Mergers vs Joint Ventures vs Greenfield Investment: A Comprehensive Treatment of Foreign Direct Investment

Horst Raff[1], Michael Ryan[2] and Frank Stähler[3]

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[1]Corresponding author, Department of Economics, University of Kiel, Wilhelm-Seelig-Platz 1, D–24098 Kiel, Germany, email: raff@econ-theory.uni-kiel.de

[2]Department of Economics, Western Michigan University, 1903 W. Michigan Ave., Kalamazoo, MI 49008, USA, email: michael.ryan@wmich.edu

[3]Department of Economics, University of Otago, P.O. Box 56, Dunedin, New Zealand, email: fstaehler@business.otago.ac.nz

Abstract

Why do some firms export to a foreign market, while others establish a subsidiary through foreign direct investment? Of those firms that invest, why do some choose greenfield investment, others merger and acquisition and still others a joint venture? We examine these questions by constructing a theoretical model of the firm's investment decision and then testing its predictions using Japanese firm-level data. We find that firm- and country-specific factors interact to determine the firm's choice.

JEL-Classification: F12, F15.

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1 Introduction

This paper examines how a manufacturer will sell goods on a foreign market. Specifically, we investigate why some firms choose to export to the foreign market while others establish a subsidiary there through foreign direct investment (FDI). For those firms choosing FDI, we want to know why some of them opt for greenfield investment, while others merge with or acquire a local firm, and still others invest by forming a joint venture. Our analysis procedes in two steps. First, we build a theoretical model to derive predictions concerning the firm's decision based on firm, industry and country characteristics. Second, we test these predictions using data on Japanese manufacturing firms.

The novelty of our contribution is that we make an attempt at providing a comprehensive treatment of the firm's investment options, whereas previous studies have tended to focus only on a subset of these options, for instance, on the choice between greenfield investment and exporting, or on the determinants of cross-border M&A. Another departure from the standard FDI literature is that we explicitly relate the firm's investment choice to firm-level characteristics (e.g., productivity, total assets), rather than only to industry or country-level determinants (such as, transport costs, scale economies, market size or factor endowments). This allows us to highlight the role of firm heterogeneity even within an industry facing identical transport costs, factor requirements or scale economies. It also lets us study how firm heterogeneity interacts with industry- and country-level factors in influencing a firm's decision.

Our paper is motivated by two kinds of empirical observations. First, we find that all three FDI modes—greenfield, M&A and joint ventures—are empirically important. In our Japanese data, which spans the period 1985 to 2000, greenfield investment accounts for 44.1% of outward manufacturing FDI, M&A for 17.3% and joint ventures for 38.6%. According to Iranzo (2004), M&A was even more important in the United States, accounting for more than 40% of inward FDI between 1977 and 1994. In France, the share of M&A in total FDI rose between 1990 and 1999 from 41% to 50.7% (Ber-

trand et al., 2003). Lipsey (2000) also acknowledges the importance of FDI modes other than greenfield investment. Second, we observe in our Japanese data that the choice of FDI mode and the choice between FDI and exporting varies significantly both across and within industries with respect to underlying characteristics of the parent company, such as total assets, sales, market capitalization, etc. For instance, we observe that the largest firms (measure by total assets) choose greenfield FDI; firms of intermediate size choose joint ventures and smaller firms choose M&A; the smallest firms export (more on this in the section on descriptive statistics and in Table 3). The importance of firm heterogeneity at least as concerns the FDI versus exporting decision has also been confirmed by recent empirical studies, notably Head and Ries (2003) for Japanese firms, Helpman et al. (2004) for U.S. industry-level FDI, and Girma and Kneller (2003) for UK firms, which find that the most productive firms engage in FDI and less productive firms export.

The paper builds on the existing literature in the following ways. Bertrand et al. (2003), Iranzo (2004), Tekin-Koru (2004) examine empirically the choice between greenfield investment and M&A. Theoretical models of cross-border mergers are provided by Bjorvatn (2004), Horn and Persson (2001) and Neary (2003), among others. Head and Ries (2003), Helpman et al. (2004), and Girma and Kneller (2003) investigate the choice between FDI and exporting, stressing the importance of firm heterogeneity; these studies, however, do not distinguish between different FDI modes. Empirical studies of FDI relating the choice between FDI and exporting to industry and country characteristics include Blonigen et al. (2002), Brainard (1997) and Carr et al. (2001). A recent survey of the FDI literature is provided by Markusen (2002). The theoretical model we construct builds on the work of Perry and Porter (1985), Salant, Switzer, and Reynolds (1983), and Yi (1998).

2 The Model

In this section we develop a simple model that predicts, based on company and country characteristics, how a firm will supply a host-country market. The firm's choices include *exporting* from its existing production plant in the

home country, establishing its own plant in the host country through *greenfield investment*, purchasing an existing plant through *M&A*, and forming a *joint venture* with another firm. The main organizing principle behind our analysis of these choices is the idea that firms own productive assets, such as technology, management skills, specialized intermediate inputs or even a government license, that allow them to compete in the market (see, for instance, Farrell and Shapiro, 1990). When a firm chooses exporting or greenfield investment, it relies on its own assets to produce goods. In the case of M&A, the firm acquires the assets of a local target firm and combines them with its own assets. When two firms form a joint venture they, too, share their assets, but continue to choose output independently.

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 the representative consumers there has quadratic quasi-linear preferences that 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 two local (country-f) producers.[1] We will label the home firm as firm 1 and the local firms as firms 2 and 3. Hence $Q = \sum_{i=1}^{3} q_i$, 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 country-j wages and α_i represents the firm's assets. Hence the more assets a firm has the more efficient or productive it is. We assume that $\alpha_1 \geq \alpha_2, \alpha_3$, which means that the home firm has an ownership advantage relative to its local rivals. If the home firm serves f through exports, an additional trade cost of size t per unit of exports arises, for which $t < (a - w_h + 3\alpha_1 - \alpha_2 - \alpha_3)/3$. This will guarantee that the home firm has at least an incentive to export to f. Furthermore, we assume that building a plant (in the case of greenfield investment and joint venture) involves a sunk cost of size F.

[1] Nothing would change if these firms were affiliates of home-country firms. Also note that our three-firm model is the most parsimonious model in which we can generate the effects we consider to be important for the home firm's best response. Our analysis would not change, if we added firms. In this case, simply think of the demand function as a residual demand curve for given output of the firms not explicitly modelled.

