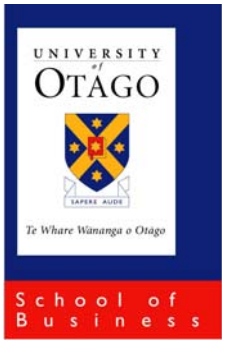

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Asset Ownership and Foreign-Market Entry[1]

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Abstract

This paper examines the link between a firm's owership of productive assets and its choice of foreign-market entry strategy. We find that, controlling for industry- and country-specific characteristics, the most productive firms (*i.e.*, those owning the most assets) will enter through greenfield investment, less productive ones will choose M&A, and the least productive ones will export. In addition, the most productive firms are shown to prefer whole ownership to a joint venture. These predictions are confirmed in an econometric analysis of Japanese firm-level data.

JEL-Classification: F12, F15.

Keywords: Foreign direct investment, merger and acquisition, joint venture, greenfield investment, firm heterogeneity, productivity

1 Introduction

This paper examines which strategy a firm will use to enter a foreign market: exporting, merger and acquisition (M&A), or greenfield investment (through either a wholly owned subsidiary or a joint venture). We construct a model linking this choice to observable firm characteristics, including asset ownership and total factor productivity, as well as to industry- and country-level determinants, and carry out an econometric analysis using data on Japanese manufacturing firms to test the model's predictions. Our data set is uniquely suited for this task in that it allows us to distinguish between different foreign direct investment (FDI) and ownership modes and also has enough detail on parent companies to enable us to study the impact of firm-specific variables.

Our analysis is motivated by two empirical observations. First, both FDI modes—greenfield and M&A—as well as both ownership modes—wholly owned subsidiary and joint venture—are empirically important. In our data on Japanese manufacturers, for example, which spans the period 1985 to 2000, greenfield investment into wholly owned subsidiaries accounts for 44.1% of investment projects, greenfield investment into joint ventures for 38.6% and M&A for 17.3%.[1]

These market-entry options are seen by the firms themselves and by the public as quite distinct strategies with very different implications, for instance, for market structure and competition (see UNCTAD, 2000, p. 161). Moreover, these decisions are likely to be interdependent. For instance, whether a firm will choose FDI over exporting may depend on how profitable it expects greenfield investment or M&A to be. Whether a firm would choose M&A and how much it would offer to pay a potential target firm will depend on how much it would expect to earn if it instead invested in a greenfield project or formed a joint venture with a local firm. This suggests

[1]Worldwide, cross-border M&As have become increasingly important over time, especially if one looks not at a count of investment projects but at their value. Global cross-border M&As in value terms have replaced greenfield investment as the main mode of FDI over the past decade. In 1999, for instance, the value of cross-border M&As amounted to 80% of total world FDI flows (UNCTAD, 2000, p. xx). World cross-border M&A sales peaked at $1.14 trillion in 2000 (UNCTAD, 2004, p. 411).

that one should not examine the determinants of the different decisions in isolation, but rather as part of a more comprehensive decision-making process. In particular, one should investigate empirically whether these decisions are interdependent and, if they are, what the relevant sequential structure of the decision-making process is.

Second, we observe that the choice of market-entry strategy varies both across and *within* industries with respect to underlying characteristics of the parent company, such as total assets and total factor productivity. In particular, a look at the mean size (measured by total assets) of the firms choosing different entry strategies reveals that the largest firms in our sample choose greenfield investment; among those the biggest ones choose wholly owned subsidiaries, whereas firms of intermediate size choose joint ventures. Smaller firms choose M&A, and the smallest firms export (more on this in the section on descriptive statistics and in Table 3).

To see whether the apparent relationship between asset ownership and market entry mode is indeed systematic and statistically significant, we have to control for other potential determinants of the market-entry mode. For this purpose we construct a model, in which firm-specific influences interact with industry- and country-level influences to determine the entry-mode choice. In the model, a firm first chooses between exporting and FDI, and then—in case of FDI—between greenfield investment and M&A. Finally, if it has chosen greenfield investment, the firm has to decide between whole ownership of its subsidiary or a joint venture with a local firm. The trade-off between exporting and FDI is the classic trade-off between reducing exporting costs (through FDI) and taking advantage of scale economies (through exporting). Acquiring the assets of a foreign competitor through M&A may raise productivity, but has the potential disadvantage relative to greenfield FDI of weakening the merged firm's competitive position vis-a-vis its rivals. If the firm forms a joint venture, it benefits from the assets contributed by its joint venture partner but, unlike in the case of whole ownership, cannot fully capture the benefits of its own assets. We show that these trade-offs vary with the amount of productive assets that the firm owns. This allows us to generate testable predictions regarding the firm's market-entry decision

that we then take to the data.

The contribution of our paper is twofold. First, we offer a more comprehensive treatment of firms' market-entry options than previous studies, and we provide empirical evidence that this treatment really matters. For instance, we find that the choice between greenfield FDI and M&A indeed depends on the profitability of the ownership modes (whole ownership versus joint venture), and that our sequential model of market-entry decisions provides a better fit with the data than alternative specifications. The literature has typically concentrated on the choice between just two of the market-entry options. There is, for example, a large literature on the choice between FDI and exporting, relating this choice to industry and country-level determinants, such as, transport costs, scale economies, market size or factor endowments (see Markusen (2002) for a survey). There is also a small but growing literature on cross-border mergers. Theoretical models of horizontal cross-border mergers are provided by Bjorvatn (2004), Horn and Persson (2001) and Neary (2003), among others. Nocke and Yeaple (2004) build a theoretical model of international mergers, in which firms trade assets in an international merger market. Iranzo (2004) and Tekin-Koru (2004) examine empirically the choice between greenfield investment and M&A. Another empirical paper, Bertrand *et al.* (2003), studies the location of cross-border M&As. The literature on international joint ventures has tended to focus on identifying factors determining their success or failure (see Caves, 1996). Interesting exceptions are Asiedu and Esfahani (2001) and Desai, Foley and Hines (2002) who investigate the ownership choices of multinational firms; these two papers also provide a detailed survey of the joint venture literature.

Second, our paper is related to the rapidly growing literature on firm heterogeneity in international trade and investment (see, *e.g.*, Melitz (2003), Yeaple (2003) and Helpman *et al.* (2004)). The specific contribution of our paper is that we do not only link the FDI-versus-exporting choice to parent characteristics (as has recently been done, for instance, by Girma *et al.* (2005) for firms in the UK, and by Head and Ries (2003) for Japanese multinationals), but also the choice between greenfield FDI and M&A, and between whole ownership and joint venture. In addition, we are able to control for a

much wider range of parent characteristics than most previous studies.

The rest of the paper is organized as follows. In Section 2, we present the theoretical framework. In Section 3, we analyze the equilibria of the model and summarize the testable predictions. Section 4 presents the descriptive statistics, Section 5 contains the empirical analysis, and Section 6 concludes. The Appendix provides a proof and a detailed description of the data.

2 The Model

In this section we develop a simple model of horizontal integration, that is, we consider a firm that wants to sell the same good abroad that it produces at home. This allows us to be clear about the interaction of firm-, industry- and country-specific determinants of the firm's strategies without having to consider the additional issue of horizontal versus vertical motives for these choices. This focus is also justified by the stylized facts: The World Investment Report (UNCTAD, 2000, p. 101) finds that around 70% of cross-border M&As are of the horizontal and less than 10% of the vertical type, the remainder being classified as conglomerate. Among the main motives for the choice of cross-border M&As are gaining market power, taking advantage of scale economies and acquiring assets (*ibid*, p. 143). The report (*ibid*, p. 127) also finds that industries characterized by significant M&A activity have typically experienced rising concentration ratios.

These stylized facts suggest that our model should have two key ingredients, namely imperfect competition and an explicit role for productive assets. We take this into account by considering the market-entry decisions from the point of view of a firm that wants to establish a foothold in a market where it faces Cournot competition. In this respect the model draws on the industrial organization literature on horizontal mergers and joint ventures, including the work of Perry and Porter (1985), Salant, Switzer, and Reynolds (1983), and Yi (1998). We also assume that firms own productive assets, *e.g.*, technology, management skills, specialized intermediate inputs, that determine their productivity (see, for instance, Farrell and Shapiro, 1990). If a firm chooses exporting or establishes a wholly-owned subsidiary, it has to rely on

its own assets. M&A implies that the firm acquires the assets of a local target firm and combines them with its own assets. If two firms form a joint venture they, too, share their assets, but remain independent in other decisions, specifically their choice of output.

We denote the home country by h and the host country by f, and assume that markets in the two countries are segmented. The relevant market for our analysis is the one in f, and we assume that quasi-linear preferences give rise to a linear inverse demand function $p = a - bQ$, with p denoting the equilibrium price for an aggregate supply of Q. When the home firm enters f it faces Cournot competition from a fixed number $n-1$ of incumbents. We will label the home firm as firm 1 and the local firms as firms $2, ..., n$. Hence $Q = \sum_{i=1}^{n} q_i$, where q_i is the output of an individual firm. The marginal cost of production of firm i when it produces in country $j = h, f$ is given by $c_{ij} \equiv w_j - \alpha_i$, where w_j denotes the country-j wage and α_i represents the firm's assets. Hence, the more assets a firm has the more efficient or productive it is. If the home firm serves f through exports from its home-country plant, an additional unit trade cost of size t arises. We assume that $t < (a - n(w_h - \alpha_1) + \sum_{i=2}^{n}(w_f - \alpha_i))/n$ so that the profit from exporting is positive. Building a plant in the foreign country in the case of greenfield investment involves a sunk cost F.

