Divesture of Foreign Manufacturing Affiliates: Country Platforms, Multinational Networks, and Agglomeration

René Belderbos
Katholieke Universiteit Leuven and Universiteit Maastricht

and

Zou Jianglei
Katholieke Universiteit Leuven

Keywords: Divesture, agglomeration, multinational firms, networks

René Belderbos
Katholieke Universiteit Leuven
Faculty of Economics and Applied Economics
Department of Managerial Economics and Strategy
Naamsestraat 69
B-3000 Leuven
Belgium
Phone + 32 16 326912
Fax + 32 16 326732
Email: Rene.belderbos@econ.kuleuven.ac.be

Zou Jianglei
Katholieke Universiteit Leuven
Faculty of Economics and Applied Economics
Department of Managerial Economics and Strategy
Naamsestraat 69
B-3000 Leuven
Belgium
Phone + 32 16 326871
Email: Jianglei.zou@econ.kuleuven.ac.be

Divesture of Foreign Manufacturing Affiliates: Country Platforms, Multinational Networks, and Agglomeration

ABSTRACT

This paper develops hypotheses concerning the impact of multinational firms' international plant configuration and foreign investor agglomeration on the divesture of manufacturing affiliates. We test our hypotheses on a comprehensive sample of 1080 Asian manufacturing affiliates of Japanese multinational firms in the electronics industry during the years preceding and up to the Asian financial crisis (1995-1999). Consistent with real option theory, country platform investments are more likely to survive, but affiliates owned by firms with extensive multinational plant networks have a higher probability of divesture. Evidence is found that investor agglomeration leads to 'adverse selection' of less competitive firms: firms most responsive to Japanese investor agglomeration or inter-firm buyer-supplier agglomeration within vertical business groups have a higher probability of divesture. Other factors affecting the probability of divesture are affiliate size, affiliate operating experience, entry mode, parent size, and the growth in labor cost in the country of investment.

Divesture of Foreign Manufacturing Affiliates: Country Platforms, Multinational Networks, and Agglomeration

INTRODUCTION

The expanding literature on multinational enterprises (MNEs) had devoted substantial attention to strategic issues related to their foreign expansion, such as the firm-level determinants of international expansion (Belderbos and Sleuwaegen, 1996; Kogut and Chang, 1991; 1996), the choice of entry mode abroad (e.g. Delios and Beamish, 1999b; Hennart, 1991; Barkema and Vermeulen, 1999), the choice of location of new affiliates (Head et al., 1994; Shaver and Flyer, 2000), the evolution of affiliate roles and capabilities (Jarillo and Martinez, 1990; Rugman and Verbeke, 2001), and the impact of multinational expansion on overall firm performance (Delios and Beamish, 1999a; Hitt, Hoskisson and Kim, 1997; Tallman and and Li, 1996). These empirical studies have been based on an abundance of, mostly complementary, theories of multinational enterprise and foreign investment that are based on transaction costs theory (e.g. Caves, 1998, Dunning, 1993; Hennart, 1988), the theory of oligopolistic interaction (Knickerbocker, 1973), location and agglomeration theory (Chung and Kalnins, 2001, Krugman, 1991, Chung and Alcacer, 2002), the resourced based theory of the firm (e.g. Chang, 1995), process and organizational learning theory (Johansson and Vahlne 1977; Kogut and Zander, 1995), and the theory of real options (Kogut and Kulatilaka, 1994a, 1994b).

Comparatively little attention has been paid to MNEs' decisions to withdraw from foreign operations, i.e. foreign divesture. Previous studies did uncover a number of factors systematically affecting the survival of foreign affiliates, such as the mode of entry (Li, 1995; McCloughan and Stone, 1998; Shaver, 1998), size and experience of the affiliate (Benito, 1997; Shaver et al, 1997), the market focus of the affiliate (Chen and Wu, 1996; Pan and Chi, 1999), the extent of diversification of entry (Li, 1995), parent experience gained through previous international expansion (Li, 1995; Shaver et al, 1997), human capital and technology advantages (Mata and Portugal, 2000; Delios and Beamish, 2001;

Belderbos, 2003), and industry concentration (Mitchell et al, 1994; Li, 1995).[1] A limitation of most studies is that they examined the determinants of survival and divesture of foreign affiliates in a single country setting, i.e. in the US (Li, 1995; Mitchell et al, 1994; Shaver, 1998; Shaver et al, 1997), Portugal (Mata and Portugal, 2000; 2002), Taiwan (Chen and Wu, 1996), Ireland (McCloughan and Stone, 1998), Belgium (Pennings and Sleuwaegen, 2000), Japan (Yamawaki, 1999) and China (Pan and Chin, 1999).[2] Partly as a result, previous studies have not paid due attention to at least two factors potentially impacting MNEs' divesture decisions. First, affiliates can be part of a larger foreign affiliate network of the MNE, playing the vital role of a country platform investment (Kogut and Kulatilaka, 1994b), but at the same time facing greater risk of manufacturing activity relocation to other affiliates in the network. Real option theory stresses the potential value of country platform investments and the flexibility value of a network of manufacturing plants in different currency areas. It has been applied to explain sequential investments by parent firms (Kogut and Chang, 1996), the formation of MNE affiliate networks as a competitive advantage (Kogut and Kulatilaka, 1994a), and entry mode decisions (Kouvelis, et al. 2001; Kogut, 1991) but the implications for divesture decisions have not been examined.[3] Second, the survival of affiliates is likely to be related to the existence of agglomeration benefits of a country location due to a concentration of foreign invested affiliates leading to potential knowledge spillovers and externalities in business services, intermediate input provision, or positive demand effects (Chung and Kalnins, 2001; Wheeler and Mody, 1992). Empirical studies of location decisions by MNEs have found that agglomeration effects have a positive impact on location choice (e.g. Head and Ries, 1996; Head et al., 1994), in particular where they concern agglomerations of buyer-supplier within Japanese vertical business groups (keiretsu). Recent work has however uncovered that there are heterogeneous responses to agglomeration depending on investing firms' characteristics (Belderbos and Carree, 2002; Shaver and Flyer, 2000), with less competitive and smaller firms more attracted to agglomerated areas. Shaver and Flyer (2000) provide preliminary evidence that agglomeration is associated with a greater probability of exit, possibly due to stronger competition in these areas and the greater attraction to smaller firms.

In this paper we develop hypotheses concerning the impact of multinational firms' international plant configuration and foreign investor agglomeration on the probability of divesture of manufacturing affiliates, informed by real option theory and the theory of agglomeration and location choice. The importance of these theoretical insights has been explored in the context of international expansion by

[1] In addition, Song (2002) analysed the role of affiliate capabilities and embeddedness in the upgrading or downsizing in a sample of 194 Japanese electronics affiliates in Asia during 1988-1994, but could not identify divestments.

[2] Exceptions are Benito (1997), examining divestment of foreign subsidiaries by Norwegian companies and Belderbos (2003), examining divestments by Japanese firms in EU countries.

[3] One exception is Pennings and Sleuwaegen (2001), who examine relocation decisions by Belgian firms.

MNEs but is yet to be examined adequately in the context of foreign divestures.[4] We explicitly take into account that foreign affiliates are often part of an intra-firm multinational network of foreign affiliates and can have strong inter-firm ties with other affiliates in foreign investor agglomerated locations, in particular if local affiliates belong to the same vertical business group. We test our hypotheses on a large sample of 1080 manufacturing affiliates operated in nine Asian countries by Japanese electronics MNEs during the years preceding and up to the Asian financial crisis (1995-1999). This is an interesting setting for our tests because of a number of reasons. The high degree of uncertainty concerning future exchange rate and economic growth performance of countries faced by foreign investors in Asia during those years will have increased the option value of platform investments and manufacturing networks. Japanese firms have also been shown to operate networks of interrelated manufacturing plants in the area making use of differences in real labor cost (Belderbos, 1998). The plant location choices of Japanese firms have furthermore been found to be responsive to agglomerations of other Japanese-owned plants abroad, in particular if the investing firms are suppliers within vertical business groups that follow the leading assembler abroad (e.g. Belderbos and Sleuwaegen, 1996).

The remainder of the proposed paper will be structured as following: In section 2 we review the relevant literature and derive hypotheses. A description of the data, operational measures and empirical methods is given in Section 3. Section 4 presents the results and Section 5 concludes.

LITERATURE AND HYPOTHESES

Literature Review

Studies on survival of foreign affiliates drew their early inspiration from industrial organization theory on industry and firm dynamics, dealing with firm entry, exit, and post-entry performance. Theoretically, Jovanovic (1982) modeled the expansion of firm as an adaptive learning process. He argued that firms learn about their efficiency only gradually and, under uncertainty, tend to enter with a relative small size. Successful firms subsequently increase their size incrementally as their efficiency reveals itself, and unsuccessful firms would exit at the early age when they were still small, since learning effects take place in particular in the early phase after entry. His model predicts that, at a point of time, larger firms and older firms are more likely to have been growing successfully in the past and hence have a higher

[4] In this regard, we follow Boddewyn (1983) where it is suggested that any theory of divestment should consider the determinants of foreign investments.

probability of survival, compared with their smaller and younger counterparts. Evidence of this prediction had been found in several empirical studies: e.g. Evans (1987) found that the probability of firm survival increases with firm size and firm age and Dunne et al (1988) found evidences that small and young firms have the highest rate of failure. The relationships between establishment size, age and the probability of survival have also been tested in the context of foreign owned affiliates. Li (1995) found a negative relationship between affiliate size and its exit rate for foreign owned affiliates in the US, Yamawaki (1999) for foreign owned affiliates in Japan, and Belderbos (2003) for Japanese affiliates in Europe. On the other hand, the relationship between foreign affiliate age and survival appears non-linear. Li (1995) found the exit rate to increase in the first 4-5 years after establishments, which suggest the presence of a "Honeymoon" effect: firms give affiliates a number of years to prove their success. Mata and Portugal (2002) argue that there might also be a "liability of adolescences": exit rates increase for the oldest affiliates, suggesting that there is increasing rigidity as new establishments age (cf. Hannan et al, 1998), although they failed to find significant result in their data to support this argument.

