	(0.004)	(0.009)	(0.014)	(0.004)
Open	0.020	-0.404	0.265***	0.009	-0.411	0.262***
	(0.163)	(0.295)	(0.073)	(0.163)	(0.299)	(0.073)
Tel	1.11	0.116	1.23***	1.24*	0.168	1.26***
	(0.704)	(1.08)	(0.311)	(0.710)	(1.09)	(0.312)
ICRG	0.071	0.131*	0.046**	0.064	0.123*	0.042*
	(0.049)	(0.074)	(0.023)	(0.049)	(0.076)	(0.023)
Skill	0.152***	0.101	-0.137***	0.152***	0.096	-0.135***
	(0.052)	(0.081)	(0.023)	(0.052)	(0.081)	(0.023)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations		5589			5589	
Wald χ^2		1280			1295	
Correlation.						
ρ_{AG}		0.136			0.147*	
		(0.094)			(0.084)	
ρ_{AE}		-0.958***			-0.976***	
		(0.074)			(0.076)	
ρ_{GE}		-0.453***			-0.459***	
		(0.073)			(0.033)	
LR test of		386			389	
indep. of eq.		(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, country, and industry fixed effects.

greenfield FDI, pointing out that Swedish MNEs with bigger size and more international market experience have a higher chance of entering new markets to serve those markets. In short, broad international experience matters.

On the other hand, *Affhost* always favors cross-border M&As and reduces to odds against G, which suggests that Swedish MNEs endowed with stronger connections to local bureaucracy or knowledge of local business culture prefer cross-border M&As to greenfield FDI. This may also be interpreted as Swedish MNEs with more bargaining power derived from their previous experience in the host market acquire local firms rather than establishing wholly owned subsidiaries.

Swedish MNEs with high *R&D Intensity* favor greenfield FDI. *GDP/capita* (level of host country

TABLE 7: EXPORTING VERSUS CROSS-BORDER MAS VERSUS GREENFIELD FDI (DISTANCE)

	MULTIVARIATE PROBIT					
	Baseline			*Interactions*		
Entry mode	A	G	E	A	G	E
Distance	-0.125***	-0.101***	-0.068***	-0.189***	-0.105***	-0.073***
	(0.017)	(0.025)	(0.005)	(0.024)	(0.026)	(0.006)
R&D Intensity	-1.55	3.53***	6.77***	-1.56	3.52***	6.73***
	(0.997)	(0.921)	(0.442)	(0.993)	(0.923)	(0.441)
Affhost	0.057*	-0.141**	-0.087***	0.092*	-0.208*	-0.132***
	(0.032)	(0.072)	(0.024)	(0.049)	(0.122)	(0.037)
Affworld	0.016***	0.010***	0.012***	0.010***	0.011***	0.010***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)
Distance x *Affhost*				0.006**	0.018	0.019
				(0.004)	(0.024)	(0.024)
Distance x *Affworld*				0.002***	0.0002	0.0005**
				(0.0004)	(0.0006)	(0.0002)
GDP	0.093***	0.062	-0.032**	0.127***	0.060	-0.035**
	(0.027)	(0.043)	(0.013)	(0.029)	(0.043)	(0.013)
GDP/capita	0.005	0.006	-0.023***	0.002	0.006	0.023***
	(0.008)	(0.013)	(0.004)	(0.008)	(0.043)	(0.004)
Open	0.595***	-0.859***	0.502***	0.575***	-0.869***	-0.503***
	(0.165)	(0.274)	(0.067)	(0.165)	(0.275)	(0.067)
Tel	1.73**	2.43**	0.067	1.76**	2.47**	0.067
	(0.716)	(1.15)	(0.294)	(0.731)	(1.15)	(0.294)
ICRG	0.133***	0.171***	0.092***	0.112***	0.170***	0.090***
	(0.041)	(0.057)	(0.018)	(0.041)	(0.057)	(0.018)
Skill	0.093*	0.076	-0.056**	0.107**	0.077	-0.055**
	(0.053)	(0.085)	(0.022)	(0.055)	(0.085)	(0.022)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	No	No	No	No	No	No
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations		7805			7805	
Wald χ^2		1933			1934	
Correlation.						
ρ_{AG}		0.146			0.149*	
		(0.096)			(0.072)	
ρ_{AE}		-0.909***			-0.945***	
		(0.062)			(0.066)	
ρ_{GE}		-0.450***			-0.462***	
		(0.067)			(0.068)	
LR test of		437			450	
indep. of eq.		(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, country, and industry fixed effects. Country effects are not used since *Distance* is time invariant.

development) significantly reduces the likelihood exporting. A better business climate in the host country *ICRG* improves the odds in favor of G and E. A skilled labor force in the host country (*Skill*) increases the likelihood of A and reduces the odds for E.