If the home firm wants to acquire a local firm (and its production plant), it makes a take-it-or-leave-it offer that the latter accepts or rejects. After the merger, the two firms combine their assets and the home firm decides how much output to produce in the acquired plant. We refer to the acquisition target as firm 2 and to the merged firm as firm 1.[2] How well the assets of the two firms complement each other is measured by a parameter $\gamma \leq 1$. In particular, we let the marginal cost of the merged firm be given by $w_f - \gamma(\alpha_1 + \alpha_2)$. If $\gamma = 1$, the assets of the two firms complement each other perfectly; if $\gamma < 1$, some of the assets overlap or are otherwise difficult to

[2]Modelling the search for an acquistion target, sequential offers to different targets, or competition between multinationals for the same target is beyond the scope of the current paper, but would appear to be worthwhile extensions.

combine.[3]

Once the home firm has paid the sunk cost of F to establish a greenfield presence, it may operate a wholly owned subsidiary or offer to enter into a joint venture with a local partner (firm 2).[4] There are many reasons why firms may enter into a joint venture. A key benefit is that a joint venture allows the two firms to share assets, for instance, by exchanging technology and marketing know-how, sharing R&D or specialized inputs, while remaining independent in other respects. We assume specifically that the joint venture partners continue to choose output independently. A key problem arising in joint ventures is how the partners are compensated for the assets they contribute, especially if it is difficult to determine *ex ante* the value of specific assets, such as technology, R&D or specialized inputs, that the partners will share. The value of the assets contributed by each partner may also be unverifiable to outside parties *ex post* and hence non-contractible. We capture this in a simple way, namely by assuming that there are no (side-) payments between the joint venture partners *ex ante* and that both partners benefit equally from the assets contributed. The marginal cost of partner firm $i = 1, 2$ in a joint venture hence is $w_f - \gamma(\alpha_1 + \alpha_2)$, where for simplicity we have selected the same parameter γ as in the merger case to capture the degree of complementarity between assets.

The overall decision-making process can be represented by the following sequential game: in stage one, firm 1 chooses between exporting and making a take-it-or-leave-it offer to acquire firm 2. In stage two, firm 2 decides whether to accept or reject the offer. If it rejects the offer, we come to stage 3, in which firm 1 chooses whether to invest greenfield. In stage 4, if it has selected greenfield investment, the firm may choose between whole ownership or making a joint-venture proposal to firm 2. In stage 5, firm 2 has the option of accepting or rejecting this proposal. In stage 6, all firms choose

[3]Note that we could also accomodate the case where $\gamma > 1$. Another reasonable extension would be to assume that after the merger firm 1 is less efficient at using the assets of firm 2 than that firm on its own. In this case we would have $c_{1f} \equiv w_f - \gamma(\alpha_1 + \beta\alpha_2)$ for $\beta \leq 1$.

[4]The assumption that F is paid by the home firm is made for simplicity; not much would change, if we assumed that this cost was shared by the joint venture partners.

output noncooperatively. Note that in this setup, firm 1 can always make an unacceptably low merger offer to firm 2, if it prefers greenfield investment or a joint venture. Hence moving the M&A decision to stage 2 does not reduce firm 1's choices, but allows us to make explicit that greenfield investment, either through a wholly owned subsidiary or in the form of a joint venture, is firm 1's outside option if firm 2 refuses the acquisition offer.

3 The Equilibrium Market Entry Strategy

In this section, we characterize the subgame perfect equilibria of the game and derive predictions about the firm's choice of market-entry strategy. Solving the game backwards, we begin with the choice of ownership mode (whole ownership versus joint venture) in the case of greenfield investment, and then move to the investment mode (greenfield vs. M&A), assuming that the firm does not want to export. We then turn to the decision of whether to choose FDI or exporting.

3.1 Whole Ownership versus Joint Venture

Greenfield investment implies that firm 1 makes an investment in the host country at a cost of F. All n firms hence have plants in the host country. If firm 1 operates a wholly owned subsidiary, denoted by the superscript W, Cournot competition implies that a firm i facing firm j $(i, j = 1, 2)$ and rivals $3, \ldots, n$ produces output

$$q_i^W = \frac{A + n\alpha_i - \alpha_j}{(n+1)b}, \tag{1}$$

and earns a profit—in the case of firm 1 gross of the investment cost— of

$$\Pi_i^W = \frac{(A + n\alpha_i - \alpha_j)^2}{(n+1)^2 b}, \tag{2}$$

where $A = a - w_f - \sum_{k=3}^{n} \alpha_k$.

In case of a joint venture, denoted by the superscript J, the market structure does not change as all firms remain independent. The equilibrium output of firm $i = 1, 2$ is

$$q_i^J = \frac{A + (n-1)\gamma(\alpha_1 + \alpha_2)}{(n+1)b}, \tag{3}$$

and the equilibrium profit—again gross of the sunk investment cost—is

$$\Pi_i^J = \frac{(A + (n-1)\gamma(\alpha_1 + \alpha_2))^2}{(n+1)^2 b}. \tag{4}$$

If firm 1 can obtain a positive profit under both investment options, *i.e.*, $\min\{\Pi_1^W, \Pi_1^J\} \geq F$, then a comparison between (2) and (4) reveals that firm i prefers a joint venture with firm j to remaining independent if

$$\alpha_j \geq \frac{n - (n-1)\gamma}{1 + (n-1)\gamma}\alpha_i. \tag{5}$$

That is, a joint venture is attractive for firm i, if partner firm j has sufficient assets relative to its own assets so that the partners are not too asymmetric. The reason for this is the following: a joint venture allows both partners to reduce their costs and take market share away from the other firms; at the same time, the joint venture partner with fewer assets experiences a larger drop in its marginal cost and hence gains market share relative to the partner with more assets. Hence if firm i has a lot more assets than firm j, a joint venture would mean that it would lose more market share to firm j than it can gain from the $n-2$ other firms, making the joint venture an unattractive option. Firm 1's choice is illustrated in Figure 1, where a joint venture is the preferred option (and acceptable to firm 2) in region J*, and a wholly owned subsidiary in region W*. Note from (5) that for region J* to be non-empty we require that $\gamma > 1/2$.

The choice between whole ownership and joint venture also depends on market structure, since for $\gamma > 1/2$ the right-hand side of (5) is decreasing in n. That is, the smaller is n (and hence the more concentrated is the industry), the more assets firm j has to have in order to make the joint venture attractive for firm i. Joint ventures are hence less likely relative to whole ownership in concentrated industries.

[Insert Figure 1 about here]

3.2 M&A versus Greenfield Investment

In case of a merger, denoted by the superscript M, the merged firm competes with $n-2$ independent firms. Its equilibrium output is

$$q_1^M = \frac{A + (n-1)\gamma(\alpha_1 + \alpha_2)}{nb}, \tag{6}$$

and its equilibrium profit, gross of the acquisition price, is

$$\Pi_1^M = \frac{(A + (n-1)\gamma(\alpha_1 + \alpha_2))^2}{n^2 b}. \tag{7}$$

The acquisition price of a successful merger depends on the choice firm 1 would make if firm 2 turned down its offer. Suppose that $\Pi_1^J \geq \Pi_1^W$, so that firm 1 would propose a joint venture in case firm 2 rejected the merger offer. In this scenario, firm 2 would have to be offered an acquisition price of at least Π_2^J, namely the profit firm 2 would receive by rejecting the offer. If, on the other hand, $\Pi_1^J < \Pi_1^W$, firm 2 would have to be paid a price of Π_2^W.

Under which circumstances would firm 1 prefer a greenfield investment to a merger? We start with the case where $\Pi_1^J \geq \Pi_1^W$. This puts us in area J* of Figure 1. Firm 1 prefers a joint venture to a merger, if $\Pi_1^J - F \geq \Pi_1^M - \Pi_2^J$, or

$$\frac{(A + (n-1)\gamma(\alpha_1 + \alpha_2))^2}{(n+1)^2 b} - F \geq \frac{(A + (n-1)\gamma(\alpha_1 + \alpha_2))^2}{n^2 b} - \frac{(A + (n-1)\gamma(\alpha_1 + \alpha_2))^2}{(n+1)^2 b},$$

or, still simpler,

$$\frac{(n^2 - 2n - 1)(A + (n-1)\gamma(\alpha_1 + \alpha_2))^2}{n^2 (n+1)^2 b} - F \geq 0. \tag{8}$$

Whether this inequality is satisfied depends on firm-specific characteristics (assets of the potential partners, degree of complementarity), industry-specific factors (sunk investment cost, market structure), and country-specific factors (market size, wage costs). A joint venture is attractive to firm 1 compared with a merger, *ceteris paribus*, if the potential partners have relatively large assets, the sunk cost of investment is low, and the assets of the potential

partners are good complements (large γ). This is due to the so-called merger paradox: the merged firm has an incentive to produce less output than the two merging firms did prior to the merger, thus losing market share to the independent rivals and making the merger unprofitable in the absence of cost savings. By contrast, the joint venture partners have no such incentive, as they continue to choose output independently. The cost advantage offered by sharing assets thus leads to a larger profit increase for the joint venture. This advantage of the joint venture becomes more pronounced the more assets the firms have (or the better the complementarities). If the assets are sufficiently large, this will offset the sunk cost of investment associated with the joint venture. Ceteris paribus, a bigger market (smaller b) and a lower host country wage (larger A) make a joint venture more attractive relative to a merger.[5]

We can illustrate the choice between joint venture and merger in Figure 2. This Figure reproduces Figure 1, except that in region J* we have added a curve representing (8). This curve is a straight line with a slope of (-1). In the region below this curve (now labelled region M_1), firm 1 chooses M&A; in the region above the line, now labelled J, firm 1 chooses the joint venture (formally by making an unacceptably low merger offer to firm 2 that the latter rejects).