The international business literature has further focused on the determinants of survival of foreign affiliates specifically, drawing on a number of theories. Conceived theory of foreign direct investment (e.g. Hymer, 1976; Caves,1996; Dunning, 1993) posits that firms entering foreign market face a much higher information and adaptation costs and are put in a inferior position through their "liability of foreigness" vis-à-vis local firms. Hence, foreign entrants require a compensating competitive advantage, often based on the possession of intangible assets, that can be transferred and exploited abroad in order to survive (e.g. Buckley and Casson, 1976; Hennart, 1988). A number empirical studies have shown a positive impact of technology, advertising, or human capital intensity on foreign affiliate survival (e.g. Delios and Beamish, 2001; Mata and Portugal, 2000; Belderbos, 2003).

A complementary view on foreign direct investment, the process or "stage" theory of internationalization, suggests that firms tend to circumvent the "liability of foreigness" problem by following an incremental pattern of foreign market involvement (Johanson and Valhne, 1977). Firms build up internationalization experience through acquiring foreign market knowledge from previous involvement, enhancing the capability to efficiently exploit their intangible assets on (more distant) foreign markets (Kogut and Zander, 1995), and reducing the probability of foreign affiliates' failure. Chang (1995) found evidences that Japanese firms follow a sequential pattern for their entries into U.S. market, with first entries focusing on core, competitive, product lines and subsequent entries, more in non-core business. Li (1995) found that subsequent entries were less likely to exit than first time entries by foreign firms in the US. Shaver et al (1997) extended this argument and suggested that firms can also learn from other firms' international experience, consistent with the finding by Mitchell et al (1994) of a

positive relationship between the survival of a foreign affiliate and the presence of other foreign affiliates in a host country market.

An expanding literature in international business has examined the entry mode decisions for foreign operations and the impact of entry mode on affiliate survival, with a focus on the longevity and stability of international joint-ventures (e.g. Franko, 1971; Gomes-Casseres, 1987; Kogut, 1989, 1991). Most findings suggest that foreign entries through joint venture have a systematically higher probability of exit than those through Greenfield (Li, 1995; Yamawaki, 1997; Benito, 1997; Hennart et al, 1998). This has been related to failure to deal with management conflicts and cultural differences, but also by a real option view of joint ventures: foreign firms may withdraw from a joint ventures once they have gained sufficient experience in the local market to go it alone (Kogut, 1988; Yan and Zeng, 1999). This may lead them to buy out the local partner, or to sell to the local partner. Hennart et al. (1998) indeed suggest that the higher termination rate of joint ventures is predominantly explained by a higher probability of selling the equity stake but not of liquidation. Dhanaraj and Beamish (2004) provide a more fine-grained analysis of the role of equity ownership in the dissolution of foreign affiliates and found that minority stakes are most associated with divesture, but not majority stakes. Besides entry through joint ventures, acquired affiliates also appear to exhibit higher divesture probabilities, which has been attributed to difficulties related to post-acquisition integration (Li, 1995). Mata and Portugal (2000) found that acquired affiliates are more likely to lead to divesture through sale of the firm, but not through closure.

Other strategic variables that have been suggested to impact foreign affiliate survival are the degree of diversification and the market orientation of the firm. Diversified affiliates are more likely to fail, mainly due to the fact that investing firms have to face in the same time unfamiliar market and unfamiliar products (Benito, 1997; Li, 1995; Yamawaki, 1997). With regard to market orientation of the firm, Chen and Wu (1996), in their study based on foreign investment projects in Taiwan, related the proportion of affiliate sales generated from export to the survival of the affiliate, and found that affiliates with higher export proportion are more likely to withdraw. Pan and Chi (1999) also studied the impact of market focus of foreign affiliates on their survival and performance but did not find evidence of a systematic impact.

HYPOTHESES

Two issues that have not received due attention in the divestment literature but have been found relevant for FDI decisions are the real options perspective on FDI and manufacturing networks, and the role of agglomeration in location decisions by MNEs.

Most of the literature on foreign affiliate survival implicitly associates exit with the failure of the foreign affiliate. However, exit may be due to reasons other than affiliate failure, and poor performance is only one of the identified factors of foreign divesture (Boddewyn, 1979). A divesture might be due to a strategic reorientation of the parent firm and to the perception that the affiliate no longer fits with the parent's strategic goals (Mata and Portugal, 2000). The literature on MNEs and firm performance emphasizes the importance of the operational flexibility achieved by maintaining a multinational network (Grant, 1987; Gomes and Ramaswamy, 1999). Within such a network, firms can easily shift production from one location to another, without having to incur fixed cost, if the manufacturing environment in a particular location proves to be unfavorable. Real option theory puts a value on this international operational flexibility due to the operation of dispersed manufacturing networks. Under the condition of uncertainty concerning future relative cost and market conditions in host countries,[5] the ability to shift manufacturing operations quickly between locations in response to changing cost differential can provide an important competitive advantage. Kogut and Kulatilaka (1994a) formally showed that the option value of this flexibility could be substantial when there is high uncertainty concerning demand or manufacturing costs. Such shifts in manufacturing operations between plants can involve changing capacity loadings of plants or transferring production lines between plants, but they can also involve the closure of plants. The advantage of operating a network of manufacturing plants in potentially competing manufacturing locations is that MNEs face lower cost of relocation. Lower relocation costs imply lower costs of divesture of an individual affiliate, which makes such divestures more likely.

Hypotheses 1: a foreign manufacturing affiliate has a higher probability of divesture if its parent firm operates a larger network of plants in potentially competing locations.

Following the same line of reasoning, however, the operational flexibility of a manufacturing network is only maintained if the firm keeps operations in several countries with potentially diverging demand and cost characteristics. In order to flexibly react to market opportunities and changes in labor costs it is necessary to maintain a platform investment in important locations, which represents a valuable option for future expansion (Kogut and Chang, 1996, Kogut and Kulatilaka, 1994b):

Hypotheses 2: a foreign manufacturing affiliate that serves as a country platform (it is the only affiliate of the parent in a country) has a lower probability of divesture.

[5] We note that in the empirical setting of this paper, i.e. conditions in Asia around the time of the Asian financial crisis, multinational firms faced great uncertainty concerning exchange rates, inflation, and economic recovery and demand in the different Asian countries. This increase the option value of operating a network in various countries, while at the same time great divergence in labour costs pushed firms to use their networks for international relocation.

It has long been suggested that firms can enjoy positive externalities stemming from geographic industry clustering through the provision of specialized inputs, specialized business services, greater demand due to lower search costs of customers, or spillovers of technological and organizational knowledge. These possible externalities would motivate firms to choose geographically clustered locations for their new investments, and this motivation would also hold for international expansions. This intuition has been supported by both formal economic models (Krugman, 1991; David and Rosenbloom**,** 1990) and empirical studies on location decision of both domestic and plant investments (Carlton, 1983; Bartik, 1985; Wheeler and Mody, 1992; Head et al, 1995; Head and Ries, 1996; Belderbos and Carree, 2002; Shaver and Flyer, 2000). Recent work has emphasized that firms can be heterogeneous in their locational choice response to agglomeration benefits (Shaver and Flyer, 2000; Belderbos and Carree, 2002), due to differences in the net contribution of such benefits. Firms with the most innovative technologies and organizational and process skills contribute relatively more to knowledge spillovers within industry clusters and therefore receive fewer net benefits (Shaver and Flyer, 2000). Hence the presence of agglomeration economies can lead to 'adverse selection': a selection process through which the firms with relatively weaker competitiveness are more likely to opt to locate within the cluster, and the most competitive firms more likely to locate outside the cluster.

Agglomeration effects have been found to be particularly strong in the case of Japanese MNEs' foreign investment decisions (e.g. Head et al, 1995; Mayer and Muchielli, 1998). This has been attributed to the use of 'national' amenities such as Japanese schools, the ease of communication and information exchange between Japanese companies, reliance on just-in-time (JIT) delivery systems that require close spatial concentration of manufacturing plants and strict production flow control by suppliers, and quality control requirements imposing strong demands on suppliers, which can be satisfied more easily by Japanese firms with experience in total quality management (Belderbos and Carree, 2002). Furthermore, agglomeration benefits and clustering have been found to be even more pronounced for firms belonging to vertical business groups (vertical keiretsu), centered around large 'core' firms in the automobile and electronics industry such as Toyota or Toshiba. Vertical keiretsu are characterized by intensive inter-firm flows of information and the core firm may give active assistances to member firms in the process of overseas relocation. Suppliers within vertical keiretsu often manufacture specialized components to the design specification of the 'core' firm, and such supplier relationships are replicated abroad. Since economies of scale in the production of the component can be reaped with larger keiretsu activities in the location, a location becomes more attractive for supplier investments with larger 'core' firm activities. Belderbos and Carree (2000) find evidence of a differential response to vertical business group agglomeration: member firms are strongly responsive to agglomeration but the 'core' firm is less

responsive and often explores alternative locations. Member firms have also been able to expand internationally even if they had weaker capabilities (in terms of R&D and human capital intensity) due to the presence and assistance of the 'core' firm manufacturing networks abroad (Belderbos and Sleuwaegen, 1996).