Then, in the last three columns of Table 6, I examine whether trade cost effects vary across different types of firms to test Hypothesis 2 of the theory. To this effect I add the interaction of trade costs with bargaining strength to the previous specification. I use experience in the host country and around the world as proxies for bargaining strength. As expected, the negative impact of trade costs on cross-border M&As declines in bargaining strength. The linear trade cost term (*Tariff*) is negative and significant and the interaction terms are significantly positive using both *Affhost*

Table 8: Robustness, Different Subsamples

	Multivariate Probit					
	OECD			*Firms Present in Whole Sample*		
Entry mode	A	G	E	A	G	E
Tariff	-2.94***	0.980	-4.65***	-3.65***	1.219*	-2.15***
	(1.12)	(1.76)	(0.542)	(0.896)	(0.721)	(0.584)
R&D Intensity	-2.46**	3.85***	7.57***	-2.18**	4.21***	7.65***
	(1.18)	(1.34)	(0.724)	(0.95)	(1.87)	(0.857)
Affhost	0.236**	-0.131*	0.085	0.268***	-0.138**	-0.047
	(0.098)	(0.077)	(0.089)	(0.102)	(0.069)	(0.062)
Affworld	0.008***	0.012***	0.004***	0.125***	0.018***	0.008***
	(0.003)	(0.003)	(0.001)	(0.002)	(0.004)	(0.003)
Tariff x *Affhost*	2.79**	0.122	2.68*	2.07***	0.932	1.12
	(1.02)	(4.48)	(0.08)	(0.253)	(1.18)	(1.21)
Tariff x *Affworld*	0.195**	0.014**	0.157**	0.389**	0.062***	0.112***
	(0.079)	(0.006)	(0.072)	(0.029)	(0.016)	(0.024)
GDP	0.083***	0.020	-0.061***	0.081***	0.054	-0.056***
	(0.029)	(0.046)	(0.015)	(0.027)	(0.047)	(0.017)
GDP/capita	0.005	0.016	-0.035***	0.008	0.016	-0.023***
	(0.009)	(0.015)	(0.005)	(0.009)	(0.014)	(0.002)
Open	0.047	-0.427	0.252***	0.009	-0.358	0.269***
	(0.174)	(0.322)	(0.081)	(0.157)	(0.302)	(0.053)
Tel	1.10	0.062	1.22***	1.35*	0.102	1.28***
	(0.811)	(1.42)	(0.403)	(0.801)	(1.24)	(0.208)
ICRG	0.074	0.144*	0.047*	0.074	0.143*	0.045*
	(0.053)	(0.096)	(0.028)	(0.053)	(0.072)	(0.028)
Skill	0.164***	0.017	-0.103***	0.162***	0.046	-0.152***
	(0.053)	(0.083)	(0.025)	(0.051)	(0.081)	(0.043)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations		4605			2002	
Wald χ^2		785			565	
Correlation.						
ρ_{AG}		0.151*			0.117*	
		(0.087)			(0.057)	
ρ_{AE}		-1.003***			-0.926***	
		(0.084)			(0.065)	
ρ_{GE}		-0.457***			-0.459***	
		(0.079)			(0.039)	
LR test of		376			318	
indep. of eq.		(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, country, and industry fixed effects.

and *Affworld* as indicators of bargaining strength. This result implies that large and experienced firms may not be as severely affected by trade costs as small firms. Falling trade costs encourage cross-border M&As conducted by small firms with less bargaining power more compared to large and experienced firms with stronger bargaining positions.

As trade costs change Swedish MNEs with a single foreign affiliate are more likely to be severely affected. Multi-affiliate MNEs 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 prone to changes in trade costs. In short, both knowing the local conditions and the degree of multinationality matter for how profound the effect of trade costs will be on the mode of

entry.

Table 7 reports the same specifications using *Distance* as the measure of trade costs. From the table it is observed that all foreign expansion strategies decline in trade costs. It is probably because distance is not only a measure of transportation costs but also a measure of degree of information transfers, establishment of trust and cultural difference across countries. Sign and significance of the other variables are similar to the ones in Table 6.

Next, I turn my attention to investments in OECD countries as Swedish MNEs mainly invest in developed countries which also have lower tariff rates than average country. Swedish MNEs invest in nearby developed countries because they have lots of potential M&A targets, and these countries just happen to have low trade costs cross-sectionally. Even though there are country-level regressors to control for level of development of a country and country fixed effects in previous estimations, a more compelling experiment is to restrict the sample to these nearby countries only to avoid potentially spurious results. The first three columns of Table 8 reports these results. Notice that results are robust.

As a final robustness exercise, I restrict the sample to the subset of firms that are present in the whole sample. This would deal with two issues – those who drop out to become purely exporters and those who join the sample during it. Although this exercise limits a lot of the time series variation in the sample, conclusions are similar or even stronger.

6 Conclusion

This paper is an endeavour to find an answer to the apparent conflict between the standard FDI theory and recent trends. Standard theory predicts less foreign expansion the lower the trade costs. However, 1990s were an era of rapid trade liberalization and intensely growing FDI. Standard theory does not differentiate between entry modes whereas newly emerging IO inspired theories underline asymmetries and heterogeneity inherent in FDI. One such asymmetry is the differential impact of trade costs on modes of foreign expansion, the central thrust of the current paper.