[Insert Figure 2 about here]

Next, consider the case where $\Pi_1^J < \Pi_1^W$. This puts us in area W* of Figure 1. Firm 1 will choose a wholly owned greenfield investment rather than a merger, if $\Pi_1^W - F \geq \Pi_1^M - \Pi_2^W$. This inequality can be rewritten as as $\Pi_1^W + \Pi_2^W - F \geq \Pi_1^M$, or

$$\frac{(A + n\alpha_1 - \alpha_2)^2}{(n+1)^2 b} + \frac{(A - \alpha_1 + n\alpha_2)^2}{(n+1)^2 b} - F \geq \frac{(A + (n-1)\gamma(\alpha_1 + \alpha_2))^2}{n^2 b}. \quad (9)$$

Greenfield FDI is hence preferred if the joint profit of firm 1 and firm 2 under greenfield investment exceeds the profit of the merged firm. In the Appendix

[5]Note that the effect of market structure is ambiguous because a further rival will not only increase n but also alter A (see (8)), and thus the size of the entrant's assets are crucial. This holds also true for subsequent comparisons of entry modes.

we show that if we start at any point where $\alpha_1 = \alpha_2$ and increase α_1 by an amount $\Delta\alpha_1$, we have to reduce α_2 by more than $\Delta\alpha_1$ if firm 1 is to be indifferent between greenfield FDI and M&A.[6] That is, the indifference curve between greenfield investment and M&A must lie everywhere below a line with a slope of -1. This implies that for sufficiently large assets firm 1 prefers wholly owned greenfield FDI to M&A. This result is illustrated in Figure 2, where the region labelled M_2 represents the parameter values for which firm 1 will choose M&A; in region W, it will opt for greenfield investment.

The choice between merger and a wholly owned greenfield investment is also affected by the other parameters of the model. An increase in host-country market size (lower b) makes greenfield FDI more attractive as does a lower F and a smaller γ. The impact of a reduction in the host-country wage (higher A) is ambiguous. In particular, we have

$$sign\left\{\frac{\partial(\Pi_1^W + \Pi_2^W - \Pi_1^M)}{\partial A}\right\} = sign\left\{(n^2 - 2n - 1)A + (n-1)(\alpha_1 + \alpha_2)(n^2 - \gamma(n+1)^2)\right\}.$$

The derivative is positive if A is sufficiently large and/or γ is small; in this case, a reduction in the host-country wage makes greenfield investment more likely relative to M&A.

3.3 FDI versus Exporting

Finally, we consider the home firm's choice between investing in the host country, either through greenfield investment or M&A, and supplying the host market through exports from its home plant. If firm 1 exports to the host country—we denote this case by the superscript E—it produces

$$q_1^E = \frac{A + n\alpha_1 - \alpha_2 - n(w_h - w_f + t)}{(n+1)b}, \tag{10}$$

and earns a profit of

[6] We can see this less formally in (9): if we raise α_1 and lower α_2 by the same amount, the right-hand side remains unchanged. The left-hand side increases, since the profit function is convex in the firm's assets; that is, the increase in firm 1's greenfield profit is bigger than the fall in the take-over price (firm 2's greenfield profit).

$$\Pi_1^E = \frac{(A + n\alpha_1 - \alpha_2 - n(w_h - w_f + t))^2}{(n+1)^2 b}. \tag{11}$$

To determine the firm's choice between FDI and exporting, we have to compare Π_1^E with $\max\{\Pi_1^M, \Pi_1^W - F, \Pi_1^J - F\}$. We illustrate this trade-off by assuming that the firm's preferred investment mode is a wholly owned greenfield subsidiary. In this case the firm chooses FDI, if $\Pi_1^W - F \geq \Pi_1^E$, or

$$\frac{(A + n\alpha_1 - \alpha_2)^2}{(n+1)^2 b} - F \geq \frac{(A + n\alpha_1 - \alpha_2 - n(w_h - w_f + t))^2}{(n+1)^2 b}. \tag{12}$$

This inequality is more likely to hold, if firm 1 has a large amount of assets (large α_1), the host market is large (small b), the home country wage is high relative to that in the host country, the transport cost is large, and the sunk cost of investment is small. Similar predictions are obtained if the firm's preferred investment strategy is M&A or joint venture.

3.4 Testable Predictions

Before turning to the empirical part of the paper it is convenient to summarize the testable predictions of the model concerning the investment strategy and the choice between exporting and FDI. Figure 2 helps us summarize the model's predictions regarding the choice of investment strategy. For a given α_2 we see that the home firm's choice of FDI mode depends on the amount of assets it has. If it has few assets, it will want to choose M&A. If it has a lot of assets, it will opt for greenfield FDI. A large host market and low host wage both favor greenfield FDI (both wholly owned and joint venture) over M&A. The choice between whole ownership and joint venture is determined by the firm's assets relative to those of the potential partner and by market concentration. If the firm has a lot of assets compared to a potential partner, it will prefer whole ownership. Whole ownership is also preferred if the industry is concentrated.

The choice between FDI and exporting is determined by the firm's assets (bigger firms tend to choose FDI) and by industry- and country-specific factors. In particular, FDI is selected, if the host market is big, the host wage

is low compared to the one at home, the transportation cost is high and the sunk investment cost is small.

4 Data and Descriptive Statistics

Our data set consists of Japanese foreign direct investments in 21 developed countries during the period 1985 to 2000.[7] We restrict our sample to investments in developed countries for two reasons: First, we only consider host countries that did not impose local ownership requirements, *i.e.*, rules typically forcing foreign investors into joint ventures with local partners. This eliminates many developing countries, simply because they impose such requirements. Second, we want to be consistent with our theoretical analysis which concentrated on horizontal investment—and this type of investment takes place mostly between developed countries.[8]

Table 1 details the 759 investments that comprise this study. 285 Japanese manufacturing multinational enterprises (MNEs) were responsible for 578 investments into manufacturing affiliates, for an average of 2 investments per parent firm. Wholly owned subsidiaries accounted for over 44% of all manufacturing affiliates, with joint ventures and M&As totaling 39% and 17%, respectively. Since we do not have destination-specific export data for our sample firms, we cannot directly observe which firms supplied our sample of host countries through exporting. However, we are able to determine which Japanese manufacturers have established wholesale/retail affiliates in a particular country. We let these firms represent the exporters in our sample, although we realize that there are exporters that use independent distributors to sell their products abroad, for instance, by going through a trading company within the same keiretsu (*i.e.*, business group).[9] The sample contains 181 wholesale and retail affiliates established by 100 Japanese MNEs,

[7]See the Appendix for a detailed description of the data and data sources.

[8]Most of the cross-border M&A activity in the world takes place between developed countries. Between 1988 and 2003, the ratio of cross-border M&As between developed countries to world cross-border M&As never dropped below 77%, reaching a peak in 1988 at over 97% (UNCTAD, 2004, p. 411).

[9]We do, however, control for keiretsu membership.

and none of these firms have manufacturing affiliates in the sample countries.

In regard to investment location, a majority of the manufacturing affiliates in our sample were established in the UK (144 investments), France (72), Germany (68), and Canada (54). M&A investments were primarily located in the UK (30% of M&A investments), France (16%), and Germany (13%), while greenfield investments (both wholly owned and joint ventures) are more evenly spread throughout the sample countries. Over one-third of the wholesale/retail affiliates were established in Germany (64 investments), with a majority of the remaining affiliates located in the UK, France, and the Netherlands.

[Insert Table 1 about here]

Our model suggests that firm-level characteristics—specifically the amount of "productive assets" a firm owns—have an influence on the choice of entry strategy. We observe several parent-specific characteristics that we can use to proxy for a firm's "productive assets", including the firm's total assets (*Size*), and total sales (*Sales*). Other parent-specific characteristics, such as market capitalization (*MktCap*), R&D intensity (*R&D*), global export percentage (*Export%*), age (*FirmAge*), and keiretsu membership (*KrtsuMem*), appear less suitable for this purpose, but can serve as further controls.

In the model, the ownership of productive assets directly translates into productivity. This suggests that the firm's total factor productivity may be an even better proxy for asset ownership. We are able to calculate two measures of a firm's TFP: "Approximate Total Factor Productivity" (*ATFP*) using the approach of Grilliches and Mairesse (1990), and "Levinsohn-Petrin TFP" (*TFP*) following Levinsohn and Petrin (2003).[10] Table 3 gives the mean values for each of these variables across all Japanese parents, with each variable measured with a one-year lag from the investment date. Table 2 provides the correlation matrix of the major firm-specific characteristics. Note that *Size* and *Sales* are highly correlated (0.958), as are the *ATFP* and *TFP* measures (0.826), while *Size* and *Sales* also somewhat correlated with our

[10]Details are provided in the Appendix.

TFP measures. Relatively low pair-wise correlation exists between the remaining variables.

[Insert Table 2 about here]

As indicated at the top of Table 3 for the whole sample of firms, firms that establish wholly-owned subsidiaries tend to be larger (both in *Size* and *Sales*) than those engaging in joint ventures, and these in turn tend to be larger than firms that opt for M&A; the latter are bigger on average than firms that only export. The pattern looks somewhat different for the other firm-specific characteristics. For instance, firms establishing affiliates via M&A have the highest export ratio at the time of investment and tend to be older than firms establishing wholly-owned subsidiaries.

To determine whether the means of parent-specific characteristics differ significantly across firms choosing different investment modes, we perform an ANOVA analysis. Specifically we test the hypothesis that the mean values for each firm-specific characteristic are equivalent across each investment type. ANOVA is employed to avoid the increased likelihood of Type-I error associated with the use of multiple pairwise t-tests, although a drawback to ANOVA is that it cannot indicate which of the mean value(s) significantly differ(s) from the others. The top section of Table 3 reveals significant heterogeneity among the parent firms in regard to five characteristics (*FirmAge*, *Size*, *Sales*, *TFP*, *KrtsuMem*). However, since this heterogeneity may arise simply from the inclusion of the firms that only export, we re-ran the ANOVA tests only for parents with manufacturing affiliates. Here we find significant differences among the means in regard to *Size* and *Sales*, suggesting that the heterogeneity arising from firm age and keiretsu membership did result from the inclusion of the exporters.

To see whether the differences in investment patterns across firms are perhaps due only to inter-industry variation, we examined the three largest investing industries separately, namely chemicals and related products (based on U.S. *SIC 28*), industrial equipment and machinery (*SIC 35*), and electronic and electric equipment (*SIC 36*); see Table 3. The results from the

ANOVA analysis suggest that significant heterogeneity exists within industries. For the chemical industry, the choice of entry strategy appears to be significantly different depending on the firms' market capitalization and total assets. In both the industrial machinery and electronics industries, we find significant heterogeneity across nearly all firm-level characteristics, including *TFP*. To eliminate the influence of the export-only parents in the latter two industries, we again carried out an ANOVA analysis for only the manufacturing parents. The results confirm that there exists significant firm-level heterogeneity in the investment-mode choice of manufacturers.