The above findings also have consequences for the survival or divesture of manufacturing affiliates. On the one hand, agglomeration provide benefits to co-located firms and enhances the overall competitiveness of the location and the population of firms (c.f.. Porter, 1990). On the other hand, co-location of firms leads to more intensive competition and may lead to a more rapid exit of the weaker firms (Chung and Kalnins, 2001). Those firms that were most responsive to agglomeration benefits at the time of entry because their net benefits from agglomeration were greater, have inherently weaker competitiveness (Shaver and Flyer, 2002). These firms are less likely to sustain a sufficient level of competitiveness to survive rivalry in agglomerated areas, in particular if the economic environment becomes less attractive, and are more likely to exit. This reasoning applies a fortiori to firms that are members in vertical business groups, which can overcome barriers and costs of foreign expansion through the replication of supplier-buyer linkages with a local network of group manufacturing plants and need fewer inherent competitive advantages to overcome the 'liability of foreignness'. This leads to the following hypotheses:

Hypotheses 3: Foreign manufacturing affiliates whose location choice has been strongly responsive to foreign affiliate agglomeration have lower inherent competitiveness and have a higher probability of divesture.

Hypotheses 4: Foreign manufacturing affiliates whose location choice has been strongly responsive to vertical business group agglomeration have lower inherent competitiveness and have a higher probability of divesture.

DATA AND EMPIRICAL METHODS

Data

Our dataset consists of 1098 manufacturing affiliates in early 1995 that are set up by 412 Japanese firms in the broadly defined electronics industry in 9 Asian countries or regions, i.e. South Korea, Taiwan,

China, Hong Kong, Singapore, Indonesia, Philippines, Malaysia, and Thailand. The data are compiled by the Research Institute of Electronic Industry as "Asia Shinshutsu Denshi Meika" (Survey of Japanese electronic firms in Asia) in Tokyo for 1995 and early 1999. It is an authoritative source on Japanese foreign investments in Asia in electronics industry with complete coverage of investments by both large firms, small and medium sized firms, and specialized suppliers to the electronics industry (glass, plastic, metals, chemical materials). The data gives a reliable picture of investments by both leading electronics firms and smaller vertical business group-related or unrelated suppliers along the value chain of the electronics industry. The database contains information on the affiliates' paid-in capital, number of employees, equity stake held by Japanese investors, direction of sales, and products manufactured, and it also contains parent firm information on sales, number of employees, paid-in capital, and recent developments in the firms' overseas operations. We included in our dataset those manufacturing affiliates in which (Japanese) parent firms have more than 10 percent equity stake. In order to determine which affiliates were divested, we compared the 1995 data-book with the 1999 edition, which covers Japanese overseas electronics affiliates operational in early 1999 in the 9 countries. A divesture case is identified when we could confirm with certainty that a 1995 affiliate was either closed or its stake sold to a local or foreign firm by its parent.[6] The confirmation was given by the parent information provided for each Japanese firm in the survey itself on such decisions, combined with information from other publications by the Research Institute on developments in Japanese electronics firms, other sources on Japanese affiliates abroad (Toyo Keizai, 1999), and coverage in Japanese newspapers drawn from the Nikkei web news service. As a result, 99 out of 1098 overseas manufacturing affiliates in operation in early 1995 were identified as having been divested by early 1999.[7] However, since for 18 affiliates a number of explanatory variables had missing values, our empirical analysis will be performed on 1080 observations, out of which 97 are divesture cases.

The country distribution of 1995 affiliates and divesture can be found in Table 1: As we can see, in 1995 China had the largest share of affiliates in our sample (22), followed by Malaysia (21) and Taiwan (13). The distribution of divestures is rather different, with divestures mostly occurring in (in terms of the share of divested affiliates) in the NIEs Singapore (19), Hong Kong (16), and South Korea (14).

Insert Table 1

[6] In line with previous work, we examine all divestments. In an extension in Section 4 we focus on relocations more specifically.
[7] The exact date (year) of the divestment could however not be determined in all cases.

Model specification

Our dependent variable is binary, taking the value 1 if a 1995 affiliate is divested prior to early 1999 and 0 if it survived as a parent affiliate in those four years. We use a Probit model to relate the probability of divesture to the explanatory variables. The Probit model assumes that there is a latent variable measuring the likelihood of divesture of each affiliate (y_i^*), which can be related to a set of parent, affiliate, and host country variables. The affiliate is divested if this latent variable exceeds a certain threshold value (e.g. Greene, 1997).

$$y_i^* = \beta_0 + \beta_1 x_i + \varepsilon_i$$

(1)
$$Y_i = 1 \qquad if \quad y_i^* > 0$$
$$Y_i = 0 \qquad if \quad y_i^* < 0$$

Operational measures

To test Hypothesis 1, we use two alternative variables measuring the size of the firm's plant network in potential competing regions. These variables both relate to the multinational plant network in Asia, since other Asian plants provide the most important options for shifts in manufacturing operations.[8] The first variable, *Asian manufacturing network size*, is merely the overall size of firm's plant network (number of manufacturing affiliates) in Asia in other countries than the country of the focal affiliate, taken in logs. Alternatively, we just count the number of Asian countries in which the firm has manufacturing operations, with the restriction that only countries with lower labour cost than the country of the focal affiliate are counted *(Asian low cost country presence*). This variable may have two advantages over a general count. First, both anecdotal and empirical evidence show that labour cost is one of the major concerns for firms' relocation decision (Cordella and Grilo, 1998; Pennings and Sleuwaegen, 2000). The presence of a large number of plants in high cost South Korea may not be relevant to a divesture or relocation decision for a plant in China in response to increase Chinese wages. Second, one could argue that the ease of relocating production to locations with lower cost is mostly related to the question whether a firm operates a plant in a specific low cost country and less to the question how many affiliates it operates in that country. Hypothesis 1 predicts a positive impact on divesture of both measures. To test Hypothesis 2, we include a dummy variable (*country platform affiliate*), which takes the value 1 if the affiliate is the only manufacturing affiliate of its parent in the country in 1995, and 0 otherwise. In particular given the uncertainty and turbulence in the Asian region in the late 1990s, divesting a

[8] In our analysis of the databooks and newspaper reports, not one case was discovered of relocation outside of Asia.

manufacturing platform in an Asian country would reduce the size and option value of the Asian manufacturing network. Hypothesis 2 predicts a negative impact on the probability of divesture.

Both Hypothesis 3 and 4 concern the degree to which the firm responded to agglomeration benefits at the time of entry and its implication on the probability of this entry being divested. To test Hypothesis 3, we include in the model a measure of foreign agglomeration at the time of entry, which is for each affiliate the logarithm of the total number of manufacturing affiliates established in the country by all other Japanese firms in the electronics value chain at the time of the affiliate's entry (*Japanese agglomeration at entry*). We cannot measure adverse selection directly, but this measure assumes, consistent with earlier findings (e.g. Belderbos and Carree, 2002), that firms take the level of Japanese affiliate agglomeration strongly into consideration when the choose locations for their manufacturing plants, and that firms with weaker competitiveness are most likely to be attracted to such agglomerations. Hypothesis 3 predicts a positive sign for *Japanese agglomeration at entry*. An alternative measure of agglomeration and adverse selection takes into account that firms do not respond in a homogenous fashion to agglomeration. Shaver and Flyer (2000) and Belderbos and Carree (2002) found that small firms are much more responsive to agglomeration than larger firms. Hence, agglomeration at entry should be more closely correlated with adverse selection for smaller firms. To capture this effect, we add an interactive term of *Japanese agglomeration at entry* and the *parent firm size*. While *Japanese agglomeration at entry* is expected to impact the probability of divesture positively, the interaction effect is expected to have a negative sign, as agglomeration is less important for larger firms and therefore less associated with adverse selection.

To test Hypothesis 4, we calculate for each affiliate at the time of entry, the logarithm of the number of manufacturing affiliates established by other Japanese firms belonging to the same vertical Keiretsu (*Keiretsu agglomeration at entry*). Hypothesis 4 suggests an adverse selection process present in firms' responses to Keiretsu agglomeration benefits, as the cost of entry abroad and the need for compensating competitiveness are substantially reduced for new affiliates that benefit from local intra-group transactions and assistance. Earlier work on locational determinants of Japanese multinationals has confirmed the strong impact of keiretsu agglomeration on location decisions of member firms (e.g. Head et al, 1995; Mayer and Muchielli, 1998). In addition, there is evidence of differential responses to keiretsu agglomeration by member firms and the core firm of the vertical groups (Belderbos and Carree, 2002; Pugel and Kimura, 1996), with member firms more responsive to agglomeration ('following the leader', the core firm) while core firms appear also involved in pioneering new locations without previous keiretsu establishments. To allow for this type of heterogeneity in the response to keiretsu agglomeration, we split the Keiretsu agglomeration into two variables: Keiretsu agglomeration measure for *core firm*s and for

member firms. Following the adverse selection argument, we expect that Keiretsu agglomeration measure for member firms has a stronger positive impact on divesture than for core firms.