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 merged firm as firm 1 and will assume that the acquisition target is firm 2 (leaving firm 3 as the competitor). 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 $c_{1f} \equiv w_f - \gamma(\alpha_1 + \alpha_2)$. 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 combine.[2]

The precondition for a joint venture is that the home firm establishes a plant in the host country at a sunk cost of F.[3] The home firm and its joint venture partner (firm 2) then share their assets, for instance, by exchanging technology, sharing R&D or specialized inputs, etc. We model this in the same way as in the case of a merger. Hence the marginal cost of partner firm $i = 1, 2$ is $c_{if} \equiv w_f - \gamma(\alpha_1 + \alpha_2)$. What distinguishes a joint venture from a merger is that the joint venture partners continue to choose output independently. Another difference is that a joint venture does not involve any (side-)payment between the partners.[4]

We can divide the home firm's investment decision into two parts. First, there is the decision whether to invest in the host country or to supply it through exports. Second, if the firm has opted for investment, it has to choose between acquiring a local firm and its plant, building its own plant through greenfield investment, or engaging in a joint venture with a local firm. This

[2]Note that we could also accomodate the case where $\gamma > 1$. How this would affect our result will become obvious later. 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 $\beta \leq 1$. Finally, our assumption that only firm 2 is a suitable M&A target could restated as an assumption that a merger between firms 1 and 3 would be associated with a low γ.

[3]Nothing much changes if we assume that the joint venture partners share this sunk cost.

[4]What we have in mind here is that while it is possible to determine a price at which to acquire an entire firm (e.g. some premium over the stock market value), it is much more difficult to determine how much one should pay to share specific assets, such as technology, R&D or specialized inputs.

decision-making process can be represented by the following sequential game: in stage one, the home firm (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, invest and form a joint venture with firm 2, or not supply the host market. Lastly, firm 2 has the option of accepting or rejecting the joint venture. 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 1 does not reduce firm 1's choices, but allows us to make explicit that greenfield investment and joint venture are firm 1's threat points if firm 2 refuses the acquisition offer.

3 The Choice of Investment Mode

In this section, we derive predictions about the firm's choice of investment mode (greenfield, M&A, joint venture), assuming that it does not want to export. We start by examining the home firm's choice between greenfield investment and joint venture.

3.1 Greenfield versus Joint Venture

In the case of greenfield investment, denoted by the superscript G, all three firms have plants in the host country. Cournot competition implies that a firm $i = 1, 2$ facing rivals 3 and $j \neq i, 3$ produces output

$$q_i^G = \frac{A + 3\alpha_i - \alpha_j}{4b}, \tag{1}$$

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

$$\Pi_i^G = \frac{(A + 3\alpha_i - \alpha_j)^2}{16b}, \tag{2}$$

where $A = a - w_f - \alpha_3$.

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

$$q_i^J = \frac{A + 2\gamma(\alpha_1 + \alpha_2)}{4b}, \tag{3}$$

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

$$\Pi_i^J = \frac{(A + 2\gamma(\alpha_1 + \alpha_2))^2}{16b}. \tag{4}$$

We assume for now that firm 1 can obtain a positive profit under both investment options, i.e., $\min\{\Pi_1^G, \Pi_1^J\} \geq F$. A comparison between (2) and (4) then reveals that firm 1 prefers a joint venture to greenfield investment if

$$\alpha_2 \geq \frac{3 - 2\gamma}{1 + 2\gamma}\alpha_1, \tag{5}$$

that is, if firm 2 has sufficient assets relative to firm 1 so that the partners are not too asymmetric. For instance, if γ approches 1, then we must have $\alpha_2 \geq \frac{1}{3}\alpha_1$. The reason for this is the following: a joint venture allows both partners to reduce their costs and take market share away from firm 3; 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 larger assets. Hence if firm 1 has a lot more assets than firm 2, a joint venture would mean that it would lose more market share to firm 2 than it can gain from firm 3, making greenfield that more attractive option. Firm 1' choice is illustrated in Figure 1, where a joint venture is the preferred option in region J*, and greenfield investment in region G*.

[Insert Figure 1 about here]

3.2 Mergers

In case of a merger, denoted by the superscript M, the merged firm is in a duopoly with firm 3. Its equilibrium output is

$$q_1^M = \frac{A + 2\gamma(\alpha_1 + \alpha_2)}{3b}, \tag{6}$$

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

$$\Pi_1^M = \frac{(A + 2\gamma(\alpha_1 + \alpha_2))^2}{9b}. \tag{7}$$

How much firm 1 will have to pay to take over firm 2 depends on firm 2's profit in the absense of a merger. This, in turn, depends on the choice firm 1 makes if firm 2 turns down its offer. Suppose first that $\Pi_1^J \geq \Pi_1^G$, 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, $\Pi_1^J < \Pi_1^G$, then firm 2 would have to be paid a price of Π_2^G.

Under what circumstances would firm 1 prefer a joint venture or greenfield investment to a merger? We start again with the case where $\Pi_1^J \geq \Pi_1^G$. 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

$$\frac{(A + 2\gamma(\alpha_1 + \alpha_2))^2}{16b} - F \geq \frac{(A + 2\gamma(\alpha_1 + \alpha_2))^2}{9b} - \frac{(A + 2\gamma(\alpha_1 + \alpha_2))^2}{16b}, \tag{8}$$

or, still simpler,

$$\frac{(A + 2\gamma(\alpha_1 + \alpha_2))^2}{72b} \geq F. \tag{9}$$

Hence 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 has to do with what is know in the literature as the merger paradox. For given marginal costs, 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 firm 3—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 a merger of joint venture thus leads to a larger profit increase for the joint venture. This effect is especially big for firms with large assets (or good complementarities) and more than compensates the sunk cost of investment.

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 (9). This curve is s 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]

Note that the joint venture versus M&A decision depends not only on firm characteristics, but also on country characteristics like market size and wages. Ceteris paribus, a bigger market (larger A or smaller b) makes joint ventures more attractive relative to mergers; a higher host-country wage (lower A) makes mergers relatively more attractive.