[Insert Table 3 about here]

Our model suggests that we should also control for country-specific determinants, specifically market size. Therefore, we include as regressors several proxies for the host's market size, namely *GDP* and a Harris (1954)-type economic potential (*EconPotential*) measure. We also wish to control for country characteristics that influence the firm's choice, but do not explicitly appear in the model, including corporate taxes, the supply of potential M&A-target firms (or JV partners), and exchange-rate effects that could affect the price of assets denominated in the local currency. The respective proxies are the average corporate tax rates (*TaxRates*), the host's market capitalization (*HostCap*), measured as the sum over all domestically incorporated companies of the share price times shares outstanding, and the Yen-local-currency exchange rate (*ExchRate*). Finally, to control for a firm's previous investment experience, we create variables indicating a firm's previous manufacturing investment into each host (*PrevFDIHost*) as well as its manufacturing investment history over the whole sample of countries (*PrevFDISmpl*). We must also account for those investment influences that do not have specific controls, for instance, the degree of market concentration and wage rates. Thus, we create dummy variables for each host, each affiliate industry, and for each year of the sample.

5 Empirical Framework and Results

Our theoretical framework suggests that a firm faces a sequential decision problem, where it first has to decide between FDI and exporting. If it opts for FDI, it has to choose between M&A and greenfield investment. If it decides to enter via greenfield investment, it faces the choice between a wholly owned subsidiary and a joint venture. The firm's choice at each stage obviously depends upon the profit associated with each alternative. We can write the profit for firm i $(i = 1, ...I)$ of choosing a particular market-entry strategy $j = 1, ..., J$ as

$$\Pi_j^{ikr} = X_j^i\beta + Y_j^k\phi + Z_j^k\varphi + W_j^r\lambda + \epsilon_j^{ikr}, \tag{13}$$

where X_j^i is a vector containing firm i's firm-specific characteristics, Y_j^k is a vector of host country's specific characteristics, Z_j^k is a vector of host-country dummy variables, W_j^r is a vector of industry affiliate dummies, and ϵ_j^{ikr} serves as the random component. Explanatory variables can vary over firm (i), host country (k), and the affiliate's industry affiliation (r). While this profit is generally unobservable, we do observe the firm's actual choice at each stage. That is, we can work with an indicator variable y_j^i that takes on the following values:

$$y_j^i = \begin{cases} 1 & \text{if } \Pi_j^i = \max\{\Pi_1^i, \Pi_2^i, ..., \Pi_J^i\}, \\ 0 & \text{otherwise.} \end{cases} \tag{14}$$

In a sequential decision structure the probability of firm i choosing a particular market-entry mode j will be determined as the product of the conditional probabilities at each decision stage. We denote the probability of a firm choosing strategy $f = 1, 2$ at stage 1 by P_f, where $f = 1$ denotes FDI, and $f = 2$ denotes exporting. The conditional probability of choosing strategy $m = 1, 2$ at stage 2 given that the firm has chosen FDI is P_{1m}, where $m = 1$ indicates greenfield investment, and $m = 2$ indicates M&A. Finally, at stage 3 the probability of selecting ownership mode $l = 1, 2$ conditional on the firm having chosen greenfield FDI is P_{11l}, where $l = 1$ stands for whole ownership and $l = 2$ for joint venture. Therefore, for example, the probability of entry through greenfield investment in a wholly owned subsidiary is $P_1^i * P_{11}^i * P_{111}^i$.

Our model is estimated sequentially via standard binomial logit estimation, providing consistent (although not efficient) parameter estimates.[11] We first estimate P_{11l} by obtaining coefficients on the parameters influencing the choice of ownership mode, assuming that the firm has chosen both to invest at stage 1 and establish a greenfield investment at stage 2. Empirical estimation employs the firm-, industry-, and country-specific characteristics that affect the firm's profit function as outlined in (13). Next, we estimate the probability of firm i choosing to invest via M&A or greenfield investment (P^i_{1m}) at stage 2. The decision to invest via greenfield FDI rather than M&A is based on the relative profitability of each strategy, given the choice of ownership mode determined at stage 3. We incorporate this stage-3 choice in our empirical estimation through the inclusive-value term INC^i_{11}, which represents the expected profit from choosing an ownership mode at stage 3. The inclusive value is computed as follows:

$$INC^i_{11} = \ln(\sum_{j=1}^{2} \exp(X^i_j\widehat{\beta} + Y^k_j\widehat{\phi} + Z^k_j\widehat{\varphi} + W^r_j\widehat{\lambda})), \tag{15}$$

where the coefficients $\widehat{\beta}$, $\widehat{\phi}$, $\widehat{\varphi}$ and $\widehat{\lambda}$ are obtained from the stage-3 regression.

The coefficient on the inclusive value is of particular interest in determining if the model is properly specified. If it takes a value of 0, the ownership modes (whole ownership vs. joint venture) are perfect substitutes and hence do not influence the choice of investment mode (greenfield or M&A). If the coefficient is estimated to be 1, stages 2 and 3 of the model collapse into a single-stage multinomial logit model (no tree structure necessary). Thus, the sequential structure is appropriate when the inclusive-value coefficient is significantly greater than 0, but significantly less than 1.

We then turn our attention to the first stage, where we estimate the

[11] We ruled out a conditional logit model (McFadden (1974)), since the error structure in this model assumes the independence of irrelevant alternatives (IIA). In the context of our model this would mean that the choice of market-entry strategy would have to be independent of changes to the set of possible choices. This is clearly not the case.

A nested logit estimation would have avoided violating the IIA assumption, since IIA would only have to hold at each stage but not across stages (see McFadden (1983) and Maddala (1983)). However, we cannot estimate a true nested logit model, since we cannot employ separate explanatory variables at each stage.

probability of firm i choosing FDI versus exporting (P_f^i). To account for the fact that the profitability of FDI depends on the second-stage choice between greenfield investment and M&A, we include in our regression the inclusive value term INC_1^i, whose value is derived from estimation of the second stage equation. The interpretation of the coefficient on the inclusive value is equivalent to the one presented for the stage-2 estimation.

5.1 Stage 3: Wholly Owned Subsidiary versus Joint Venture

We first turn our attention to stage 3 of the firm's investment tree—the choice between a wholly owned subsidiary (WOS) and a joint venture (JV). Thus, we pare the sample down to only those manufacturing affiliates that were established via greenfield investment. Table 4 provides the estimation results, where positive coefficients indicate an increased likelihood of WOS, while negative coefficients suggest an increased likelihood of JV. To save space, we do not report the coefficients on the industry, host-country, or time-specific dummy variables.

[Insert Table 4 about here]

Columns (1) and (2) are the base specification, with column (1) using *GDP* as a measure of host market size, while column (2) employs a Harris-type (1954) economic potential (*EconPotential*) indicator of market size. The estimation results reveal that, as suggested by theory, greater *TFP* increases the probability that a firm will choose WOS rather than JV. In addition, the greater a firm's export orientation (*Export%*) and the smaller the pool of possible JV partners (*HostCap*), the greater is the likelihood of entry via WOS.

In column (3) we proxy firm assets through total assets (*Size*) rather than *TFP*. Here larger firms are more likely to enter via WOS, while none of the other variables changes its sign or significance.[12] Column (4) incorporates

[12]We also analyze a firm's *Sales* as a measure of its firm-specific assets. Given the high pairwise correlation between *Size* and *Sales,* the results are nearly identical; thus, we leave

both *TFP* and *Size* as measures of a firm's assets. In this case, *Size* remains a significant positive determinant of WOS, while the *TFP* measure becomes insignificant. The inclusion of both measures does not affect the previously determined influences of *Export%* or *HostCap*, although now a firm's previous investment into that host (*PrevFDIHost*) makes JV more likely.

Finally, columns (5) and (6) use the alternative measure of a firm's TFP, *ATFP*. In column (5), when *ATFP* is the only measure of a firm's assets, its coefficient indicates a positive and significant effect on the probability of selecting WOS. When *ATFP* is combined with *Size*, as in column (6), the effect of *ATFP* is dominated by *Size*'s positive and significant effect on WOS.

The other firm-specific variables, such as a firm's keiretsu membership (*KrtsuMem*), age (*FirmAge*), market capitalization (*MktCap*), R&D spending (*R&D*), and the sum of previous total investments into the sample countries (*PrevFDISample*), do not significantly affect the choice of ownership mode. For the host- country variables, only the aforementioned *HostCap* is significant; the host's *GDP*, *EconPotential*, exchange rate with respect to the Yen (*ExchRate*), and tax rates (*TaxRates*) have no significant influence.

Summarizing the above results, we find that, as suggested by our theory, greater firm-specific assets (*TFP*, *ATFP*, *Size*) lead to increased likelihood of WOS as compared to JV. In addition, a greater number of potential JV partners increases the likelihood of JV. Like in our model, market size has no effect on the choice of ownership mode.

5.2 Stage 2: Greenfield Investment versus M&A

We now turn our attention to the second stage, the choice between greenfield investment (WOS or JV) and M&A. The regression results are provided in Table 5. A positive coefficient estimate indicates a greater likelihood of entry via M&A, while a negative coefficient estimate indicates an increased likelihood of entry via greenfield investment. To incorporate how the profits earned from greenfield investment in stage 3 affect the choice between green-

these unreported. Similar results, also not reported, occur when we replace *Size* with *Sales* in the first stage regressions discussed below.

field investment and M&A, we include in our estimation the inclusive values (INC^i_{11}) determined in the third-stage regressions.