Control variables

The model includes an extensive set of control variables representing factors at the parent, affiliate, and host country level suggested to have a potential impact on divesture in earlier studies. We distinguish parent firm characteristics, affiliate characteristics and host country characteristics.

Parent firm characteristics

We include two control variables for the competitiveness of the parent firm expected to impact the probability of divesture. *Parent firm Patent intensity* (the number of US patents granted to the parent firm during 1993-1999 times 1000, divided by parent sales in 1995). Patent intensity proxies for competitive advantages based on advanced technology that are likely to increase the probability of affiliate survival. In addition, *parent competitiveness in Asia* (the change in the number of other manufacturing affiliates of the parent firm operated in the nine Asian countries between 1995 and 1999) is an indicator of the overall success of the parent firm in its Asian operations. A strong reduction in the number of other Asian plant will indicate reduced competitiveness of the Japanese vis-à-vis other Japanese or Asian firms.

We include two other parent control variables: p*arent size*, and *parent prior country experience*. *Parent size* (the logarithm of parent firm sales in 1995) has been found to impact the probability of divesture positively (Li, 1995; Hennart et al, 1998; Belderbos, 2003), but also negatively (Park and Park, 2000). On the one hand, larger investing firms either find it easier to reach a withdrawal decision or give less weight to an individual affiliate, speeding up rationalization. However, a reverse argument also has appeal: larger firms have more financial or management resources and can exercise more patience for poorly performing affiliates. *Parent prior country experience* (the logarithm of the number of affiliates established by the parent firm in the country prior to the establishment of the focal affiliate) captures that multinational firms can reduce it "liability of foreigness" by learning from prior experience in the host country. Previous studies have confirmed an positive impact on the probability of affiliate survival of the host country experience of the parent firm (Hennart et al. 1998; Park and Park 2000; Shaver et al, 1997).

Affiliate characteristics

We include two control variables at the affiliate level consistent with the entry and exit theory of Jovanovic (1982). *Affiliate size* (the logarithm of the number of employees of the affiliate in 1995[9]) has been found to be positively associated with firm survival (Dunne et al, 1989; Mitchell, 1994; Mata et al, 1995). Affiliate size is taken as an indicator of success as only successful affiliates have been capable of growth.[10] Studies show that this positive relationship between size and survival also applies to foreign affiliates (Mata and Portugal, 2000; Belderbos, 2003). *Affiliate age* (the number of year the affiliate has been in operation until 1995) is included to capture that newly established affiliates suffer more from "liability of newness" and still face greater uncertainty concerning their efficiency, while older affiliates have been able to improve their operations to adapt to host country conditions. Earlier evidence supports a positive relationship between firm age and firm or affiliate survival (e.g. Mitchell, 1994; Mata and Portugal, 1994; Yamawaki, 1999; Benito, 1997; Shaver et al, 1997). On the other hand, evidence has also been found of the presence of a "liability of adolescences" (Hannan, 1998), with the probability of survival increasing with age over a range of years (Mata and Portugal, 2002). To accommodate a more complex relationship between age and divesture, we include the quadratic term as well as the linear term of *affiliate age*.

The entry mode of the affiliate is also likely to impact divesture probabilities. We include three dummy variables with wholly owned Greenfield affiliates as reference group: *majority owned JV (*taking the value 1 if the affiliate is a Joint Venture in which its Japanese parent held a majority stake, 51-95 percent), *minority owned JV* (taking the value 1 if the affiliate is a Joint Venture in which the Japanese parent held a minority or 50 percent stake), and a*cquired affiliate* (taking the value 1 if the affiliate was acquired by the Japanese parent). Earlier work has found that entry through joint venture is associated with significantly higher probabilities of divestment (Barkema et al, 1996; Hennart et al, 1998;), with minority owned joint ventures more likely to be divested than majority owned ventures (Mata and Portugal, 2000). Similarly, acquired affiliates have been found to have a higher probability of subsequent divestment (Wilson, 1980; Delacroix, 1993;Li, 1995; Mata and Portugal, 2002;).

The last affiliate characteristic is its market orientation. Multinational firms have different motives for foreign affiliate establishments: they can use their foreign affiliates as a production base serving export markets, or to manufacture products serving, and often adapting to, the local market. Export-oriented affiliates established in Asia by Japanese electronic firms are often a vehicle to take advantage of the comparative advantages in these countries in terms of manufacturing costs. They may be more sensitive to changes in comparative advantages, also they tend to be less embedded in the local economy in terms of

[9] The dataset does not include reliable sales figures for all affiliates.

[10] In addition, there is also evidences that affiliates with a larger start-up size are more likely to survive (Mata and Portugal, 1994). Large affiliates have better management resources, and larger priori expectation of success.

supplier and other linkages (Belderbos et al, 2001). Local-orient affiliates, in contrast, give more weight to local adaptation and are comparatively more integrated into local economy. Belderbos and Fukao (2001) found evidence that foreign affiliates of Japanese firms that are local market oriented demonstrate more intensive backward linkages with local suppliers. Development of ties with local suppliers can be seen as country-specific assets that increase local capabilities but loose their value once the firm decides to divest, increasing exit costs (e.g. Song, 2002). Pan and Chi (1999) argue that local market oriented firms may perform better since they are more shielded from fierce competition on world markets, but found no evidence in a sample of foreign owned affiliates in China. Accordingly, we include in our model two market orientation variables: *Export orientation* (dummy variable taking value of 1 if 100 percent sales of affiliate is generated from export); *Mixed market orientation* (dummy variable taking value of 1 if the affiliate is oriented both to local and export market). Affiliates that are completely oriented to local market serves here as a reference group.

Country characteristics

The analysis controls for the potential impact of *Japanese agglomeration in 1995* (the logarithm of number of manufacturing affiliates in the electronics value chain in operation in the country in 1995, excluding those affiliates belonging to the parent firm of the focal affiliate). The current agglomeration measure may have a negative effect on the probability of divesture due to the beneficial effects of agglomeration (e.g. Mitchell, 1994), but this impact may be mitigated if agglomeration is associated with increased competition. We also include a measure of *labour cost growth* (the average growth in annual wage for manufacturing workers in the host country's electronics industry between 1995 and 1997). In particular in an assembly industry such as electronics, labour input is an important cost factor and labour cost is an important determinant of the relative attractiveness of a location (e.g. Belderbos and Carree, 2002). Song (2002) found a positive relationship between labour cost and affiliate downsizing for a sample of Japanese electronics affiliates in Asia. A third factor in location and divesture decisions is the growth of the local market. Market growth allows manufacturing affiliates to grow without intensifying competition for market share and generally increases the attractiveness of a country as a location for investment, reducing the likelihood of divestment (Li, 1995; Benito, 1997). We include as a measure of the growth in the relevant market the average yearly percentage growth in the country's electronics market between 1992 and 1998 (*electronics market growth).*

Summary statistics for the dependent variable, operational measures and control variables are provided in Table 2, and the correlation matrix is given in Appendix I.

Insert Table 2

EMPIRICAL RESULTS

The results of the Probit model relating the probability of manufacturing affiliate divesture to the operational measures and control variables are presented in Table 3. In models 1 and 2 we include as operational measure for hypothesis 1 *Asian manufacturing network size*. In model 3 we substitute the alternative measure *Asian low cost country presence.* Model 1 contains the undifferentiated agglomeration measures at the time of entry of the affiliate, *Japanese agglomeration at entry* and *Keiretsu agglomeration at entry*. In model 2, *Japanese agglomeration at entry* is interacted with *parent firm size*, and the effect of *Keiretsu agglomeration at entry* is estimated separately for member firms and core firms.

Insert Table 3

The three models are highly significant as indicated by the Chi-square test statistic. The percentage of correct prediction is about 70 percent in all three models, if we use the sample probability of divesture (0.09) as a cut-off value**.** In model 1, the coefficient of *Asian manufacturing network size* is positive and significant. The coefficient remains significant (at the 5 percent level in a one-sided test) in model 2, while the alternative operational measure *Asian low cost country presence* is significantly positive in Model 3.[11] These results lend strong support for Hypothesis 1. Hypothesis 2 is also firmly supported by the empirical results: the variable *country platform affiliate* has the predicted negative sign and is strongly significant in all three models. Support for Hypothesis 3 is more qualified. In model 1, *Japanese agglomeration at entry* has an unexpected negative sign but is not significantly different from zero. If we drop the assumption that agglomeration plays an equal role in investment location decisions for all firms, but allow a differentiated response related to parent firm size in models 2 and 3, then our results provide support for Hypothesis 3. In models 2 and 3, Japanese agglomeration at entry is positive and highly significant, while the interaction effect between Japanese agglomeration at entry and parent size is significantly negative. This is consistent with the notion that agglomeration plays a lesser role in the investment decisions by larger firms, such that larger firms are less likely to be adversely selected, while adverse selection is a more common phenomenon for smaller firms. The combined effect of the

[11] The correlation coefficient between the two variables is 0.61. Firms with the largest Asian plant network also tend to have a substantial number of manufacturing affiliates in lower cost countries.

coefficients implies that agglomeration at time of entry has a positive impact on divesture for firms with annual sales less than 14.7 billion Yen, which applies to about 29.7 percent of investment cases in our sample. The estimates for keiretsu agglomeration provide support for Hypothesis 4. The coefficient of *Keiretsu agglomeration at entry* in model 1 is positive and significant as predicted. If the effects of keiretsu agglomeration is estimated separately for core and member firms in models 2 and 3, the coefficient for member firms remains significant at the 5 percent level, while the coefficient for core firms is positive and substantially larger, though only marginally significant (at the 10 percent level in a one-sided test). Overall, these results indicate that not only member firm investments abroad incorporate adverse selection, but also to an extent do additional manufacturing entries by the core firms themselves.[12]

The estimated coefficients for the operational measures also indicate a substantial magnitude of the different effects. For all variables we calculated the increase in the probability of divesture when variables takes on the sample maximum rather than the sample minimum, with all other variables in the sample mean. The probability of divesture with all variables in the sample mean is 5.5 percent, based on result from model 2. If the size of the Asian manufacturing network is zero, this probability reduces to 3.1 percent, and if the variable takes on the maximum (54 manufacturing affiliates), the probability more than doubles to 12.7 percent. A comparable effect is also calculated for Asian low cost country presence in model 3 (from 5.0 percent to 14.1 percent). The probability of divesture for a non-country-platform affiliate is 8.0 percent while it is 3.9 percent for a country platform investment, also based on results from model2.