Next, consider the case where $\Pi_1^J \geq \Pi_1^G$. This puts us in area G* of Figure 1. Firm 1 will choose greenfield investment rather than a merger, if $\Pi_1^G - F \geq \Pi_1^M - \Pi_2^G$, that is, if

$$\frac{(A+3\alpha_1-\alpha_2)^2}{16b} - F \geq \frac{(A+2\gamma(\alpha_1+\alpha_2))^2}{9b} - \frac{(A-\alpha_1+3\alpha_2)^2}{16b}. \qquad (10)$$

If we hold fixed α_2 and increase α_1, we see that this raises the profit from greenfield investment as well as the profit of the merged firm, but reduces the acquisition price. To obtain the net marginal effect we compute

$$\frac{\partial(\Pi_1^G - (\Pi_1^M - \Pi_2^G))}{\partial\alpha_1} = \frac{(9-16\gamma)A + (45-32\gamma^2)\alpha_1 - (27+32\gamma^2)\alpha_2}{36b}. \qquad (11)$$

This derivative is positive, if α_1 is sufficiently large, specifically if

$$\alpha_1 > \frac{27+32\gamma^2}{45-32\gamma^2}\alpha_2 + \frac{16\gamma-9}{45-32\gamma^2}A. \qquad (12)$$

This implies that firm 1 prefers greenfield investment to a merger, if it has sufficiently many assets relative to firm 2. To illustrate this in Figure 2, note that the slope of the curve where firm 1 is indifferent between greenfield investment and M&A is

$$\frac{d\alpha_2}{d\alpha_1} = -\frac{(9-16\gamma)A + (45-32\gamma^2)\alpha_1 - (27+32\gamma^2)\alpha_2}{(9-16\gamma)A - (27+32\gamma^2)\alpha_1 + (45-32\gamma^2)\alpha_2}$$

and hence highly non-linear. We therefore rely on a simulation to plot this curve. In the region labelled M_2, firm 1 will choose M&A; in region G, it will opt for greenfield investment.

Finally consider how the choice between merger and greenfield investment is affected by the other parameters of the model. The effects of an increase in F and in γ are obvious. This makes a merger more attractive. The impact of an increase in market size or a reduction in the host-country wage (both raising A) is given by:

$$\frac{\partial(\Pi_1^G - (\Pi_1^M - \Pi_2^G))}{\partial A} = \frac{A + (9 - 16\gamma)(\alpha_1 + \alpha_2)}{36b}. \tag{13}$$

This derivative is positive if A is sufficiently large, indicating that an increase in market size or reduction in the host-country wage makes greenfield investment more likely relative to M&A.

3.3 Predictions regarding the Choice of Investment Mode

We can now use Figure 2 to summarize the model's predictions concerning the choice of investment mode. An important general message is that this choice will depend on both firm and host-country characteristics and that these characteristics interact in subtle ways. For example, in a host country with a large market and low wages, region J becomes larger at the expense of region M_1. For a given α_2 we then 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 a joint venture. With an intermediate amount of assets it will want to acquire a local firm; and with a large amount of assets it will engage in greenfield FDI.

By contrast, in smaller host markets or host countries with higher wages the firm is more likely to choose M&A over a joint venture. In this case, it is possible for a firm with a small amount of assets to choose M&A rather than a joint venture, making the link between the amount of assets and the M&A versus joint venture decision ambiguous.

A general prediction, however, is that the more assets the home firm has, the more likely it is to invest greenfield. In addition, we find that (under some

conditions) greenfield investment is more likely relative to M&A the bigger is the host market and the lower is the host-country wage.

4 FDI versus Exporting

Finally, we consider the home firm' choice between investing in the host country, either through greenfield investment, M&A or a joint venture, 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 T—, profit maximization of all three firms leads to individual production level for firm 1 of

$$q_1^T = \frac{A + 3\alpha_1 - \alpha_2 - (w_h - w_f) - 3t}{4b}, \tag{14}$$

and profits of

$$\Pi_1^T = \frac{(A + 3\alpha_1 - \alpha_2 - (w_h - w_f) - 3t)^2}{16b}. \tag{15}$$

Analyzing the firm's choice between FDI and exporting is straightforward, if somewhat tedious, since we have to take into account the choice of investment mode. But we can illustrate the main predictions of the model by assuming that the firm's preferred investment mode is greenfield investment. In this case the firm chooses FDI, if $\Pi_1^G - F \geq \Pi_1^T$, or

$$\frac{(A + 3\alpha_1 - \alpha_2)^2}{16b} - F \geq \frac{(A + 3\alpha_1 - \alpha_2 - (w_h - w_f) - 3t)^2}{16b}. \tag{16}$$

This inequality is more likely to hold, if firm 1 has a large amount of assets (large α_1), the host market is large (large A, 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.

5 The Data

The FDI data employed in this study is compiled from several issues of Toyo Keizai Inc.'s *Kaigai Shinshutsu Kigyo Soran* (Japanese Overseas Investment,

hereafter JOI). The JOI provides numerous details on each Japanese foreign investment, including the date and location of initial investment into (or acquisition of) the foreign affiliate, as well as a verbal description of the affiliate's main business activity. For this study, we focus on those investments for which (1) the affiliate is in an industry for which no local ownership requirements existed at that time (UNCTC), (2) the principle 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 in one of the twenty-one countries that comprise this sample during the period 1985-2000.[5]

In most cases, the verbal description allows for a clear determination of the affiliate's main business line at a 2-digit SIC level. For a consistent and more detailed determination of the foreign affiliate's industry affiliation, we collect the firm's primary 4-digit 1987 U.S. Standard Industry Classification (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 [Luxemboug], 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. The use of the agency-provided information significantly improves the reliability and consistency of affiliate SIC coding.

For each affiliate, the JOI also provides enough information to determine the investment mode. For the purposes of this paper, we are able to categorize each investment into a manufacturing affiliate as a greenfield investment, a joint venture, or a merger/acquisition. Greenfield investments are defined as wholly-owned subsidiaries of a single Japanese investor not established via merger/acquisition, with the parent company holding at least a 95% equity share in the affiliate.[6] A joint venture investment is defined as an affiliate

[5] See data appendix for the list of countries.

[6] This 95% cut-off appears to be standard in the literature, although oftentimes a lower

established with multiple investing parents, where none of the investors holds greater than a 95% equity stake in the affiliate. 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.[7]

Finally, we are able to determine which firms have established only wholesale/retail affiliates in a particular country. We let these firms represent the exporters in our sample. 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). But since we do not have destination-specific export data for our sample firms, we cannot capture these firms directly. (We do, however, control for keiretsu membership.)

5.1 Parent-Specific Characteristics

For each affiliate, the Japanese firm with the largest equity ownership share is considered the primary investor, with its industry affiliate determined by its 4-digit SIC code at the time of investment. SIC codes for the Japanese parents were found in various issues of Dun and Bradstreet's *Principal International Businesses*, National Register's *Directory of Corporate Affiliations*, and other publicly available sources. Data on the principal investor's firm-specific characteristics come from several sources. Toyo Keizai's *Japan Company Handbook* (various issues) 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*), and R&D intensity (*R&D*), measured as R&D expenditure as a percentage of total sales. The Pacific-Basin Capital Markets Database (PACAP) (2003) provided the information to create the variable capturing the firm's annual market capitalization (*MktCap*). To determine the investing firm's keiretsu membership (*KrtsuMem*) status we employ the keiretsu listings located in Dodwell Mar-

(90%) threshold is used.