[Insert Table 5 about here]

Columns in Table 5 are in the same format as in Table 4 above. In our base specifications (columns 1 and 2), increases in a firm's *TFP* value decrease the likelihood of entry via M&A as compared to greenfield investment. In addition, increased *R&D* expenditures and previous manufacturing investment in that host (*PrevFDIHost*) lead to a greater likelihood of investment via greenfield investment, whereas a higher sum of total manufacturing investment into the sample countries (*PrevFDISample*) leads to a greater likelihood of future M&A investment. In regard to the country-specific characteristics, the negative and significant coefficient on *ExchRate* indicates that a depreciation of the Yen reduces M&A activity as this raises the cost of merging with/acquiring a local company.

Replacing *TFP* with *Size* in the regression (column 3) does not change the estimation results, as larger firms are more likely to invest via greenfield investment than through M&A. In the regression with both *Size* and *TFP* (column 4), we find—similar to the third-stage regression—that the effect of *Size* dominates the *TFP* effect. If we use *ATFP* as the measure of firm specific assets (column 5), we find that although *ATFP* has the correct sign, its effect is insignificant. When both *ATFP* and *Size* are included (column 6), *Size* retains its significant influence on the likelihood of greenfield investment, as does the rest of the previously-determined significant investment influences.

Finally, in regard to the inclusive values, we note that in each regression, the inclusive values are significant and significantly different from both 0 and 1, suggesting that the sequential investment structure is appropriate for stages two and three of the decision tree.

5.3 Stage 1: FDI versus Exporting

Finally, we turn to the firm's first-stage decision, FDI versus exporting. Here, the dependent variable is assigned the value 1 in the case of FDI, and 0 in

case of exporting; therefore, positive coefficient values indicate an increased likelihood of FDI. Results from this set of regressions are provided in Table 6, and follow the same structure as the previous two tables. However, as we include firms in this stage that are only exporters, we drop the variables that account for previous manufacturing FDI experience (*PrevFDISample*, *PrevFDIHost*).

[Insert Table 6 about here]

We find that both measures of firm productivity (*TFP*, *ATFP*) have a positive and significant influence on the likelihood of FDI. The same is true if we substitute *Size* for *TFP*. Similar to the earlier stages, we observe that *Size* remains a significant determinant even when added to models with *TFP* or *ATFP*. Keiretsu membership and firm age are shown to be consistently positive influences on the likelihood of FDI across all model specifications.

Finally, in regard to the inclusive values, we note that the coefficients on these values are insignificant (not statistically significantly different from 0). Thus, while expected profits from the alternative ownership mode choices (WOS vs. JV) do affect the greenfield versus M&A decision, the investment mode choice (greenfield vs. M&A) is not a significant factor in determining whether the firm chooses to service the foreign markets through FDI or exporting.

5.4 Robustness Check

A problem with sequential models, as noted by Greene (2000), is the ad hoc partitioning of the choice set which may lead to results which might depend on the defined branches. Thus, even though we note significant inclusive values at the greenfield versus M&A decision stage, we wish to investigate whether or not our three-stage sequential model is robust to changes in the firm's decision sequence. For instance, it may well be the case that a firm does not view the investment decision as a three-stage sequence, as assumed in our model, but rather as a two-stage process, in which the first stage (FDI or exporting) remains the same, but the second and third stage are merged

into a single stage. In this new second stage, the firm would then choose between entry via M&A, WOS, or JV.

We estimate the second stage of this new model via a multinomial logit model. We then turn to the first stage to estimate the probability of firm i choosing FDI rather than exporting. The results of the second-stage estimation are reported in columns 1 to 3 of Table 7; those for the first stage in columns 4 to 6.

In stage 2 (columns 1-3), WOS serves as the base category for comparisons; a positive (negative) coefficient estimate in the M&A or JV columns indicates a higher (lower) likelihood of that particular entry mode as compared to WOS. To save space, we do not report the coefficients on the industry, host-country, or time-specific dummy variables.

[Insert Table 7 about here]

Each measure of a firm's assets (*TFP, ATFP*, *Size*) positively affects the likelihood of WOS relative to M&A. However, only firm *Size* positively increases the likelihood of WOS as compared to JV. This is a slight difference between the three-stage and two-stage models, as in the three-stage model, all three proxies for firm asset had a positive and significant effect on the WOS likelihood (albeit at the 10% significance level). Similar to the three-stage model, greater R&D investment leads to lower M&A likelihood, while increased export sales lead to a reduced likelihood of JV investment. Finally, we note similar effects of the *ExchRate* and *HostCap* variables on investment choices as well. The only notable difference between the two-and three-stage framework up to this point is the significance of the host's *TaxRates* on ownership choice. Here, a higher host country average corporate tax rate leads to greater likelihood of entry via WOS (as compared to both M&A and JV).[13]

Turning to the FDI versus exporting decision (columns 4-6), we note similar estimation results as compared to those determined in the three-stage

[13]The positive influence of taxes on the likelihood of WOS (as compared to JV) is consistent with findings by Desai *et al.* (2002). They argue that WOS gives firms greater freedom than JV to set internal transfer prices to ease their tax burden.

model (Table 6). All three asset measures (*TFP*, *ATFP*, *Size*) have a positive and significant influence on the likelihood of FDI. The same continues to hold for Keiretsu membership (*KrtsuMem*) and firm age (*FirmAge*). The inclusive values derived from the first stage are insignificant, as they were in the similar stage of the three-stage framework, suggesting that the investment/ownership choice is not a significant consideration in the FDI versus export decision.

As we have two competing models that both yield similar results (the larger the firm's assets, the greater the likelihood of WOS investment over the other possible market entry modes), we would like to investigate which model does a better job at explaining the data. While there is no well-defined testing procedure for discriminating among tree structures (Greene (2000)), we can nevertheless assess the relative goodness of fit of the two models via both the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC). To do so, we compare similar first-stage regressions in both the 3-stage and 2-stage models (*e.g.*, Column 2 in Table 6 with Column 4 in Table 7). Note that the only difference between each regression pair is the inclusive values derived from the estimations of the subsequent stage(s). In each and every case, both the AIC and BIC criteria yield lower values for the 3-stage models than the 2-stage models, suggesting that the 3-stage model is the preferred estimation model. Thus, while both the three-stage and two-stage frameworks produce similar estimation results, given its close relation to our theoretical set-up and the AIC/BIC criteria tests, we believe that the three-stage model is the better model in which to examine the market-entry decision.[14]

6 Conclusions

The paper examined how a manufacturer supplies goods to a foreign market. We represented this decision as a three-stage process. In the first stage, the

[14]We also analyze a single-staged multinomial logit model with four possible alternatives (M&A, WOS, JV, Exporting). Hausman tests indicate the IIA assumption fails in this set-up (test results are omitted for space considerations, but available from the authors). In addition, this model does not fit our theoretical framework as there is no outside alternative in case a firm's M&A offer is rejected.

manufacturer decides whether to export or to invest in the foreign country. In the second stage, the manufacturer chooses the investment mode: greenfield investment or M&A. If he opts for greenfield investment, the third-stage decision is whether to establish a wholly owned subsidiary or to form a joint venture with a local partner. We constructed a theoretical model to show how these choices are interrelated and how they are determined by firm-, industry- and country-specific variables. We then confronted the model with firm-level Japanese data and found that its main predictions were confirmed. In particular, we found that, controlling for industry- and country-specific factors, the more assets a firm has (or the higher its total factor productivity) the more likely it is to choose whole ownership rather than a joint venture, greenfield investment rather than M&A, and FDI rather than exporting. These results indicate that firm-specific characteristics play an important role in determining the pattern of FDI and that we hence should observe considerable heterogeneity in the investment and ownership mode choices of firms even within the same industry. This suggests that a consideration of firm-level determinants adds a significant new dimension to the FDI literature, that has traditionally relied only on industry- and country-specific factors to explain FDI patterns.

The selection of different firms within an industry into different investment and ownership modes should also be taken into account when analyzing the effects of FDI, for instance, on local firms, market structure and social welfare (see, for instance, Aitken and Harrison (1999)). For example, there is widespread public concern that cross-border M&As may be less beneficial than greenfield FDI or may even have negative effects on host-country welfare. M&As are often seen simply as a transfer of ownership, whereas greenfield FDI is perceived as adding to the capital stock of the host country and creating jobs. More importantly, M&As are seen as reducing competition in the host market (UNCTAD, 2000, p. 14, 15). A complete analysis of these issues is beyond the current paper. But clearly, any analysis must have as its basis a theory (with a solid empirical foundation) of why firms choose one strategy rather than the other. Our paper provides some guidance. In particular, since we see a tendency for the biggest, most productive

firms to choose greenfield FDI and for less productive firms to choose M&A, competition in the host country may be higher under greenfield FDI than under M&A. Notice that this effect goes beyond simply the market structure effect of having one more firm in the case of greenfield FDI. Rather, a more productive multinational in the case of greenfield FDI provides tougher competition for its local rivals. This has to be good for consumers, because the increase in competition leads to a lower equilibrium price. However, from this increase in consumer surplus we would have to subtract the profit that the multinational earns and potentially repatriates. In addition, the tougher competition under greenfield FDI means that local firms would lose market share, whereas they may gain market share under M&A. FDI in the form of greenfield FDI would hence hurt local firms, whereas M&A may benefit them.

7 Appendix

7.1 Proof

Here we prove that the indifference curve between greenfield FDI and M&A must lie everywhere on or below a line with a slope of -1. If we increase α_1 and reduce α_2 by the same amount, i.e., $d\alpha_1 = -d\alpha_2$, the right-hand side of (9) remains unchanged. To keep the left-hand side unchanged we require

$$\frac{d\alpha_2}{d\alpha_1} = -\frac{2(n-1)A + 2(n^2+1)\alpha_1 - 4n\alpha_2}{2(n-1)A + 2(n^2+1)\alpha_2 - 4n\alpha_1}. \tag{16}$$

Note that if $\alpha_1 = \alpha_2$, then $\frac{d\alpha_2}{d\alpha_1} = -1$. If $\alpha_1 > \alpha_2$, then the numerator of (16) is positive and $\left|\frac{d\alpha_2}{d\alpha_1}\right| > 1$. Hence starting at $\alpha_1 = \alpha_2$ and increasing α_1 by increments $d\alpha_1$ means that α_2 has to fall by more than $d\alpha_1$ to keep the left-hand side of (9) constant. As one continues to raise α_1, the denominator of (16) may become negative; this implies that the line representing the combinations of α_1 and α_2 for which the left-hand side of (9) stays constant first becomes vertical and then bends backward so that both α_1 and α_2 have to fall to keep the left-hand side of (9) the same. The indifference curve

between greenfield investment and M&A must have a slope that lies between -1 (the value that keeps the right-hand side of (9) unchanged) and (16).