Similarly from our result we can calculate the magnitude of impact of agglomeration measures on divesture probabilities:

For Japanese agglomeration at entry, we base the calculation on results from model 2. Results show that for an affiliate belonging to the parent firm with the lowest sales level in our sample, the probability of this affiliate being divested would increase from 9.9 percent to 45.6 percent, if its "Japanese agglomeration at entry" measure increases from sample minimum (no affiliate of other Japanese firms) to sample maximum (306 affiliates of other Japanese firms), keeping all other variables at their sample means. However, for an affiliate that belongs to the parent firm with the highest sales level in our sample, correspondent change in probability of divesture will be from 9.9 percent to 0.1 percent, a decrease instead of increase.

Similarly, if we look at results from model 1 for "Keiretsu agglomeration at entry" in general, we see that probability of divesture increases from 5.7 percent to 17 percent, if this measure of agglomeration increases from sample minimum (no affiliate of other Japanese firms from same group) to sample

[12] Perhaps because later entries by the core firm are in operations for which the firm is less competitive (e.g. Chang, 1995).

maximum (27 affiliates of other Japanese firms from same group), again keeping all other variables at their sample means. In model 2 we can distinguish this impact of agglomeration on divesture for Keiretsu member firms from that for Keiretsu core firms: For an affiliate belonging to a Keiretsu member firm, probability of divesture would increase from 4.9 percent to 15.8 percent, if the "Keiretsu agglomeration at entry" measure increases from sub-sample minimum to sub-sample maximum. For a Keiretsu core firm, the correspondent increase is from 5.0 percent to 28.5 percent.

Control variables

The estimated coefficients of the control variables are largely consistent with results in previous empirical studies and perceived theory. The two indicators for parent competitiveness, *parent firm patent intensity* and *parent competitiveness in Asia*, both have an expected negative sign, with parent competitiveness in Asia strongly significant and parent firm patent intensity marginally so. *Prior country experience* has a negative sign but is not significant. *Parent size* is negative and significant in model 1 but this effect disappears in models 2 and 3: it is the interaction effect with agglomeration rather than a pure size effect that reduces the probability of divesture. Consistent with earlier studies, larger affiliates are less likely to be divested, while minority owned joint ventures and acquired affiliates (marginally significant) have a greater probability of divesture than wholly owned Greenfield affiliates. Divesture is related to affiliate age in an inverted U-shape manner. The probability of divesture increases with age up to a certain point and then start to decrease. However, the coefficients indicate that this decrease only occurs for very early established affiliates, with an age of more than 35 years. These results are more in line with a 'liability of adolescence' view (e.g. Hannan, 1998) than with an organizational learning perspective.[13] The market-orientation of the affiliate has a marginal impact on divesture: export oriented firms are more likely to be divested than domestic market oriented affiliates, the reference group (significant at the 10 percent level), but not affiliates with a mixed market orientation. Of the country variables, *labour cost growth* has a positive impact on divestures as expected. The coefficient of electronics *market growth* has a counter-intuitive positive sign and is marginally significant in model 1, but not significantly different from zero in the more elaborate models 2 and 3. Japanese agglomeration in 1995 has a negative sign throughout and is significant at the 5 percent level in model 2, indicating that the benefits of agglomeration dominate over a potential competition increasing effect.

Divesture and Relocations

[13] Older affiliates may still rely on mature technologies or focus on markets with less growth potential. In dynamic markets with rapid technological developments such as electronics, age is not necessarily an advantage (Li, 1995).

Hypotheses 1 refers to a parent firm's ability to flexibly shift plant capacity loading in times of changing cost and demand conditions. Divestures are more likely if manufacturing operations can be transferred more smoothly to plants in other countries. Hence, implicit in this hypothesis is that divestures concern relocations to other Asian locations. In order to further test the hypothesis, we attempted to ascertain whether each divesture was a relocation within Asia or a simple dissolution without relocation. In several cases, direct evidence on relocations was provided in the survey by the Research Institute of Electronics Industry. In others, we defined divestures as relocations if the parent firm during 1995-1998 established a new plant or increased employment in an existing plant in another Asian country, and if that plant produced identical products as the divested affiliate. As a result we identified 28 relocation cases. Given the small number of relocations, it is not useful to treat relocations and non-relocating divestures as separate choices and to estimate a full multinomial Logit model. This would introduce 20 new coefficients to be estimated and would reduce the degrees of freedom to an unworkable level for the relocation choice (28 observations). Instead we estimated a basic auxiliary model explaining whether a divesture is a relocation or not. The variables of interest are *Asian manufacturing network size* and *Asian low cost country presence*, which should make it more likely that a divesture is a relocation, instead of simple dissolution. We include in the model a number of variables that could be expected to have an impact on the relocation decision. The parent competitiveness variables are expected to be positively related to relocations, as simple dissolutions are more likely to be due to a lack of general competitiveness, while relocations are not. *Labour cost growth* is expected to spur relocations, while in the case of lack of *market growth* relocation is not a panacea and simple dissolutions are more likely. Since firms with more manufacturing affiliates in a country have more opportunities for rationalization and production transfer on a country basis and may choose that option rather than international relocations, we include the variable *country platform investment* (the affiliate is the only affiliate in the country) and expect a positive impact on relocation. In addition, the model include as controls parent size.

The results of two Probit model estimations with the two different operational measures for Asian plant networks are presented in Table 4. Both measures of plant network size are positive, but only the *Asian low cost country presence* is significant (at the 1 percent level) and appears to be more robust. It is not the entire network size that matters for relocations, but rather the possibility to shift production to an existing production base in countries with lower labour costs that makes relocation likely. The magnitude of the effect is substantial: the probability of relocation increases from 13.7 percent to 61.5 percent if a parent firm increases it's low cost country presence from none to 7 (sample maximum). Among the other variables, *parent competitiveness in Asia* has the expected positive sign and is at the 10 percent level in model 5, while patent intensity has a negative sign but is of no significance. Country platform investment has the expected positive effect and is strongly significant in both models. *Country platform affiliates* are

less likely to be divested, but if a divesture decision is taken, it is much more likely to involve a relocation, as domestic restructuring options are not available. *Market growth* has the expected negative sign and is marginally significant (10 percent level) in model 4. *Labour cost growth* has the expected positive sign but is not significant; neither does parent firm size have a systematic effect on the type of divesture.

Insert Table 4

CONCLUSIONS

We analyzed divesture decisions for 1080 Japanese electronics manufacturing affiliates in nine Asian countries in the years leading up to the Asian financial crisis, 1995-1999. The empirical results gave broad support for a "real options" perspective on divestures as well for the notion of adverse selection in investment processes in agglomerated areas. Affiliates belonging to a parent firm with a large network of plants in Asia are more likely to be divested, in particular if the parent firm operates plants in lower cost countries. This is consistent with the view that multinational firms use Asian manufacturing networks flexibly to adjust plant capacities to changing cost and market circumstances. An auxiliary analysis distinguishing between relocations and simple dissolution indeed showed that international relocations are much more likely if the multinational firms operated plants in lower cost countries. These results show that affiliate divesture decisions should be considered in the context of wider multinational firm strategy and their position in international plant networks, rather than separate decisions (as has been the approach in most previous work on foreign divestures). The results are also consistent with the notion (Kogut and Kulatilaka, 1994; Pennings and Sleuwaegen, 2000) that a network of manufacturing plants provides option value of the flexibility to adjust the distribution of manufacturing operations over locations, under conditions of uncertainty concerning exchange rates, labour cost, and market conditions. Such conditions were certainly prevailing in the second half of the 1990s in Asia, and Japanese multinational firms with such a network in place have made use of this flexibility option. Similarly consistent with a "real options" perspective, 'country platform affiliates', those affiliates that were the sole manufacturing presence of a firm in a country, contribute to the flexibility option for the multinational firm and were significantly less likely to be divested.