[7] 88% of the M&As in the sample were established by a single Japanese parent.

keting's *Industrial Groupings in Japan*. Finally, to control for a firm's previous investment experience, we employ the JOI to create variables indicating a firm's previous investment into each host (*PrvFDIHost*) as well as its investment history over the whole sample of countries (*PrvFDISmpl*).

Table 1 provides the correlation matrix of the major firm-specific characteristics. Note that *Size* and *Sales* are highly correlated, while low pair-wise correlation exists between the remaining variables.

Table 1: Correlation of Firm-Specific Characteristics

	KrtsuMem	FirmAge	MktCap	Size	Sales	R&D	Export%
KrtsuMem	1.00						
FirmAge	0.209	1.00					
MktCap	-0.109	-0.075	1.00				
Size	0.270	0.139	-0.010	1.00			
Sales	0.257	0.099	0.003	0.959	1.00		
R&D	0.143	-0.013	-0.024	0.167	0.138	1.00	
Export%	0.014	-0.089	-0.069	0.080	0.103	0.028	1.00

5.2 Country-Specific Characteristics

We collect several types of host-country data. These include the host's unit labor costs (*LaborCost*) and four measures of the host's market size, such as *GDP*, per-capita GDP (*GDPpc*), population (*Pop*), and a Harris (1954)-type economic potential (*EconPotential*) measure.

We also wish to control for characteristics that influence the firm's choice, but do not explicitly appear in the model. This includes average corporate tax rates (*Tax*). A firm's ability to undertake M&A should be influenced by the following additional factors. First, we determine the host's market capitalization (*HostCap*), measured as the sum of the share price multiplied by the shares outstanding for all domestically incorporated companies. We take this as a measure of the supply of potential M&A-target firms. Next, we follow Bertrand, Mucchielli and Zitouna (2003) in calculating Japan's access to each host market (*MktAccess*). In addition, we also determine the host's financial openness (*FinOpen*) to account for the Japanese firm's ability to access the host's financial markets. Finally, we determine the Yen-Local currency exchange rate (*ExchRate*), as fluctuations in this value affect the

price of assets denominated in the local currency.

We must also account for those investment influences that do not have specific controls. Thus, we create dummy variables for each host, each affiliate industry, and for each year of the sample.

5.3 Descriptive Statistics

Table 2 details the 759 investments that comprise this study. 285 Japanese manufacturing MNEs were responsible for the 578 investments into manufacturing affiliates, for an average of 2 investments per parent firm. Greenfield investments accounted for over 44% of all manufacturing affiliates, with joint ventures and merger/acquisitions totaling 39% and 17%, respectively. While greenfield investments comprise the largest percentage of manufacturing affiliates, the early part (1985-1987) of the sample period was dominated by JV investments. Since 1988, however, greenfield investments dominated the ownership choice decision. Although M&A investments decreased in overall percentage prior to 1988, since that year, M&As accounted for an increasing amount of overall Japanese FDI into the sample countries. However, M&As lagged far behind relative to greenfield or joint venture investments throughout the entire period.

In regard to investment location, a majority of the manufacturing affiliates were established in the UK (144 investments), France (72), Germany (68), and Canada (54). MA investments were primarily located in UK (30% of M&A investments), France (16%), and Germany (13%), while both greenfield and joint venture investments are more evenly spread throughout the sample countries (although the UK served as the primary host for all investment types)

The 181 wholesale and retail affiliates were established by 100 Japanese MNEs and, as stated previously, none of these firms have manufacturing affiliates in the sample. 130 (72%) of these investments occurred between 1987 and 1993, with a peak in 1991 (34 investments). In regard to location, 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.

Table 2: 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

The model described in section 2 suggests that firm-level characteristics—specifically the amount of assets it owns—has an influence the investment mode decision. We have several firm-specific characteristics available to try to proxy for a firm's "assets", including the firm's age, market capitalization, global export percentage, total assets, total sales, R&D intensity, and keiretsu membership. Table 2 provides 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.

While firms that only export appear younger, smaller (both in total assets and sales), and less likely to be keiretsu members than firms with manufacturing affiliates, heterogeneity appears to exist among the firms with manufacturing affiliates as well. While those establishing greenfield investments tend to be the largest firms, firms establishing affiliates via merger/acquisition have the highest export ratio at the time of investment.

To more accurately determine the extent to which such heterogeneity exists, we perform ANOVA analysis to 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. Table 3 reveals significant heterogeneity among the parent firms in regard to four characteristics (firm age, total assets, total sales, keiretsu membership). However, as it appears that this heterogeneity may arise from the inclusion of the firms that only export, we re-ran the ANOVA tests only for parents with manufacturing affiliates. Here, we find heterogeneity among means in regard to firm size (total assets and total sales). This suggests that the heterogeneity arising from firm age and keiretsu membership did result from the inclusion of the exporting-only firms.

Table 3: Means of Firm-Specific Characteristics: All Japanese Parents

	M&A	Greenfield	Joint Venture	Whlsale/ Retail	ANOVA F-stat	ANOVA 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
TotalAssets[a]	402,158	697,752	485,211	101,861	18.192	2.11e-11*
TotalSales[a]	352,687	742,073	494,970	101,861	17.514	5.36e-11*
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

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

As Table 3 includes all parent firms, we do not know whether the heterogeneity (or lack thereof) in the sample was due to inter-industry variation or the result of heterogeneity within industries. To better understand if firm-specific heterogeneity leads to differing investment patterns within an industry, we narrow the sample and focus on the three largest investing industries: chemicals and related products (Table 4), industrial equipment and machinery (Table 5), and electronic and electric equipment (Table 6).