7.2 Data

The FDI data employed in this study is compiled from several issues of Toyo Keizai Inc.'s *Kaigai Shinshutsu Kigyo Soran*. This data set provides the date and location of initial investment into (or acquisition of) the foreign affiliate. We focus on those investments for which (1) the affiliate was in an industry for which no local ownership requirements existed at that time (UNCTC), (2) the principal Japanese investor held an equity ownership share of at least 10%, (3) all of the relevant ownership characteristics are known (as described below), and (4) the investment occurred during the period between 1985 and 2000 in one of the sample countries.

For a consistent and detailed determination of the foreign affiliate's industry affiliation, we collected the firm's primary 4-digit SIC code for the year of initial investment (acquisition). Affiliate main business line information was located in numerous publicly available European sources, as well as from the main offices of most national foreign investment agencies (*e.g.*, STATEC [Luxembourg], Invest in France Agency, Invest in Sweden Agency) for those affiliates too small in size to gain entry into the published corporate listings. Main business lines reported in earlier SIC revisions (1972, 1977) or in the European NACE format were converted to the 1987 SIC equivalent by standard classification concordances.

A wholly-owned subsidiary (WOS) is defined as an affiliate of a single Japanese investor not established via M&A (with the parent company holding at least a 95% equity share in the affiliate). A joint venture (JV) is an affiliate not created through M&A, in which none of the investors holds greater than a 95% equity stake (lowering this to a 90% threshold does not affect our results). Finally, an M&A investment occurs when the foreign affiliate is established via merger or acquisition. For the purposes of this paper, any investment through a merger/acquisition is considered an M&A, regardless of the number of investing parents (however, 88% of the M&As in the sample

were established by a single Japanese parent).

7.2.1 Parent-Specific Characteristics

For each investment, the Japanese firm with the largest equity ownership share is considered the primary investor. Parent 4-digit SIC codes were located in Dun and Bradstreet's *Principal International Businesses*, National Register's *Directory of Corporate Affiliations*, and other publicly available sources. Various issues of Toyo Keizai's *Japan Company Handbook* as well as the Pacific-Basin Capital Markets Database (PACAP) (2003) provided the information on the firm's age (*FirmAge*) as well as its annual global export sales as a percentage of total sales (*Export%*), total assets (*Size*), total sales (*Sales*), R&D intensity (*R&D*, measured as R&D expenditure as a percentage of total sales), and the firm's annual market capitalization (*MktCap*), determined by the number of shares of common stock multiplied by the year-end stock price. *Size*, *Sales*, and *MktCap* are measured in millions of Yen. Also, Dodwell Marketing's *Industrial Groupings in Japan* was used to determine the investing firm's keiretsu membership (*KrtsuMem*) status.

The *Japan Company Handbook* and PACAP database also were used to determine a firm's "Approximate Total Factor Productivity" (*ATFP*), calculated as $ATFP = \ln(Q)/L - s\ln(K)/L$, where Q, L and K denote output, employment and capital, respectively, with $s = 1/3$. This follows Grilliches and Mairesse (1990) and Head and Ries (2003).

A concern in regard to calculating *ATFP*—or any total factor productivity measure for that matter—is the simultaneity bias associated with its computation. This bias arises, because the firm can observe its output and change its factor input mix, yielding biased OLS estimates of the production function and, therefore, biased productivity estimates. To correct for this, we also estimate a firm's total factor productivity via Levinsohn and Petrin's (2003) estimation technique and the accompanying STATA program. While highly correlated with the ATFP measure (as noted in Table 2), the Levinsohn-Petrin TFP (*TFP*) measure is the more consistent of the two.

7.2.2 Country-Specific Characteristics

The countries included in this sample are Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Poland, Portugal, Spain, Sweden, Switzerland, and the UK. Data for host-market *GDP*, *EconPotential*, and market capitalization (*HostCap*) were found in the World Bank's *World Development Indicators* CD-ROM, and are measured in billions of U.S. dollars. Data used to construct *TaxRate* are courtesy of the University of Michigan's Office of Tax Policy Research, while exchange rates are determined from the IMF's *International Financial Statistics* CD-ROM.

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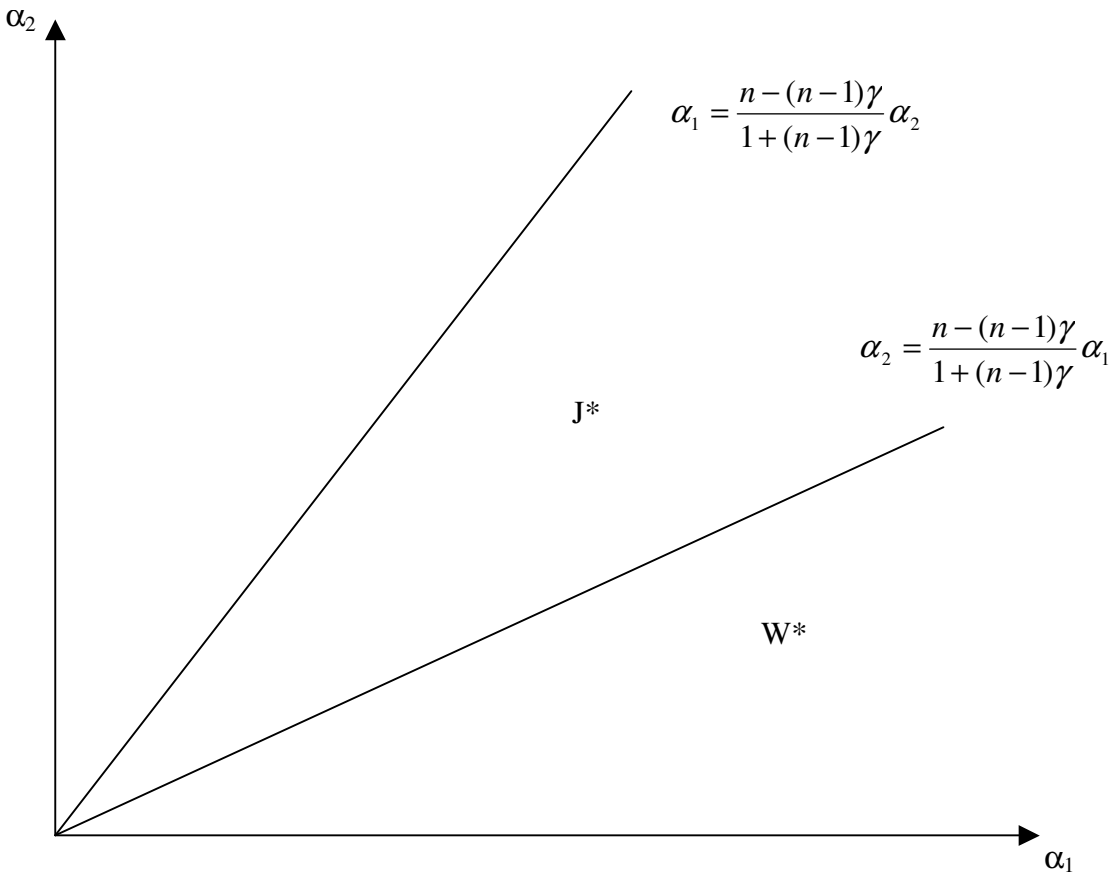

Figure 1: Joint venture vs wholly-owned subsidiary

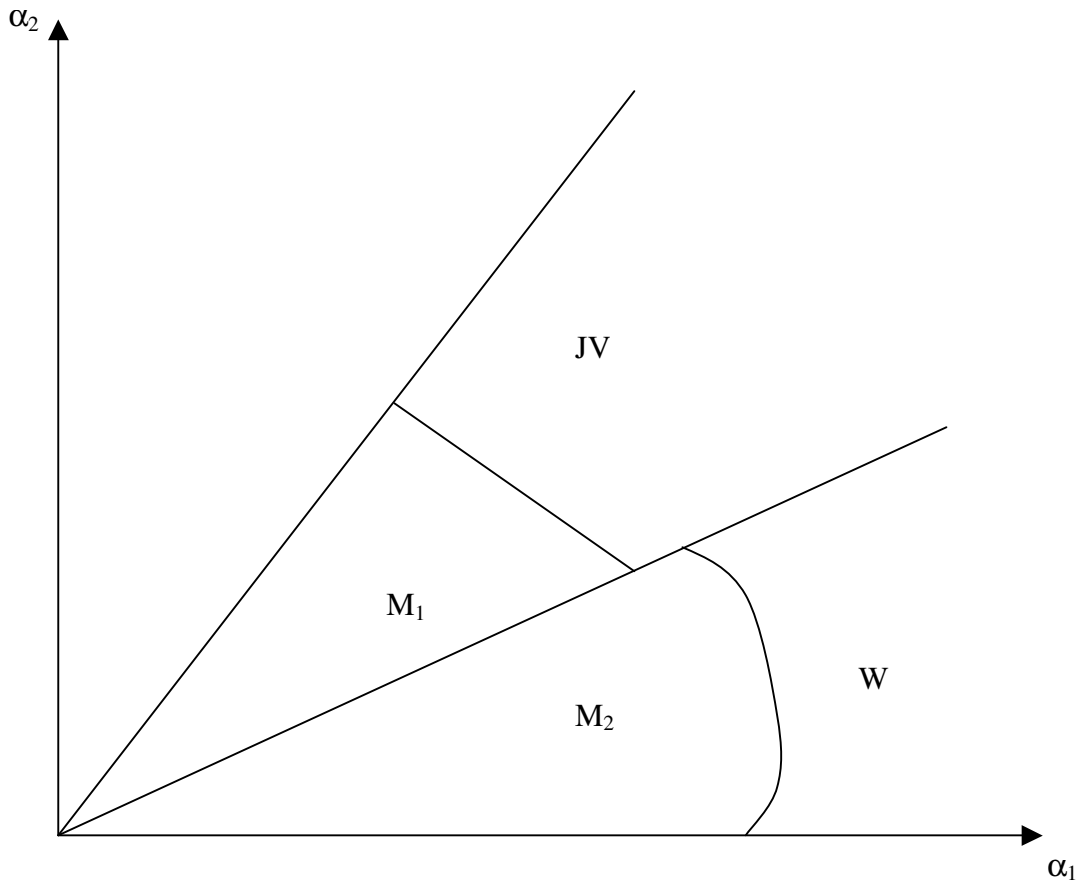

Figure 2: Joint venture vs M&A vs wholly-owned subsidiary

Table 1: FDI Data Description

Affiliate Type	Number of Investments	%of Investments
Merger/Acquisitions	100	17.3%*
Greenfield Investments	255	44.1%*
Joint Ventures	223	38.6%*
Wholesale/Retail	181	100%
Parent Information		
# w/ Manuf. Invst.	285	
Avg. per Parent	2.02	
# w/ Whlsle/Retl Invst.	100	
Avg. per Parent	1.81	