The role of foreign investor agglomeration in affiliate divesture and survival proves complex. On one hand, evidence was found that affiliates operating in countries with substantial Japanese affiliate presence are less likely to be divested, which is related to the perceived benefits of agglomeration found in location studies (e.g. Belderbos and Carree, 2002; Head et al, 1995). On the other hand, we found clear

evidence that the potential agglomeration benefits are more likely to attract firms with weaker inherent competitiveness ('adverse selection') by reducing the (information) cost of investment and reducing the 'liability of foreigness' for investors. Firms for which the benefits of agglomeration can be assumed to have been of importance, hence those firms that are more likely to be 'adverse selected' to agglomerations, were found to have a greater probability of divesture. This did not apply if we assumed that all firms investing in a location with strong Japanese affiliate agglomerations were similarly attracted to it, but it did hold if we allowed for size heterogeneity in the responses of firms to agglomeration. Divesture was only more likely to occur for firms establishing affiliates in locations with strong Japanese affiliate agglomeration if the investing firms were small rather than large. This is consistent with previous findings on location decisions (Belderbos and Carree, 2002; Shaver and Flyer, 2001), suggesting that agglomeration benefits play a much smaller role in location choices by large firms. Adverse selection was also observed for affiliates established by firms belonging to large vertical business groups (keiretsu). Location studies have suggested that keiretsu affiliate agglomerations provide additional benefits for investing member firms and facilitate the decision to invest abroad (e.g. Smith and Florida, 1994; Pugel and Kimura, 1996; Belderbos and Sleuwaegen, 1996). The empirical results showed that affiliates established by keiretsu firms in countries with a strong existing presence of affiliates of the same keiretsu were significantly more likely to be divested. We did not find support for the notion that adverse selection occurs for member firms in the keiretsu but not for affiliates of the leading 'core' firm. The likely explanation is that later investments by the 'core' firm in agglomerated locations tend to be operations with lower inherent competitiveness (cf. Chang, 1995). Adverse selection does not only apply at the firm level, but also at the level of investment projects for affiliates.

Overall, the findings on the effects of agglomeration can be seen to qualify to an extent earlier policy conclusions concerning the need for countries to attract major investors in order to generate agglomeration benefits sustaining incoming investments flows. Investment agglomeration also attracts lower quality investments and is likely to be associated with higher rates of turbulence and divestures in the operation of foreign firms. The findings do suggest that labour cost (growth) has a strong impact on divesture and relocations decisions, suggesting that Asian countries are directly competing on cost for Japanese electronics manufacturing investments.

A number of limitations of this study and suggestions for future work can be noted. The analysis of divesture only covered 4 years, during which divestures and relocation became a common phenomenon for the first time.[14] A natural extension of the analysis is to extend the time period of analysis to follow the

[14] Our data suggest that divestments before 1995 were rather uncommon. Song (2002) could not identify divestments in his sample of Japanese electronics affiliates in Asia in 1988-1994.

affiliates over more years.[15] This may also allow estimating a hazard model of the duration of survival rather than a simple Probit model. Another improvement of the analysis is to estimate the model at the level of sub-country regions rather than countries. This will allow for more accurate measurement of relevant agglomeration and labour costs at the regional level (if regional data are available), which is of importance in particular for the growing number of affiliates established in the various regions of China.

REFERENCES

Barkema, H. G., and Vermeulen, F. (1999). International Expansion through Start-Up or Acquisition: A Learning Perspective, *Academy of Management Journal*, 41 (1), pp:7-26.

Barkema, H. G., Bell, J. H. and Pennings, J. (1996). Foreign Entry, Cultural Barriers, and Learning. *Strategic Management Journal*, 17(2), pp: 151-160.

Bartik,T.J. (1985). Business location decisions in the United States: estimates of the effects of unionization, taxes, and other characteristics of states. *Journal of Business and Economics Statistics* 3(1), pp: 14– 22.

Belderbos, R. (1998). *Japanese Electronics Multinationals and Strategic Trade Policies*, Oxford University Press, Oxford, 1998.

Belderbos, R. (2003). Antidumping and Tariff Jumping Divestment, *Weltwirtschaftliches Archiv*, 2003, forthcoming.

Belderbos, R. and Carree, M. (2002). The location of Japanese investment in China: Agglomeration effect, Keiretsu and firm heterogeneity, *Journal of Japanese and International Economies* 16, pp: 194-211

Belderbos, R., Capannelli, G. and Fukao, K. (2001) Backward Vertical Linkages of Foreign Manufacturing Affliates: Evidence from Japanese Multinationals, *World Development* 29(1), pp:189-208.

Belderbos, R. and Sleuwaegen, L. (1996). Japanese firms and the decision to invest abroad: Industrial groups and regional core networks, *Review of Economics and Statistics* 78, pp: 214–220.

Belderbos, R. and Sleuwaegen, L. (2003). International plant configuration strategies: A structured decision making approach and product level test, V*lerick Gent Management School Working Papers*, 2003/02.

Benito, G. R. G. (1997). Divestment of Foreign Production Operations. *Applied Economics* (29), pp: 1365-1377.

Boddewyn, J. (1979). Foreign divestment: magnitude and factors. *Journal of International Business Studies*, 10 (1) , pp:21-27

Boddewyn, J. (1983). Foreign Direct Divestment Theory: Is It the Reverse of FDI Theory? *Weltwirtschaftliches Archiv* , 119 (2) , pp:345-355

Buckley, P. J. and M. Casson (1976). *The Future of Multinational Enterprises*. Holmes & Meier, Lon-investment.

Carlton, D.W. (1983). The location and employment choices of new firms: an econometric model with discrete and continuous endogenous variables. *Review of Economics and Statistics* 65, pp: 440–449.

Caves, R. E. (1996). *Multinational Enterprise and Economic Analysis*, 2nd edition. Cambridge, MA: MIT Press.

Cambridge, MA: MIT Press.Caves, R. E. (1998). Industrial Organization and New Findings on the Mobility and Turnover of Firms. *Journal of Economic Literature* 36, pp: 1947-1982.

[15] Unfortunately, the Research Institute of Electronics Industry has ceased publishing the Asian affiliate data books and replaced this with only a China volume. Other data sources will have to be found to analyse divestments in later years.

Chang, S.J. (1995). International expansion strategy of Japanese firms: capability building through sequential entry. *Academy of Management Journal* 38(2) , pp: 383–407.

Chen,T.J. and Wu, G. (1996). Determinants of divestment of FDI in Taiwan. *Welwirtschaftliches Archiv* 136, pp:172–184.

Chung, W. and Alcácer, J. (2002). Knowledge Seeking and Location Choice of Foreign Direct Investment in the United States. *Management Science*, 48 (12) , pp:1534-1554

Chung, W. and Kalnins, A. (2001). 'Agglomeration effects and performance: a test of the Texas lodging industry'. *Strategic Management Journal*, 22 (10) , pp: 967-986.

Cordella, T., Grilo, I., (1998). 'Globalization' and Relocation in a Vertically Differentiated Industry, *CEPR working paper* 1863, CEPR London..

David, P. and J. Rosenbloom. (1990). Marshallian factor market externalities and the dynamics of industrial location, *Journal of urban Economics*, 28, pp: 349-370

Delacroix, J. (1993). The European subsidiaries of American multinationals: An exercise in ecological analysis, In S. Ghoshal and E. Westney (eds.), *Organizational Theory and the Multinational Enterprises*. St. Martin's Press, New York, pp:105-135

Delios, A., and Beamish, P. W. (1999a). Geographic scope, product diversification and the corporate performance of Japanese firms. *Strategic Management Journal* 20, pp: 711-728.

Delios, A., and Beamish, P. W. (1999b). Ownership Strategy of Japanese Firms: Transactional, Institutional, and Experience Influences, *Strategic Management Journal*, 20 (10) , pp :915-934.

Delios, A., and Beamish, P. W. (2001). Survival and Profitability: the Roles of Experience and Intangible Assets in Foreign Subsidiary Performance, *Academy of Management Journal*, 44 (5), pp:1028-1038.

Dhanaraj, C, and Beamish, P. W. Effect of Equity Ownership on the Survival of International Joint Ventures. *Strategic Management Journal* 25 (3), pp: 295-305

Dunne, T., Roberts, M. J. and Samuelson L. (1988). Patterns of Firm Entry and Exit to U.S. Manufacturing Industries. *Rand Journal of Economics* 19, pp: 495-513.

Dunne, T., Roberts, M. J. and Samuelson L (1989). The growth and failure of U.S. manufacturing plants, *Quarterly Journal of Economics*, 104, pp: 671–698.

Dunning, J. (1993). *Multinational Enterprises and the Global Economy*. Addison-Wesley, New York.

Evans, D. S. (1987). The Relationship Between Firm Growth, Size, and Age: Evidence for 100 Manufacturing Industries. *Journal of Industrial Economics* 35, pp: 567-581.

Franko, L. G. (1971). *Joint venture survival in multinational corporations*. New York: Praeger.

Gomes-Casseres, B. (1987). Joint venture instability: Is it a problem? *Columbia Journal of World Business*, 22, pp:97-102.

Gomes, L. and Ramaswamy, K.(1999) 'An Empirical Examination of the Form of the Relationship Between Multinationality and Performance', *Journal of International Business Studies*, 30(1) , pp: 173-187.

Grant, R. M. (1987). Multinationality and performance among British manufacturing companies. *Journal of International Business Studies*, 18, pp: 79-89.

Green, W.H., (1997). *Econometric Analysis*, Englewood Cliffs, NJ, Prentice Hall.

Hannan, M.T. (1998). Rethinking Age Dependence in Organizational Mortality: Logical Formalizations. *American Journal of Sociology*, 104(1), pp:126-164.

Hannan, M.T., Carroll, G.R., Dobrev, S., and Han, J. (1998). Age dependence in organizational mortality revisited, Part I: European and American automobile industries, 1885–1981. *European Sociological Review* 14, pp: 279–302.

Head, K., and Ries, J. (1996). Inter-city Competition for Foreign Investment: Static and Dynamic Effects of China's Incentive Areas, *Journal of urban economics*. 40, pp :38–60.