Table 4: Means of Firm-Specific Characteristics: Chemicals and Related Products

	M&A	Greenfield	Joint Venture	Whlsle/ Retail	ANOVA F-stat	ANOVA p-value
FirmAge	59.79	57.41	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
TotalAssets[a]	500,438	363,568	308,876	126,813	7.611	1.10e-4*
TotalSales[a]	395,733	297,521	304,239	98,284	6.023	7.65e-4*
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

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

Table 5: Means of Firm Specific Characteristics:Industrial Equipment and Machinery

	M&A	Greenfield	Joint Venture	Whlsle/ Retail	ANOVA F-stat	ANOVA p-value
FirmAge	56.89	52.62	51.24	43.60	5.366	0.002*
MarketCapital	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
TotalAssets[a]	414,426	732,571	536,858	74,501	8.915	1.79e-5*
TotalSales[a]	340,882	765,330	535,699	57,908	7.843	6.75e-5*
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*

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

Table 6: Means of Firm Specific Characteristics: Electronic and Electric Equipment

	M&A	Greenfield	Joint Venture	Whlsle/ Retail	ANOVA F-stat	ANOVA p-value
FirmAge	47.08	46.78	54.45	41.40	4.845	0.003*
MarketCapital	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***
TotalAssets[a]	269,801	669,471	612,553	73,536	3.623	0.015**
TotalSales[a]	220,013	662,941	618,850	59,044	3.396	0.020**
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 - Billions of Yen, b - Measured as a dummy variable (1= keiretsu member, 0 otherwise); *,**,*** - significant at the 1%, 5%, and 10%-levels, respectively.

The results from the ANOVA analysis suggest that significant heterogeneity exists within industries. For the chemical industry, ownership choice 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. To eliminate the influence of the export-only parents in the latter 2 industries, we again perform ANOVA analysis for only the manufacturing parents. Our results confirm that there exists significant firm-level heterogeneity not only in the choice between exporting or manufacturing abroad, but also in the investment-mode choice of the manufacturing affiliates.

6 Empirical Framework and Results

From the previous theoretical framework, investing firms first face the decision on whether to invest in, or export to, the destination country. If the firm chooses the investment route, it then must choose among the three competing investment modes (M&A, greenfield, JV); the firm's choice of market servicing strategy depends upon the profit generated from each strategy, and we assume that the firm chooses the one that provides the greatest profit. Although we cannot observe the profit from operating each affiliate type, we

can observe the firm's choice at each stage of the investment decision (invest or export at the first stage; M&A, greenfield, JV at the second stage).

Most previous studies on this subject are forced in their the empirical specification to consider only a part of the decision tree, as typically the only data available is the investment mode of the manufacturing affiliate; that is, no data is available on firms that do not invest. However, we do have data on a subsample of firms that only service the foreign market via exports, namely those that only have wholesale and retail investments. Hence we are able to investigate both the first and second stage of the decision process.

As such, we would prefer to establish a two-stage nested logit framework. Following Maddala (1983), we index the first-stage alternatives as k and the second as i, and let x_{ki} and y_i represent the vector of explanatory variables in (k, i) and (k). Then, the probabilty that alternative i is chosen in the second stage is

$$\Pr(k|i) = \Pr(i|k) \Pr(k).$$

We can then define $\Pr_{i|k}$ to be (for the parameters β)

$$\Pr(i|k) = \frac{\exp(x_{ki}\beta)}{\sum_n \exp(x_{kn}\beta)}.$$

Also, if we define the inclusive values for category (k) as

$$I_k = \ln\{\sum_j \exp(x_{kj}\beta),$$

then we can define the probabilty that i occurs in the second stage as

$$\Pr(i) = \frac{\exp(y_k\alpha + \tau_k I_k)}{\sum_m \exp(y_k\alpha + \tau_m I_m)}.$$

While the nested logit is the model that best fits our theoretical framework, such a model cannot be estimated under our current set-up. This results from the fact that all variability in the data is derived from two sources, the investing firm and the destination country, and not from the different alternatives (investment mode choices). Therefore, to best approach the 2-stage decision, we choose the following estimation strategy. First, using a

standard binomial logit technique, we investigate the first stage investment decision. Second, by restricting our analysis to those investments that did occur, we perform standard multinomial logit estimation on the investment mode decision.[8]

6.1 Stage 1: Invest or Export

This section investigates the firm's first-stage investment decision via a standard binomial logit model. The dependent variable *Invst* is assigned the value 1 if the investment is a manufacturing investment, and 0 if it is a wholesale/retail affiliate (export). Results from this set of regressions are provided in Table 7.

Columns (1)-(2) of Table 7 show the estimation results when only the firm-specific characteristics are included. Since *Size* and *Sales* are shown to be highly pairwise correlated in Table 1, we include these separately as measures of firm assets. Note that larger firms (in *Sales* and *Size*) are more likely to invest than to export to our sample countries, as predicted by the model. Firm age is positively related with the decision to invest, while R&D intensity and export sales have no significant influence on the invest-export decision. Although perhaps somewhat counterintuitive, the increases in the firm's market capitalization significantly increase the likelihood of remaining an exporter.

Columns (3)-(6) add several host-country characteristics to the firm-specific variables. Column (3) adds one-year-lagged values of the host's GDP, the Yen/local currency exchange rate (*ExchRate*), and the Japan-host tax rate differential (*TaxRate*). While the addition of these variables increases the model's pseudo-R^2, none of the individual variables significantly impacts the investment decision.

[8] This second step is in line with most previous studies on the topic, as they are limited to investigating only the second stage.

Table 7: First-Stage Investment Decision: Binomial Logit Model

	(1)	(2)	(3)	(4)	(5)	(6)
KrtsuMem	0.143	0.199	0.298	0.395^c	0.409^c	0.402^c
	(0.199)	(0.202)	(0.212)	(0.223)	(0.227)	(0.223)
FirmAge	0.018^a	.016^b	0.019^a	0.021^a	0.021^a	0.020^b
	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
MktCap	-1.90e-3^c	-1.89e-3^c	-1.66e-3	-2.75e-3^b	-2.72e-3^c	-2.92e-3^b
	(1.03e-3)	(1.06e-3)	(1.11e-3)	(1.36e-3)	(1.38e-3)	(1.35e-3)
Sales	3.890^a					
	(0.632)					
Size		4.261^a	4.251^a	3.710^a	3.710^a	3.750^a
		(0.666)	(0.698)	0.685	(0.688)	(0.069)
R&D	-1.398	-1.09	-0.580	-3.332	-3.225	-3.582
	(2.738)	(2.734)	(2.829)	(3.743)	(3.791)	(3.736)
Export%	-0.002	-0.001	7.94e-4	8.397e-4	8.88e-4	5.74e-4
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GDP			-8.75e-7	-3.46e-7		
			(2.00e-7)	(4.40e-7)		
Pop					-0.170^b	
					(0.073)	
EconPotential						3.04e-3
						(0.006)
ExchRate			0.001	-4.60e-4	-0.002	2.09e-4
			(0.001)	(0.006)	(0.006)	(0.006)
TaxRates			.-2.612	0.861	3.485	1.776
			(2.88e-4)	(2.782)	(2.886)	(2.826)
HostDummy				YES	YES	YES
Constant	-0.497	-0.384	0.164	-2.532^c	-1.891	-2.649^c
	(0.353)	(.359)	(0.429)	(1.309)	(1.369)	(1.509)
Obs.	722	722	722	722	722	722
LR test	122.06	130.36	172.91	163.72	179.71	162.99
Prob $> \chi^2$	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.156	0.167	0.221	0.228	0.251	0.228

Notes: Standard errors in parenthesis. ^{a},^{b},^{c}-significant at the 1%, 5% and 10%-levels, respectively.