Notes: * - percentage of manufacturing investments

Table 2: Correlation of Firm-Specific Characteristics

	KrtsuMem	FirmAge	ATFP	TFP	MarCap	Size	Sales	R&D	Export%
KrtsuMem	1.000								
FirmAge	0.224	1.000							
ATFP	0.377	0.083	1.000						
TFP	0.356	0.177	0.826	1.000					
MarCap	-0.110	-0.085	0.037	0.022	1.000				
Size	0.270	0.136	0.542	0.558	-0.005	1.000			
Sales	0.255	0.097	0.408	0.571	0.013	0.958	1.000		
R&D	0.191	0.021	-0.170	0.015	-0.050	0.207	0.173	1.000	
Export%	0.003	-0.083	0.035	0.030	-0.074	0.079	0.100	0.048	1.000

Table 3: Means of Firm-Specific Characteristics

			Joint	Whlsale/	ANOVA	
All Firms	M&A	WOS	Venture	Retail	F-stat	p-value
FirmAge	52.49	51.35	53.81	45.52	9.104	6.34e-6∗
MarketCapital	2.03e+10	1.75e+10	1.79e+10	2.87e+10	0.551	0.648
Export%	26.39	23.83	17.82	23.01	1.789	0.148
Size[a]	402,158	697,752	485,211	122,044	18.192	2.11e-11*
Sales[a]	352,687	742,073	494,970	101,861	17.514	5.36e-11*
TFP	0.004	0.004	0.004	0.003	8.15	2.45e-5*
R&D	3.83	4.38	4.41	4.12	0.905	0.438
KeiretsuMember[b]	0.606	0.655	0.679	0.436	10.068	1.65e-6*
SIC 28						
FirmAge	59.79	54.71	54.68	55.80	0.425	0.736
MarketCapital	7.89e+9	6.96e+9	1.42e+10	7.03e+10	2.372	0.074***
Export%	10.17	8.03	12.15	11.20	1.819	0.148
Size[a]	500,438	363,568	308,876	126.813	7.611	1.10e-4*
Sales[a]	395,733	297,521	304,239	98,284	6.023	7.65e-4*
TFP	0.002	0.003	0.003	0.002	1.117	0.096***
R&D%	4.80	5.47	5.30	5.94	0.448	0.719
KeiretsuMember[b]	0.684	0.692	0.824	0.800	0.862	0.462
SIC 35						
FirmAge	56.89	52.62	51.24	43.60	5.366	0.002*
Market Capital	1.31e+10	9.19e+8	6.70e+9	1.51e+10	2.786	0.043**
Export%	18.94	27.76	21.69	25.14	1.515	0.213
Size[a]	414,426	732,571	536,858	74,501	8.915	1.79e-5*
Sales[a]	340,882	765,330	535,699	57,908	7.843	6.75e-5*
TFP	0.003	0.004	0.004	0.003	2.188	0.073***
R&D%	3.37	4.51	4.55	3.03	3.859	0.011**
KeiretsuMember[b]	0.556	0.694	0.724	0.310	7.875	6.49e-5*
SIC 36						
FirmAge	47.08	46.78	54.45	41.40	4.845	0.003*
Market Capital	1.72e+10	3.57e+9	6.80e+9	5.43e+10	2.944	0.036**
Export%	24.42	35.49	24.45	28.49	2.596	0.055***
Size[a]	269,801	669,471	612,553	73,536	3.623	0.015**
Sales[a]	220,013	662,941	618,850	59,044	3.396	0.020**
TFP	0.003	0.007	0.003	0.002	4.193	0.007*
R&D%	4.87	4.51	4.23	4.87	0.367	0.777
KeiretsuMember[b]	0.750	0.706	0.546	0.171	10.856	2.13e-6*

Notes: a - Millions of Yen, b - Measured as a dummy variable (1= keiretsu member, 0 otherwise); *,**,*** - significant at the 1%-, 5%-, and 10%-level.

Table 4: Third-Stage Investment Decision: WOS versus JV

	(1)	(2)	(3)	(4)	(5)	(6)
KrtsuMem	-0.060	-0.062	-0.100	-0.103	-0.017	-0.094
	(0.259)	(0.259)	(0.255)	(0.260)	(0.262)	(0.266)
FirmAge	-0.005	-0.005	-0.008	-0.007	-0.004	-0.006
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
MktCap	-1.40e-4	-1.26e-4	-3.87e-4	-2.17e-4	5.13e-5	-1.18e-4
	(1.49e-3)	(1.48e-3)	(1.50e-3)	(1.53e-3)	(1.47e-3)	(1.53e-3)
TFP	**0.335**^{c}	**0.301**^{c}	.	-0.040	.	.
	(0.204)	(0.203)		(0.224)		
ATFP	.	.	.	.	**0.261**^{c}	0.242
					(0.167)	(0.275)
Size	.	.	**0.286**^{c}	**0.274**^{c}		**0.272**^{c}
			(0.165)	(0.171)		(0.173)
R&D	-2.147	-2.028	-4.183	-2.976	-2.060	-3.070
	(3.963)	(3.955)	(3.383)	(4.011)	(4.155)	(4.209)
Export%	**0.023**^{a}	**0.023**^{a}	**0.022**^{a}	**0.022**^{a}	**0.023**^{a}	**0.021**^{a}
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
PrevFDISample	0.060	.060	0.028	0.037	0.069	0.038
	(0.055)	(0.058)	(0.056)	(0.057)	(0.057)	(0.061)
PrevFDIHost	-0.285	-0.286	-0.279	**-0.037**^{c}	-0.288	**-0.323**^{c}
	(0.189)	(0.189)	(0.189)	(0.057)	(0.193)	(0.196)
GDP	-2.42e-4	.	.	.	.	.
	(7.44e-4)					
EconPotential	.	-0.006	-0.003	-0.004	-0.125	-0.108
		(0.156)	(0.155)	(0.157)	(0.163)	(0.164)
ExchRate	0.003	0.004	0.003	0.002	0.006	0.005
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
HostCap	**-1.53e-3**^{b}	**-1.48e-3**^{c}	**-1.72e-3**^{b}	**-1.50e-3**^{b}	**-1.51e-3**^{c}	**-1.53e-3**^{c}
	(7.38e-4)	(7.69e-4)	(7.50e-4)	(7.69e-4)	(7.93e-4)	(7.92e-4)
Tax Rates	4.972	5.048	5.230	5.524	4.586	5.111
	(3.557)	(3.465)	(3.451)	(3.481)	(3.638)	(3.657)
Obs.	478	478	478	478	478	478
LR test	74.6	74.6	76.2	76.8	75.1	72.5
Prob $> \chi^2$	0.001	0.001	0.001	0.001	0.002	0.002
Pseudo R2	0.182	0.182	0.192	0.191	0.180	0.185

Notes: Logit Model (WOS=1, JV=0). Standard errors in parenthesis. Time, country, and industry dummy variables included.^{a},^{b},^{c}-significant at the 5% and 10%-levels, respectively.

