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## **Uncertainties in Global Supply Chains and Real Option Strategies in Location Choices**

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### **Abstract**

Previous studies demonstrate that firms are likely to enter and stay in countries where customers locate. For example, Martin, Mitchell, & Swaminathan (1995) show that Japanese auto parts manufacturers were likely to enter US market if their customers were operating there. According to such established understandings, suppliers simply appear to follow customers, and this view is further confirmed by agglomeration literature where presence of customers is considered as one of agglomeration economies (e.g. Alcacer and Chung, 2014).

However, this view is critically limited in understanding strategies of suppliers. Particularly, considering examples of disruptive innovations (Christensen and Bower, 1996), managers need to recognize the risk of being dependent on customers, and should be eager to implement their own strategies in order to lessen the dependency. Previous studies do not tell about this aspect of suppliers' strategy, and this is the gap my study aims at. Specifically, this study looks at firms' location choice in the context of global supply chain. Although firms follow customers as is shown by previous studies, I argue that they still have two types of strategic choices. First, by distinguishing present and potential customers, firms can choose to follow present and potential customers in different degrees in different business conditions they face. Second, by distinguishing customers' presence in target countries and in other nearby countries, firms can determine how closely locate to their customers. Adopting real option theory (eg. Dixit and Pindyck, 1996), I propose that when firms face uncertainty about future demand from present customers, they are more likely to be attracted by the presence of potential customers. On the other hand, when firms face uncertainty about future location of customers, they are more likely to be attracted by (present or potential) customers' presence in other nearby countries rather than in host or target country. Exploiting different business environments originating from capital intensity of customers, uncertainty of customer performance, and capital intensity of focal firms, are the three sets of hypotheses presented. Using rich data from COMPUSTAT customer segment file and ORBIS disks, empirical tests generally support these hypotheses. When focal firms face uncertainty about customers' location due to customers' low capital intensity, they are more likely than other firms to establish export platform near customers' locations rather than locating in the same countries. In addition, when focal firms face uncertainty about customers' future demand due to intensive competition in customers' industry or focal firms' own long-term investments, they are more likely to locate close to potential customers rather than present customers. Furthermore, these results hold with manufacturing subsidiaries where significant sunk costs are involved while

service and sales subsidiaries does not show such patterns. This study is a significant contribution to our knowledge about firms' location choice strategies in the sense that it takes supply chain of each firm into considerations. It reveals unique strategy of suppliers, and offers a practical framework to manage uncertainties they face. References Alcácer, J., & Chung, W. (2014). Location strategies for agglomeration economies. *Strategic Management Journal*, 35(12), 1749-1761. Christensen, C.M. and Bower, J.L., 1996. Customer power, strategic investment, and the failure of leading firms. *Strategic management journal*, 17(3): 197-218. Dixit, A. K. & Pindyck, R. S. 1995. *The options approach to capital investment. Real Options and Investment under Uncertainty-classical Readings and Recent Contributions.* MIT Press, Cambridge: 6. Martin, X., Swaminathan, A., & Mitchell, W. 1998. Organizational evolution in the interorganizational environment: Incentives and constraints on international expansion strategy. *Administrative Science Quarterly*: 566-601

WHICH CUSTOMERS DO FIRMS FOLLOW AND HOW CLOSELY?:  
UNCERTAINTIES IN GLOBAL SUPPLY CHAINS AND REAL OPTION STRATEGIES IN  
LOCATION CHOICES

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**INTRODUCTION**

As global supply chains have become a norm in today's international business, their geographic configurations have been attracting great interest from researchers, and we have seen substantial developments in studies, for example, on agglomeration patterns of multinational firms (Alcácer, 2006; Alfaro & Chen, 2014) and locational designs of mutually-linked subsidiaries within multinational firms (Baltagi, Egger, & Pfaffermayr, 2007; Blonigen, Davies, Waddell, & Naughton, 2007; Chen, 2011). Yet studies considering inter-firm relationships between suppliers and customers are not abundant. The current study focuses on this gap and contributes to broader streams of literatures on global supply chains by investigating how the presence of customers affect location choice strategy, and especially by identifying specific strategic decisions about location choices that focal firms pursue.