The negative sign on the host-market size (GDP), while not significant, is counter to our theoretical predictions. A possible explanation for this result is that our sample of exporters is biased. If the sunk cost involved in establishing a wholesale/retail affiliate is significant, then we will only observe "exporting" if the market is big enough to justify this cost, and in the process ignore exports to smaller markets handled by independent distributors. An

indication that this may be true is that the averge exporter in our sample has established less than 2 affiliates (as noted in Table 1), with a median of 1 established affiliate. A majority of the single-affiliate exporters chose the UK (one of the largest markets in the sample) to host their wholesale/retail distribution affiliates, while a majority of multiple-affiliate exporters have at least 1 of their wholesale/retail affiliates located there (with the other most likely established in Germany).

The inclusion of the host-country dummy variables (columns 4-6) does not significantly affect the previous results, except that now we see that keiretsu membership is significant at the 10% level. In column (5), we replace GDP with host country population (*Pop*) as a measure of host-market size, and it also indicates a negative correlation with market size and manufacturing investment likelihood. This is not surprising, given a pairwise correlation between *GDP* and *Pop* of 0.884.

Finally, to better account for the fact that affiliates established in one host can (and do, especially in the European and Australia-New Zealand regions) service other host markets, column (6) uses a Harris-type (1954) economic potential variable to measure market size. The inclusion of this variable, not pairwise correlated with either *GDP* and *Pop*, yields a positive (albeit insignificant) coefficient, which does support our theoretical framework.

6.2 Stage 2: The Choice of Investment Mode

We now turn our attention to the choice of investment mode. Here, we pare the sample down to only the established manufacturing affiliates (*Invst=1*). Initial estimates are through a standard multinomial logit specification, in which the dependent variable *OwnType* takes separate values depending upon whether the manufacturing affiliate was established through M&A, greenfield investment, or joint venture.

Table 8 provides the estimation results. The greenfield investment alternative serves as the base category for these comparisons; as a result, the coefficient estimates in the M&A and JV columns indicate a relative increase or decrease in the likelihood of that ownership mode being chosen as compared

to a greenfield investment.

Column (1) shows the parameter estimates when the model is restricted to the firm-specific characteristics. These results support the model's general prediction that higher firm assets lead to a greater likelihood of greenfield investment. Smaller firms are significantly more likely to enter via either M&A and/or JV than through greenfield investment, with the coefficients on *Size* negative and significant at the 1% level. In addition, firms with lower export sales percentages are more likely to invest via JV than greenfield, although it does not affect the greenfield-M&A decision. Previous manufacturing experience in the sample countries leads to a significant increase in M&A investments as compared to greenfield, although this experience is not necessarily gained from any one particular host country.

Column (2) adds the host-country specific variables and each host's specific dummy variable to the model. While the firm-specific characteristics *Size, PrevFDISample,* and *Export%* maintain their previous significance, previous investment experience in a particular host (*PrevFDIHost*) is shown to increase the likelihood of a future JV investment. This suggests that increased local market knowledge allows firms greater ability to establish successful joint ventures. In addition, a higher Yen/local currency exchange rate (*ExchRate*) serves to deter M&A investment relative to greenfield investment. This suggests that as host-market assets become more costly to the Japanese investor, its ability to acquire these assets decreases, reducing its ability to invest via M&A. The variable that measures the host's potential M&A-target firms, *HostCap*, does not significantly influence the ownership choice decision. A similar regression, replacing *GDP* with *Pop* as a measure of host market size, yields similar qualitative results.

Table 8: Second-Stage Investment Decision: Multinomial Logit Model

	(1)		(2)		(3)	
	M&A	JV	M&A	JV	M&A	JV
KrtsuMem	0.015	0.176	0.008	0.236	0.005	0.221
	(0.283)	(0.218)	(0.298)	(0.239)	(0.299)	(0.240)
FirmAge	0.011	0.005	0.010	0.007	0.010	.009
	(0.008)	(0.006)	(0.008)	(0.006)	(0.008)	(0.006)
MktCap	5.00e-4	-1.31e-4	2.50e-4	-4.29e-4	2.49e-4	-3.04e-4
	(1.38e-3)	(1.04e-3)	(1.47e-3)	(1.24e-3)	(1.45e-3)	(1.29e-3)
Size	-0.810^a	-0.243^a	-0.007^a	-2.94e-07^c	-0.076^a	-0.029^c
	(0.025)	(0.132)	(0.025)	(0.015)	(0.025)	(0.016)
R&D	-3.774	2.369	-2.793	2.806	-2.641	3.158
	(4.798)	(2.901)	(5.048)	(3.099)	(4.963)	(3.068)
Export%	0.002	-0.013^b	0.002	-0.014^b	0.002	-0.016^a
	(0.003)	(0.005)	(0.002)	(0.006)	(0.003)	(0.006)
PrevFDISample	0.196^a	-0.037	0.195^a	-0.058	0.190^a	-0.047
	(0.050)	(0.047)	(0.055)	(0.052)	(0.055)	(0.052)
PrevFDIHost	-0.089	0.241	-0.131	0.326^c	-0.117	0.331^c
	(0.226)	(0.168)	(0.243)	(0.181)	(0.241)	(0.181)
GDP			3.90e-4	-3.53e-4		
			(8.32e-4)	(6.27e-4)		
EconPotential					0.005	-0.017^b
					(0.010)	(0.008)
ExchRate			-0.013^c	0.006	-.0012^c	0.005
			(0.007)	(0.005)	(0.007)	(0.005)
HostCap			-3.59e-4	6.33e-4	-3.90e-4	1.06e-3^b
			(5.39e-4)	(4.05e-4)	(6.14e-4)	(4.51e-3)
TaxRates			-3.660	-1.920	-4.039	-3.292
			(3.939)	(3.000)	(3.841)	(2.951)
HostDummy			YES	YES	YES	YES
Constant	-1.487^a	-0.179	-2.098^b	-0.407	-2.584^c	1.312
	(0.500)	(0.392)	(1.029)	(0.776)	(1.417)	(1.084)
Obs.	553		551		551	
LR test	51.58		116.93		121.82	
Prob > χ^2	0.000		0.000		0.000	
Pseudo R2	0.102		0.103		0.110	

Notes: Base case is Greenfield Investment. Standard errors in parenthesis. ^{a},^{b},^{c}-significant at the 1%, 5% and 10%-levels, respectively.