Head, K., Ries, J., and Swenson, D. (1994).The Attraction of Foreign Manufacturing Investment: Investment Promotion and Agglomeration Economies, *NBER working paper* No. 4878.

Head, K., Ries, J., and Swenson, D. (1995). Agglomeration benefits and location choice: Evidence from Japanese manufacturing investments in the United States, *Journal of international economics.* 38, pp: 223–247.

Hennart, J. F. (1988). A Transaction Costs Theory of Equity Joint Ventures, *Strategic Management Journal*, 9, pp: 361-375.

Hennart, J. F., (1991). The Transaction Costs Theory of Joint Ventures: An Empirical Study of Japanese Subsidiaries in the United States, *Management Science*, 37, pp: 483-497.

Hennart, J. F., Kim, D. J. and Zeng, M. (1998). The Impact of Joint Venture Status on the Longevity of Japanese Stakes in U.S. Manufacturing, *Organization Science*, May/Jun98, 9 (3) , pp:382-395.

Hitt, M. A., Hoskisson, R. E., and Kim, H. (1997). International diversification. Effects on innovation and firm performance in product-diversified firms. Academy of Management Journal, 40: 767-798.

Hymer S. (1976). *The International Operations of National Firms*. MIT Press: Cambridge, MA.

Jarillo, J. C., and Martinez. J. I. (1990). Different Roles for Subsidiaries: The Case of Multinational Corporations in Spain, *Strategic Management Journal*, 11, pp: 501-512.

Jovanovic, B. (1982). Selection and the Evolution of Industry. E*conometrica* 50, pp: 649-670.

Johanson, J. and Vahlne, J. (1977). The internationalization process of the firm: A model of knowledge development and increasing foreign market commitments, *Journal of international Business Studies*, Spring/Summer, pp:22-32.

Knickerbocker, F.T. (1973). *Oligopolistic reaction and the Multinational Enterprises*. Cambridge, Havard University Press.

Kogut, B. (1988). A study of the life cycle of joint ventures. In Contractor F. and P. Lorange (Eds.), *Cooperative strategies in international business*: 169-185. Lexington, MA: Lexington Books.

Kogut, B. (1989). The stability of joint ventures: Reciprocity and competitive rivalry. *The Journal of Industrial Economics*, 38(2) , pp: 183-98.

Kogut, B. (1991). Joint ventures and the option to expand and acquire, *Management Science*, 37 (1) , pp: 19-34.

Kogut, B. and Chang, S.J. (1991). Technological Capabilities and Japanese Foreign Direct Investment in the United States. *Review of Economics & Statistics*, 73(3) , pp: 401-423.

Kogut, B. and Chang, S. J. (1996). Platform Investments and Volatile Exchange Rates: Japanese Direct Investment in US Electronic Industries, *Review of Economics and Statistics*, 78:221-231.

Kogut, B., and Kulatilaka, N. (1994a). Operational Flexibility, Global Manufacturing, and the Option Value of a Multinational Network. *Management Science* 40 (1) , pp: 123-139.

Kogut, B., and Kulatilaka, N. (1994b). Options Thinking and Platform Investments: Investing in Opportunity, *California Management Review*, pp: 52-71

Kogut, B. and Zander, U. (1995). Knowledge and the Speed of the Transfer and Imitation of Organizational Capabilities: An Empirical Test. *Organization Science* 6(1) , pp:76-92.

Kouvelis, P., Axarloglou K. and Sinha, V. (2001). Exchange rates and the choices of ownership structure of production facilities in supplying foreign markets, *Management Science*, 47(8) , pp:1063-1080.

Krugman, P. (1991). Increasing returns and economic geography. *Journal of Political Economy* 99(3) , pp: 483–499.

Li, J. T. (1995). Foreign Entry and Survival: Effects of Strategic Choices on Performance in International Markets. *Strategic Management Journal* 16, pp: 348-362.

Mata, J., Portugal, P. (1994). Life duration of new firms, *The journal of industrial economics*, 42, pp: 227-245

Mata, J., and Portugal, P. (2000). Closure and Divesture by Foreign Entrants: The Impact of Entry and Post-Entry Strategies. *Strategic Management Journal* 21 (5) , pp: 549-562.

Mata, J., and Portugal, P. (2002). The survival of new domestic and foreign-owned firms. *Strategic Management Journal* 23, pp: 323-343.

Mata, J., Portugal, P., and Guimaraes, P. (1995). The Survival of New Plants: Start-up Conditions and Post-entry Evolution, *International Journal of Industrial Organization*, 13 (4), pp: 459-481

Mayer,T., and Muchielli, J.L. (1998). *Hierarchical Location Choice and Multinational Firm Strategy*, paper presented at the Western Economic Association conference at Lake Tahoe, June 28–July 2,1998.

McCloughan, P. and Stone, I. (1998). Life duration of foreign multinational subsidiaries: evidence from U.K. northern manufacturing industry 1970–93. *International Journal of Industrial Organization* 16, pp: 719–747.

Mitchell, W. (1994). Effects of Business Sales and Age on the Dissolution and divestiture of start up firms and Diversifying Entrants, *Administrative Science Quarterly*, 39, pp: 575-602

Mitchell, W., Shaver, J. M. and Yeung, B. (1994). 'Foreign entrant survival and foreign market share: Canadian companies' experience in United States medical sector markets', *Strategic Management Journal*, 15(7) , pp:555–567.

Pan, Y.G. and Chi, S.K. (1999). Financial performance and survival of multinational corporations in China, *Strategic Management Journal*, 20, pp: 359-374

Park, Y. R., and Park, S. W. (2000). Determinants of *FDI Survival: The Case of Korean Manufacturing Firms.* Paper presented at the AIB conference in Phoenix, Arizona.November 2000.

Pennings, E., and Sleuwaegen, L. (2000). International Relocation: Firm and Industry Determinants. *Economics Letters* 67, pp: 182-184.

Porter M. E. (1990). *The Competitive Advantage of Nations*. Free Press: New York.

Pugel, T. and Kimura, Y. (1996). Further Evidence on Japanese Direct Investment in U.S. Manufacturing, *Review of Economics and Statistics*, 78(2), pp:208-213.

Rugman, A. M, and Verbeke. A. (2001). Subsidiary-Specific Advantages in Multinational Enterprises, *Strategic Management Journal*, 22 (3) , pp:237-250.

Shaver, J. M. (1998). Accounting for endogeneity when assessing strategy performance: does entry mode choice affect survival? *Management Science* 44, pp: 571–585.

Shaver, J. M., and Flyer, F. (2000). Agglomeration economies, firm heterogeneity, and foreign direct investment in the United States, *Strategic Management Journal*. 21, pp: 1175–1193.

Shaver, J. M., Mitchell, W., Yeung, B. (1997). The effect of own-firm and other-firm experience on foreign direct investment survival in the United States, 1987-92, *Strategic Management Journal*, 18(10) , pp: 811-824

Smith, D, F. and Florida, R., (1994). Agglomeration and industrial location: An econometric analysis of Japanese-affiliated manufacturing establishments in automotive-related industries, *Journal of Urban Economics*, 36(1), pp: 23-41.

Song, J. Y. (2002), Firm Capability and Technology Ladders: Sequential Foreign Direct Investments of Japanese Electronics Firms in East Aisa, *Strategic Management Journal* 23 (3), pp: 191-200

Tallman, S., and Li, J. T. (1996). Effects of international diversity and product diversity on the performance of multinational firms. *Academy of Management Journal*, 39: 179-196.

Toyo Keizai Inc. (1999). Kaigai Shinshutsu Kigyou Souran (Directory of Japanese Multinational Corporations). Tokyo: Toyo Keizai Inc.

Wheeler, D., and Mody, A. (1992). International investment location decision, *Journal of International Economics*. 33, pp:57–76.

Wilson, B. D. (1980). *Disinvestment of Foreign Subsidiaries*. UMI, Ann Arbor, MI

Yamawaki, H. (1997). Exit of Japanese Multinationals in U.S. and European Manufacturing Industries. In P. J. Buckley and J.-L. Mucchielli (eds.), M*ultinational Firms and International Relocation*. Cheltenham: Edward Elgar, 234-371.

Yamawaki, H. (1999). *Who Survives in Japan: An Empirical Analysis of European and U.S. Multinational Firms in Japanese Manufacturing Industries*. Working Paper. The Anderson Graduate School of Management, UCLA, Los Angeles.

Yan, A.M. and Zeng, M. (1999). International Joint Venture Instability: A Critique of Previous Research, A Reconceptualization, and Directions for Future Research, *Journal of International Business Studies*, Vol. 30 Issue 2, pp: 395-412.