Table 5: Second-Stage Investment Decision: M&A versus Greenfield Investment

	(1)	(2)	(3)	(4)	(5)	(6)
KrtsuMem	-0.310	-0.315	-0.166	-0.237	-0.284	-0.164
	(0.310)	(0.310)	(0.309)	(0.317)	(0.310)	(0.326)
FirmAge	-0.001	-0.001	0.003	0.002	0.001	0.004
	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
MktCap	-4.98e-4	-4.96e-4	-1.44e-4	-1.90e-4	-5.13e-4	-3.05e-4
	(1.50e-3)	(1.50e-3)	(1.62e-3)	(1.58e-3)	(1.55e-3)	(1.65e-3)
TFP	**-0.233**^{c}	**-0.234**^{c}	.	0.255	.	.
	(0.131)	(0.133)		(0.268)		
ATFP	.	.	.	.	-5.13e-4	-0.127
					(1.55e-3)	(0.338)
Size	.		**-0.537**^{b}	**-0.659**^{b}	.	**-0.519**^{c}
			(0.280)	(0.336)		(0.309)
R&D	**-8.536**^{c}	**-8.208**^{c}	**-8.671**^{c}	**-8.527**^{c}	**-12.410**^{b}	**-9.090**^{c}
	(5.302)	(5.284)	(5.317)	(5.290)	(5.740)	(5.523)
Export%	0.006	0.006	0.006	0.006	0.006	0.005
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)
PrevFDISample	**0.228**^{a}	**0.224**^{c}	**0.248**^{a}	**0.251**^{a}	**0.250**^{a}	**0.261**^{a}
	(0.061)	(0.061)	(0.060)	(0.060)	(0.067)	(0.064)
PrevFDIHost	**-0.424**^{c}	**-0.419**^{c}	**-0.432**^{c}	**-0.425**^{c}	**-0.453**^{c}	**-0.452**^{c}
	(0.253)	(0.252)	(0.260)	(0.266)	(0.265)	(0.284)
GDP	2.32e-4	.	.	.	.	.
	(9.00e-4)					
EconPotential	.	0.151	0.127	0.138	0.183	0.185
		(0.188)	(0.188)	(0.188)	(0.201)	(0.202)
ExchRate	**-0.017**^{c}	**-0.019**^{b}	**-0.017**^{c}	**-0.018**^{c}	**-0.022**^{b}	**-0.021**^{b}
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
HostCap	-1.21e-3	-1.34e-3	-1.10e-3	-1.24e-3	-1.07e-3	-8.61e-4
	(9.47e-4)	(9.58e-4)	(1.03e-3)	(9.89e-4)	(9.72e-4)	(1.02e-3)
Tax Rates	-3.647	-3.540	-4.718	-4.493	-2.940	-3.897
	(4.601)	(4.410)	(4.521)	(4.568)	(4.432)	(4.623)
Inclusive Values	**0.385**^{c}	**0.382**^{c}	**0.611**^{c}	**0.651**^{c}	**0.593**^{c}	**0.559**^{c}
	(0.257)	(0.252)	(0.357)	(0.365)	(0.366)	(0.359)
Obs.	578	578	578	578	578	578
LR test	62.1	62.1	69.5	69.7	68.0	69.0
Prob > χ^2	0.001	0.001	0.001	0.001	0.001	0.01
Pseudo R2	0.187	0.186	0.248	0.249	0.200	.201

Notes: Logit Model (MA=1, Greenfield=0). Standard errors in parenthesis. Time, country, and industry dummy variables included. ^{a},^{b},^{c}-significant at the 5% and 10%-levels, respectively.

Table 6: First-Stage Investment Decision: FDI versus Export

	(1)	(2)	(3)	(4)	(5)	(6)
KrtsuMem	**0.809**^{a}	**0.822**^{a}	**0.577**^{b}	**0.578**^{b}	**0.833**^{a}	**0.565**^{b}
	(0.254)	(0.253)	(0.245)	(0.248)	(0.250)	(0.250)
FirmAge	**0.019**^{b}	**0.019**^{b}	**0.013**^{c}	**0.014**^{c}	**0.022**^{a}	**0.014**^{c}
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
MktCap	-3.59e-3	-3.61e-3	**-3.65e-3**^{c}	**-3.53e-3**^{c}	-1.81e-3	-1.62e-3
	(1.43e-3)	(1.41e-3)	(1.47e-3)	(1.45e-3)	(1.75e-3)	(1.83e-3)
TFP	**0.883**^{a}	**0.924**^{a}	.	-0.076	.	.
	(0.212)	(0.211)		(0.237)		
ATFP	.	.	.	.	**0.689**^{b}	0.061
					(0.306)	(0.305)
Size	.	.	**0.448**^{a}	**0.428**^{a}	.	**0.451**^{a}
			(0.083)	(0.092)		(0.088)
R&D	3.436	4.304	-0.829	-2.565	1.754	-1.465
	(5.368)	(5.213)	(4.699)	(4.587)	(5.885)	(5.671)
Export%	-0.001	-0.001	-0.003	-0.002	0.001	-0.002
	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
PrevFDISample	**-0.185**^{c}	**-0.192**^{c}	**-0.337**^{b}	**-0.273**^{b}	-0.081	**-0.302**^{b}
	(0.101)	(0.099)	(0.131)	(0.124)	(0.101)	(0.138)
PrevFDIHost	**0.502**^{b}	**0.538**^{b}	**0.430**^{c}	0.360	0.368	0.339
	(0.251)	(0.248)	(0.261)	(0.258)	(0.249)	(0.274)
GDP	**-1.61e-3**^{c}	.	.	.	.	.
	(9.16e-4)					
EconPotential	.	-0.090	-0.071	-0.024	-0.152	-0.163
		(0.174)	(0.176)	(0.177)	(0.183)	(0.196)
ExchRate	0.004	0.006	0.013	0.004	-0.001	0.007
	(0.012)	(0.122)	(0.124)	(0.012)	(0.012)	(0.013)
HostCap	-5.66e-4	-3.53e-4	3.08e-4	-9.83e-6	-1.19e-3	-3.13e-4
	(1.00e-3)	(9.99e-4)	(1.07e-3)	(1.08e-3)	(9.65e-4)	(1.08e-3)
Tax Rates	2.286	2.879	3.126	2.522	0.818	1.852
	(3.885)	(3.810)	(3.986)	(3.969)	(3.658)	(3.878)
Inclusive Values	0.383	0.545	0.533	0.599	0.557	0.604
	(0.230)	(0.306)	(0.313)	(0.332)	(0.302)	(0.318)
Obs.	759	759	759	759	759	759
LR test	139.9	137.5	177.9	176.5	140.9	177.0
Prob $> \chi^2$	0.001	0.001	0.000	0.000	0.000	0.000
Pseudo R2	0.303	0.299	0.357	0.356	0.311	0.356

Notes: Logit Model (FDI=1, Export=0). Standard errors in parenthesis. Time, country, and industry dummy variables included. ^{a},^{b},^{c}-significant at 1%, 5% and 10%-levels, respectively.

Table 7: Two Stage Estimation

	Second Stage (MA vs Greenfield vs JV)						First Stage (FDI vs Export)		
	(1)		(2)		(3)		(4)	(5)	(6)
	M&A	JV	M&A	JV	M&A	JV			
KrtsuMem	0.140	0.097	0.200	0.246	0.140	0.097	**0.839**^{a}	**0.483**^{b}	**0.764**^{a}
	(0.353)	(0.273)	(0.341)	(0.273)	(0.353)	(0.273)	(0.229)	(0.228)	(0.221)
FirmAge	0.010	0.009	0.014	**0.015**^{b}	0.010	0.009	**0.023**^{a}	**0.016**^{b}	**0.024**^{a}
	(0.010)	(.007)	(0.010)	(0.007)	(0.010)	(0.007)	(0.008)	(0.008)	(0.008)
MktCap	4.07e-4	-2.34e-4	8.83e-4	9.58e-4	4.07e-4	-2.34e-4	-1.85e-3	**-2.93e-3**^{b}	-2.05e-3
	(2.35e-3)	(1.92e-3)	(2.28e-3)	(1.93e-3)	(2.35e-3)	(1.92e-3)	(1.76e-3)	(1.37e-3)	(1.72e-3)
TFP	**-0.646**^{b}	0.028	0.053	0.041	.	.	**0.705**^{a}	-0.024	.
	(0.353)	(0.296)	(0.303)	(0.250)			(0.262)	(0.220)	
ATFP	.	.	.	.	**-0.646**^{c}	0.028	.		**0.674**^{a}
					(0.353)	(0.296)			(0.250)
Size	.	.	**-0.079**^{a}	**-0.040**^{b}	.	.	.	**0.423**^{a}	.
			(0.031)	(0.021)				(0.087)	
R&D	**-11.919**^{b}	3.120	-1.902	5.090	**-11.919**^{b}	3.120	0.098	-3.003	1.474
	(6.109)	(4.228)	(5.833)	(4.168)	(6.109)	(4.228)	(4.215)	(3.388)	(3.974)
Export%	0.002	-0.014	0.002	**-0.012**^{c}	0.002	**-0.014**^{b}	0.002	0.001	0.001
	(0.003)	(0.007)	(0.003)	(0.007)	(0.003)	(0.007)	(0.003)	(0.002)	(0.003)
PrevFDISample	**0.197**^{a}	-0.049	**0.215**^{a}	0.010	**0.197**^{a}	-0.049	.	.	.
	(0.067)	(0.059)	(0.066)	(0.060)	(0.067)	(0.059)			
PrevFDIHost	-0.259	0.303	-0.132	0.319	-0.259	0.303	.	.	.
	(0.268)	(0.199)	(0.262)	(0.199)	(0.268)	(0.199)			
EconPotential	0.217	-0.001	0.002	-0.004	0.002	-0.001	-0.074	-0.051	0.036
	(0.155)	(0.012)	(0.002)	(0.001)	(0.002)	(0.001)	(0.166)	(0.070)	(0.070)
ExchRate	**-0.026**^{b}	-0.005	**-0.020**^{b}	-0.001	**-0.026**^{b}	-0.005	-0.005	-0.002	-0.004
	(0.011)	(0.008)	(0.010)	(0.008)	(0.011)	(0.008)	(0.009)	(0.006)	(0.006)
HostCap	8.56e-5	**1.18e-3**^{c}	-5.12e-4	**1.16e-3**^{c}	8.56e-4	**1.18e-3**^{c}	-1.48e-3	-2.36e-3	-4.37e-4
	(8.73e-4)	(7.54e-4)	(8.75e-4)	(7.42e-4)	(8.73e-4)	(7.54e-4)	(9.14e-4)	(4.20e-4)	(4.09e-4)
TaxRates	-7.453	-6.423	**-8.702**^{c}	**-7.510**^{b}	-7.453	**-6.423**^{c}	1.495	2.415	2.571
	(4.794)	(3.738)	(4.692)	(3.592)	(4.794)	(3.738)	(3.429)	(2.844)	(2.851)
Inclusive Value	.	.	.	.	.	.	0.329	0.375	0.341
							(0.200)	(0.207)	(0.207)
Obs	578		578		578		759	759	759
LR test	221.73		233.79		225.73		124.48	193.05	114.79
Prob $> \chi^2$	0.000		0.000		0.000		0.000	0.000	0.000
Pseudo R2	0.206		0.206		0.204		0.181	0.206	0.185

Notes: Base case in multinomial logit regressions is WOS investment. Standard errors in parenthesis. Time, country, and industry dummy variables included. ^{a},^{b},^{c}-significant at 1%, 5% and 10%-levels, respectively.