Finally, column (3) presents coefficient estimates when we measure host-market size with *EconPotential.* This change does not affect our previous

results for the firm-specific influences, as the coefficients on *Size, PrevFDISample, PrevFDIHost,* and *Export%* all maintain their previous signs and significance levels. The Yen/local currency exchange rate continues to influence the M&A decision, and now *HostCap* postively influences JV formation, although it continues to not significantly impact M&A formation. Finally, the coefficient on *EconPotential* is negative and significant, indicating that greenfield investment is preferred to joint ventures in countries with larger economic potential.

A major assumption of the multinomial logit model is the independence of irrelevant alternatives (IIA), which means that the relative probabilities of selecting a given alternative remain constant regardless of which alternatives are included in the model. We follow Hausman and McFadden (1984) and test the IIA assumption, finding that we are unable to reject the hypothesis that the difference in coefficients is not systematic; the IIA assumption holds.

7 Conclusions

The paper examined how a manufacturer supplies goods to a foreign market. We represented this decision as a two-stage process. In the first stage, the manufacturer decides whether to export or to establish a production subsidiary in the foreign country. In the second stage, the manufacturer chooses the investment mode: greenfield investment, merger and acquisition or joint venture. In a theoretical model we related these choices to firm- and country-specific variables. In particular, we found that the highest-asset (or -productivity) firms choose greenfield FDI, the lower-asset firms M&A or joint ventures and those with the least assets exporting. This prediction is confirmed in our empirical analysis using firm-level Japanese data. This suggests that firm heterogeneity plays an important role in the explaining the pattern of foreign direct investment.

8 Data Appendix

- Countries included in this sample: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Poland, Portugal, Spain, Sweden, Switzerland, UK.

- A firm's market capitalization is determined by the number of shares of common stock multiplied by its year-end stock price (as listed in the PACAP database). In cases where the year-end stock price was not available, its price was determined using the stock information listed in Toyo Keizai's Japan Company Handbook.

- Data for host-market GDP(current $), population, per capital GDP (current $), and market capitalization was found in the World Bank's World Development Indicators CD-ROM.

- Data used to construct *TaxRate* is courtesy of the University of Michigan's Office of Tax Policy Research.

References

[1] Barros, P. and L. Cabral (1994). Merger policy in open economies. European Economic Review 38, 1041-55.

[2] Bertrand, O., J.L. Mucchielli and H. Zitouna (2003), Location choices of multinational firms: the case of mergers and acquisitions, TEAM-University of Paris, mimeo.

[3] Bjorvatn, K. (2004), Economic integration and the profitability of cross-border mergers and acquisitions, European Economic Review, forthcoming.

[4] Blonigen, B.A., R.B. Davis, and K. Head (2002). Estimating the Knowledge-Capital Model of the Multinational Enterprise: Comment. NBER Working Papers 8929. NBER, Cambridge, Mass.

[5] Brainard, S.L. (1997). An empirical assessment of the proximity-concentration tradeoff between multinational sales and trade, American Economic Review 87, 520-544.

[6] Cabral, L. (2003). International merger policy coordination. Japan and the World Economy 15, 21-30.

[7] Carr, D.L., J.R. Markusen, and K.E. Maskus (2001). Estimating the Knowledge Capital Model of the Mulitinational Enterprise. American Economic Review 91 (3): 693–708.

[8] Chao, C.C. and E.S.H. Yu (1996), Are wholly foreign-owned enterprises better than joint ventures?, Journal of International Economics 40, 225-237.

[9] Chen, Z. and T.W. Ross (2003), Cooperating upstream while competing downstream: a theory of input joint ventures, International Journal of Industrial Organization 21, 381-397.

[10] Farrell, J. and C. Shapiro (1990), Asset ownership and market structure in oligopoly, Rand Journal of Economics 21, 275-292.

[11] Girma, S. and R. Kneller (2993), Export versus FDI: an empirical test, mimeo.

[12] Head, K. and J. Ries (1997). International mergers and welfare under decentralized competition policy. Canadian Journal of Economics 30, 1104-23.

[13] Head, K. and J. Ries (2003). Heterogeneity and the FDI versus export decision of Japanese manufacturers. Journal of the Japanese and International Economies 17, 448-467.

[14] Helpman, E., M.J. Melitz und S.R. Yeaple (2004). Export versus FDI with Heterogeneous Firms. American Economic Review 94 (1): 300–316.

[15] Horn, H. and J. Levinsohn (2001). Merger policy and trade liberalization. Economic Journal 111, 244-76.

[16] Horn, H.; Persson, L. (2001), The equilibrium ownership of an international oligopoly, Journal of International Economics, 53: 307-333.

[17] Horstmann, I.J., Markusen, J.R. (1992), Endogenous market structures in international trade (natura facit saltum), Journal of International Economics, 32: 109-129.

[18] Irzano, S. (2004), FDI mode of entry and acquisition of firm specific assets. University of Sydney, mimeo.

[19] Kwoka, J.E., The output and profit effects of horizontal joint ventures, Journal of Industrial Economics 40, 325-338.

[20] Lipsey, R. (2000), Interpreting developed countries' foreign direct investment, NBER Working Paper 7810.

[21] Markusen, J.R., Venables, A.J. (1998), Multinational firms and the new trade theory, Journal of International Economics, 46: 183-203.

[22] Markusen, J.R., Multinational Firms and the Theory of International Trade, MIT Press 2002.

[23] Mukherjee, A. and S. Sengupta (2001), Joint ventures versus fully owned subsidiaries: multinational strategies in liberalizing economies, Review of International Economics 9, 163-180.

[24] Neary, P. (2003), Cross-border mergers as instrument of comparative advantage, mimeo

[25] Perry, M.K. and R.H. Porter (1985), Oligopoly and the incentive for horizontal merger, American Economic Review 75, 219-227.

[26] Salant, S.W., Switzer, S., Reynolds, R.J. (1983): Losses From Horizontal Merger: The Effects of an Exogenous Change in Industry Structure on Cournot-Nash Equilibrium, Quarterly Journal of Economics , 98: 185: – 199.