In this paper, I attempt to disentangle the tariff effects on entry mode decision by carrying out an empirical analysis with rich, firm-level data on the activities of Swedish MNEs around the globe in manufacturing sectors from 1987 to 1998. Two hypotheses emerge from a simple theoretical framework. Cross-border M&As and exporting are encouraged by falling trade costs and a higher bargaining power measured by host country and global experience dampens the impact of trade

costs on entry modes.

The panorama of the results presented in the previous section shows the following: (i) There is almost no evidence of tariff-jumping foreign entry when different entry modes are not ignored. (ii). Trade liberalization increases the likelihood of cross-border M&As as conjectured by recent studies. (iii). Cross-border M&As and exporting respond in the same way to changing tariffs yet interestingly M&As are even more severely affected by changes in trade costs than exports. (iv) International experience dampens the effect of trade costs on the mode of entry.

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Appendix

Table A1: List of industries

RIIE Code	Industry
	Manufacture of food and beverage
1.1	Food manufactures
1.2	Beverage manufactures
	Textile, apparel, and leather
2.1	Textiles
2.2	Apparel
2.3	Leather and footware
11.3	*Furniture*
11.2	*Wood and wood products (excluding furniture)*
	Manufacture of paper and paper products
3.1	Pulp and paper
3.2	Paperboard and fine paper
4.0	Paper products
	Manufacture of chemicals, plastic products, and petroleum
5.4	Petroleum refineries and manufacture 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	*Non-metallic mineral products (except products of petroleum and coal)*
	Basic metal industries
6.1	Iron and steel basic industries
6.2	Non-ferrous metal basic industries
	Manufacture of fabricated metal products (except machinery and equipment)
7.1	Tools
7.2	Metal constructions
7.3	Other fabricated metal products (except machinery and equipment)
8.1	*Office machines and computers*
	Manufacture of non-electrical machinery and equipment
8.2	Machinery for agriculture and forestry, machine tools and other special machinery
8.3	Other non-electrical machinery, weapons, and ammunition
	Electrical machinery, apparatus, appliences, and supplies
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	*Professional, scientific, measuring and controlling equipment, optical products*
	Manufacture of transport equipment
10.1	Motor vehicles
10.2	Other transport equipment
15.0	*Other manufacturing*

Table A2: Summary statistics

	Units	Observations	Mean	Standard Deviation	Minimum	Maximum
M&As	number	8994	0.031	0.173	0	1
GF	number	8994	0.009	0.093	0	1
EX	number	8994	0.375	0.484	0	1
Tariff	number	6074	0.083	0.076	0	0.843
Distance	in thousands of kms	8994	4.66	4.42	0.4	17.0
R&D Intensity	number	8673	0.021	0.034	0	0.262
Affhost	number	8994	0.118	0.646	0	14
Affworld	number	8994	6.14	15.2	1	125
Firmsize	in thousands	8994	5.17	16.2	0.044	150
GDP	in trillions of USD	8923	0.741	1.44	0.008	8.79
GDP/capita	in thousands of USD	8923	16.3	11.1	0.426	39.0
Open	number	8816	0.611	0.383	0.110	2.93
Tel	per one million people	8923	0.378	0.189	0.022	0.684
ICRG	number	8554	6.31	1.58	1.58	8.76
Skill	percentage	8376	2.91	1.25	0.437	6.33

Table A3: Correlation table

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) *M&As*	1.000														
(2) *GF*	-0.019	1.000													
(3) *EX*	-0.184	-0.088	1.000												
(4) *Tariff*	-0.056	-0.011	-0.202	1.000											
(5) *Distance*	-0.083	-0.027	-0.233	0.338	1.000										
(6) *R&D Intensity*	-0.006	0.075	0.179	-0.087	0.008	1.000									
(7) *Affhost*	0.209	0.019	0.094	-0.065	-0.049	0.060	1.000								
(8) *Firmsize*	0.155	0.117	0.148	-0.053	-0.001	0.304	0.279	1.000							
(9) *Affworld*	0.223	0.083	0.076	-0.025	0.007	0.084	0.461	0.623	1.000						
(10) *GDP*	0.086	0.043	0.069	-0.053	0.111	0.000	0.154	-0.003	-0.004	1.000					
(11) *GDP/capita*	0.100	0.030	0.316	-0.366	-0.367	-0.003	0.114	-0.001	-0.003	0.371	1.000				
(12) *Open*	-0.039	-0.029	0.009	-0.168	-0.421	0.012	-0.050	0.002	0.015	-0.425	0.115	1.000			
(13) *Tel*	0.079	0.019	0.283	-0.499	-0.351	0.002	0.105	-0.001	0.003	0.278	0.844	0.089	1.000		
(14) *ICRG*	0.042	0.022	0.186	-0.333	-0.095	0.027	0.114	-0.013	0.011	0.285	0.640	0.195	0.679	1.000	
(15) *Skill*	0.011	0.000	0.103	-0.342	0.120	0.007	0.064	-0.006	-0.0016	0.343	0.471	-0.038	0.695	0.504	1.000