Tabel 1: Distribution by country of overseas plants and divesture

Host countries or regions	Manufacturing affiliates in 1995			Divested affiliates: 1995-early 1999		% divested affiliates (row%)
	Number	Share in total %	Mean age of affiliates in 1995	Number	Share in total %	
China	237	21.94%	2.57	16	16.49%	6.75%
Hong Kong	45	4.17%	13.20	7	7.22%	15.56%
Indonesia	58	5.37%	5.71	2	2.06%	3.45%
Korea	99	9.17%	13.75	14	14.43%	14.14%
Malaysia	228	21.11%	7.26	11	11.34%	4.82%
Philippines	35	3.24%	8.11	3	3.09%	8.57%
Singapore	126	11.67%	12.69	24	24.74%	19.05%
Thailand	108	10.00%	7.56	2	2.06%	1.85%
Taiwan	144	13.33%	16.76	18	18.56%	12.50%
Total	**1080**	**100%**	**8.95**	**97**	**100.00%**	**9.00%**

Table- 2: Descriptive statistics of dependent and explanatory variables

Name	Description	Mean	Stdev	Hypo - thesis sign
Divesture	Binary variable denoting if the affiliate is divested or not	0.09	0.29	
Asian manufacturing network size	Logarithm of the number of affiliates belonging to the parent firm in all other 8 countries in Asia than the country of the focal affiliate	1.47	1.07	H1: +
Asian low cost country presence	Logarithm of number of countries in which parent firm has manufacturing operations, but only those countries with lower labour cost than the country of the focal affiliate	0.63	0.64	
Country platform affiliate	Dummy taking value of 1 if the affiliate is the only manufacturing affiliate of the firm in the country	0.55	0.50	H2: -
Japanese agglomeration at entry	Logarithm of the total number of manufacturing affiliates established in the country by all other Japanese firms in the electronics value chain at the time of the affiliate's entry	4.28	1.10	H3:+
Keiretsu agglomeration at entry	Logarithm of the number of manufacturing affiliates established in the country by other Japanese firms of the same vertical keiretsu at the time of entry of the focal affiliate	0.41	0.75	H4: +
-for member firms	"Keiretsu agglomeration at entry" measure for member firms.	0.29	0.68	
-for core firms	"Keiretsu agglomeration at entry" measure for core firms.	0.12	0.41	
Parent firm Patent intensity	Number of US patents granted to the parent firm during 1993-1999 times 1000, divided by parent sales in 1995.	0.90	1.50	
Parent competitiveness in Asia	the change in the number of other manufacturing affiliates of the parent firm operated in the nine Asian countries between 1995 and 1999	2.37	5.16	
Parent size	Logarithm of 1995 sales of the parent firm	11.16	2.35	
Parent prior country experience	Logarithm of the number of manufacturing affiliates established by the parent firm in the country prior to the entry of the focal affiliate.	0.38	0.57	
Affiliate size	Logarithm of the number of employees in 1995 of affiliate	5.73	1.63	
Affiliate age	the number of year the affiliate has been in operation until 1995	8.90	8.06	
Majority owned JV	Dummy taking the value 1 if the affiliate is a joint venture in which the parent holds a majority stake (51-95%).	0.24	0.43	
Minority owned JV	Dummy taking the value 1 if the affiliate is a joint venture in which the parent holds a minority or 50 percent stake.	0.30	0.46	
Acquired affiliate	Dummy takes 1 if the affiliate was acquired by the parent firm.	0.004	0.07	
Mixed market orientation	Dummy variable, taking 1 if the affiliate markets its output both in the local market and in export markets.	0.26	0.44	
Export orientation	Dummy variable, taking value 1 if affiliate only exports	0.27	0.44	
Japanese agglomeration in 1995	Logarithm of total number of Japanese manufacturing affiliates in electronics and main supplying industries to the electronics sector in the country in 1995, excluding those affiliates belonging to the parent firm of the focal affiliate.	5.21	0.50	
Labour cost increase	The average growth in annual wage for manufacturing workers in the host country's electronics industry , 1995-1997	0.09	0.09	
Market growth	The average yearly percentage growth in the country's electronics market between 1992 and 1998	0.10	0.04	

Table- 3: Probit model of Japanese manufacturing divesture in Asia 1995-1999

	Model 1	*Model 2*	*Model 3*
Asian manufacturing network size	0.22*** (0.09)	0.18** (0.09)	
Asian low cost country presence			0.26** (0.15)
Country platform affiliate	-0.37*** (0.15)	-0.35*** (0.15)	-0.37*** (0.15)
Japanese agglomeration at entry	-0.08 (0.09)	0.50** (0.28)	0.48** (0.28)
Parent size*Japanese agglomeration at entry		-0.05** (0.02)	-0.06*** (0.02)
Keiretsu agglomeration at entry	0.19** (0.09)		
- For member firms		0.20** (0.09)	0.20** (0.09)
- For core firms		0.40* (0.28)	0.44* (0.29)
Parent firm Patent intensity	-0.06* (0.04)	-0.07* (0.05)	-0.07* (0.05)
Parent competitiveness in Asia	-0.05*** (0.02)	-0.06*** (0.02)	-0.05*** (0.02)
Parent size	-0.150*** (0.04)	0.08 (0.11)	0.11 (0.11)
Parent prior country experience	-0.07 (0.15)	-0.04 (0.16)	-0.03 (0.16)
Affiliate size	-0.14*** (0.05)	-0.14*** (0.05)	-0.14*** (0.05)
Affiliate age	0.07*** (0.03)	0.08**** (0.03)	0.07*** (0.03)
Square of affiliate age	-0.002** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)
Majority owned JV	-0.14 (0.16)	-0.17 (0.17)	-0.17 (0.17)
Minority owned JV	0.36*** (0.14)	0.34*** (0.14)	0.33** (0.14)
Acquired affiliate	0.93* (0.65)	0.86* (0.64)	0.82* (0.63)
Mixed market orientation	0.09 (0.15)	0.10 (0.15)	0.10 (0.15)
Export orientation	0.27* (0.17)	0.27* (0.17)	0.25* (0.18)
Japanese agglomeration in 1995	-0.33* (0.22)	-0.36** (0.21)	-0.28 (0.22)
Labour cost increase	1.67** (0.87)	1.73** (0.88)	1.41* (0.91)
Market growth	1.07* (2.30)	1.38 (2.23)	2.06 (2.28)
Observations	1080	1080	1080
Chi Square	81.74***	86.07***	85.64***
Log likelihood	-282.30	-280.00	-279.96
% correctly predicted	70%	68%	68%

Note: *, **, *** indicate significant at the 10, 5, 1 percent level, respectively (One-tailed test); Huber-White-sandwich corrected standard errors in parentheses.

Table- 4: Probit model of relocation vs. simple dissolution

Variables	*Model 4*	*Model 5*
Asian manufacturing network size	0.16 (0.20)	
Asian low cost country presence		0.67*** (0.28)
Country platform affiliate	0.76** (0.33)	0.84*** (0.32)
Parent size	-0.03 (0.11)	-0.07 (0.11)
Parent firm Patent intensity	0.03 (0.22)	-0.10 (0.24)
Parent competitiveness in Asia	0.07 (0.07)	0.11* (0.07)
Labour cost increase	0.59 (1.89)	0.26 (1.92)
Market growth	-5.57* (3.86)	-1.64 (4.47)
Observations	97	97
Chi Square	10.55*	15.00**
Log likelihood	-53.02	-50.79
% correctly predicted	69%	71%

Note: *, **, *** indicate significant at the 10, 5, 1 percent level, respectively (One-tailed test); Huber-White-sandwich corrected standard errors in parentheses.

Appendix I: Correlation matrix of explanatory variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Asian manufacturing network size	1.00																		
2	Country platform affiliate	-0.51	1.00																	
3	Jap agglomeration in 1995	-0.02	-0.18	1.00																
4	Jap agglomeration at entry	-0.25	0.07	0.40	1.00															
5	Keiretsu agglomeration at entry	0.11	-0.12	0.15	0.26	1.00														
6	Parent size	0.77	-0.49	0.02	-0.19	0.25	1.00													
7	Parent firm Patent intensity	0.29	-0.15	-0.04	-0.09	-0.05	0.38	1.00												
8	Parent prior country experience	0.47	-0.52	0.19	0.24	0.27	0.44	0.12	1.00											
9	Parent competitiveness in Asia	0.62	-0.33	0.04	-0.14	0.19	0.60	0.08	0.48	1.00										
10	Affiliate size	0.39	-0.22	-0.02	-0.37	0.00	0.42	0.18	0.10	0.19	1.00									
11	Affiliate age	0.18	0.01	-0.29	-0.73	-0.21	0.14	0.05	-0.24	0.07	0.27	1.00								
12	Square of affiliate age	0.20	0.00	-0.24	-0.71	-0.19	0.16	0.06	-0.21	0.09	0.24	0.96	1.00							
13	Majority owned JV	-0.01	-0.03	0.04	0.00	0.08	0.03	-0.05	0.03	-0.01	-0.01	-0.03	0.00	1.00						
14	Minority owned JV	0.05	-0.08	-0.01	-0.07	0.05	0.01	-0.05	0.06	0.13	-0.11	0.07	0.08	-0.37	1.00					
15	Acquired affiliate	0.01	0.01	0.02	-0.03	-0.02	0.03	0.02	0.00	0.04	0.02	0.04	0.03	-0.04	-0.04	1.00				
16	Mixed market orientation	-0.10	0.12	0.02	-0.04	-0.04	-0.16	-0.11	-0.15	-0.15	0.01	0.12	0.09	-0.03	0.00	-0.01	1.00			
17	Export orientation	0.04	-0.01	-0.09	-0.09	-0.06	0.11	0.10	0.00	0.06	0.24	-0.01	-0.02	-0.05	-0.17	-0.01	-0.57	1.00		
18	Labour cost increase	-0.04	-0.10	0.66	0.25	0.08	-0.05	-0.02	0.14	0.04	-0.06	-0.21	-0.20	-0.03	-0.10	0.00	0.00	-0.02	1.00	
19	Market growth	0.02	-0.20	0.69	0.23	0.10	0.06	0.03	0.17	0.06	0.02	-0.33	-0.25	0.08	-0.05	0.02	-0.02	-0.01	0.35	1.00