[27] Tekin-Koru, A. (2004), Is FDI indeed tariff-jumping? Firm-level evidence, Oregon State University, mimeo.

[28] Yi, S.-S., (1998), Endogenous formation of joint ventures with efficiency gains, Rand Journal of Economics 29, 610-631.

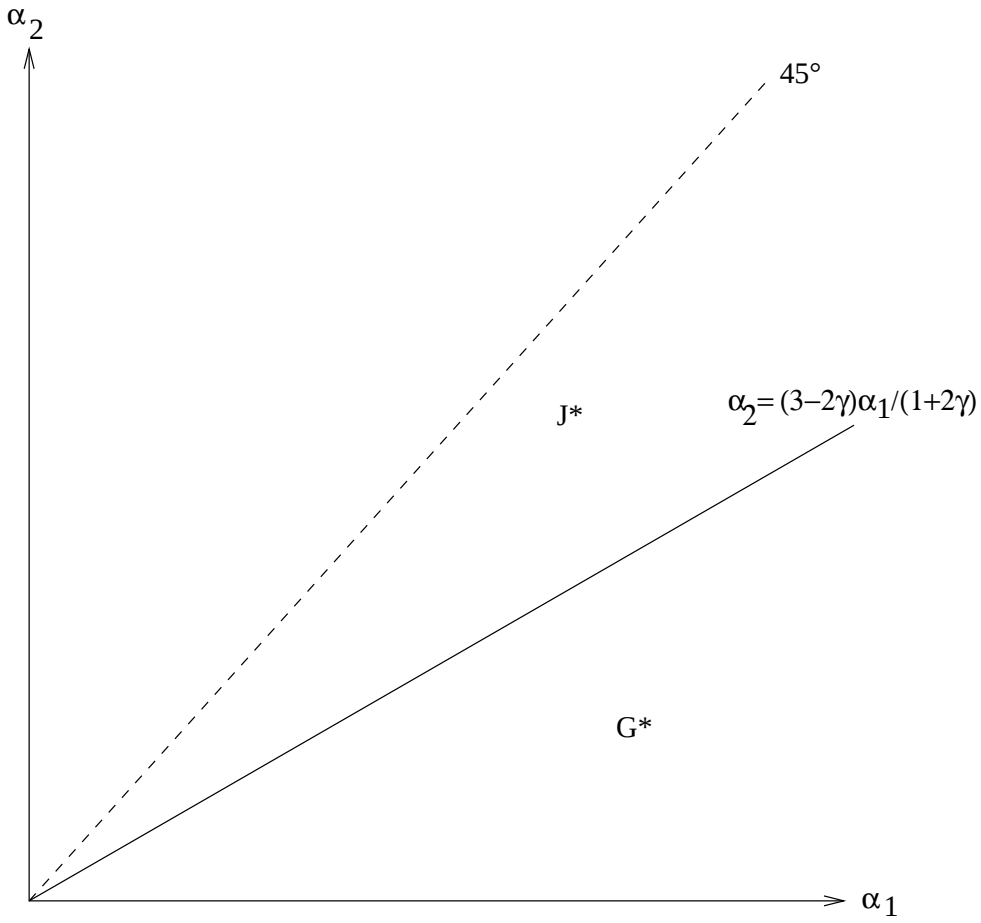

Figure 1: Joint venture vs greenfield

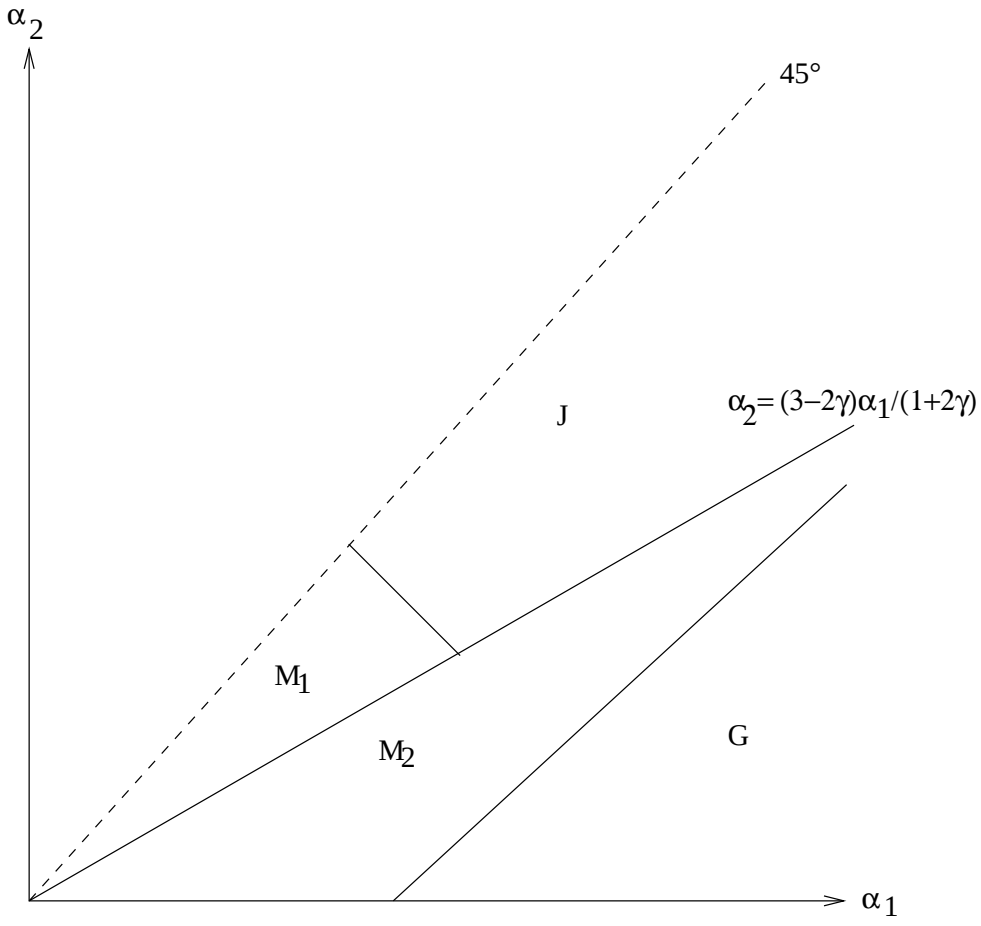

Figure 2: Joint venture vs merger vs greenfield