Previous studies about effects of customers' presence have found that firms are likely to choose locations close to their customers, and the supplier-customer relationships at home are often recreated in host countries (Martin, Mitchell, & Swaminathan, 1995; Martin, Swaminathan, & Mitchell, 1998; Schmitt & Van Biesebroeck, 2013). Building on these findings, the current study further extends our knowledge in two ways. First, it finds differentiated and non-monotonic effects of present versus potential customers. Second, by examining (present or potential) customers' presence in the host or target country and in other nearby countries, it identifies another differentiated and non-monotonic effects originating from loci of customers (i.e. customers presence in the host or target country versus in other nearby countries). Figure 1 is an illustrative explanation on these elements.

The theoretical angle utilized for articulating these differentiated effects is the real option logic (Damaraju, Barney, & Makhija, 2015; Dixit & Pindyck, 1995; Folta & O'Brien, 2004; Klingebiel & Adner, 2015; Kogut & Kulatilaka, 1994; Myers, 1977). Real option logic posits that as the future is more uncertain, holding alternative opportunities or real options is more valuable. Applied to location choices of firms, this logic leads to testable propositions. When firms face uncertainty on future demand from customers, they would seek real options concerning their customer bases by choosing locations close to potential customers. In addition, if the uncertainty they face is about geographic locations of customers, they would choose locations that provide better access to customers not only in the host or target country, but also in other nearby countries which allows them to build export platforms and continue to cater customers in wider range of locations. Such location choices generate real options for the access to customers.

These extensions of our knowledge about location choice strategy are significant because they identify new areas of strategic behavior by firms. Firms and their customers are “hybrid” organizations (Williamson, 1991) that are interdependent and coordinated for mutual benefits, but at the same time, they keep significant room for autonomous strategy. This study recognizes the ambivalence of hybrid organizations, and reveals strategic behaviors of focal firms upon location choices.

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Insert Figure 1 about here  
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Hypotheses derived from the propositions mentioned above are tested with archival data. The research question in this paper demands profound amount of data, and it is probably the reason why not so many studies have been done on this research question. First, to identify pairs of focal firm and present customers, firm-level information on supplier-customer relationships is necessary. Second, to find locations of focal firms and customers, information on worldwide locations of the sample firms is required. Third, because focal firms and customers are from different countries, such worldwide location data needs to include at least large firms from around the world. Furthermore, the research

question requires significant variance in the conditions that focal firms face. Ideally, focal firms or customers should be from various industries so that variances can be exploited in different business environments. To overcome these challenges, COMPUSTAT customer segment file and ORBIS database are used. COMPUSTAT customer segment file identifies supplier-customer relationships at firm level, and includes firms from various industries. On the other hand, ORBIS provides worldwide information about public and private companies including their equity ownerships. As I will explain in more detail later, these data sets enable the test in this paper.

The next section reviews previous studies related to supplier-customer relationships in economic geography, before it identifies the research gap. Then, specific hypotheses are presented in the following section. Design of empirical analysis and its results are explained in detail in the section following above. The last section concludes with discussion on limitations and implications of this paper.

## **LITERATURE REVIEW**

The effect of customer presence has been studied as one of basic agglomeration economies in economic geography (Marshall, 1920). By locating near customers, firms can benefit from low transportation cost (Fujita, Krugman, & Venables, 2001). In addition, close location facilitates interaction and knowledge flows between focal firms and their customers, and enhances innovations (Porter, 1990). These effects are confirmed by empirical studies. For example, Glaeser and Kerr (2009) demonstrate that local presence of customers, along with other factors - such as local presence of suppliers, local labor pool, and level of knowledge spillovers - encourages creation of new manufacturing firms. Adopting a different context, Alcácer and Chung (2014) examine how each of agglomeration economies and structure of each factor market affect location choice of foreign firms. Though it is not the main variable, presence of customers is shown to have positive effect on entries by foreign firms.

For the purpose of this paper, however, these studies on agglomeration economies are not satisfactory in the sense that they capture the presence of customers only at industry level. Therefore,

we cannot tell from these studies whether firms are following their present customers or exploring new customers.

In this aspect, Martin et al. (1998) and Schmitt and Van Biesebroeck (2013) take one step further using data in automobile industry. Both studies identify present and potential customers at firm level. Martin et al. (1998) confirm that presence of present as well as potential customers leads to focal firm's entry to a foreign market. In the same vein, Schmitt and Van Biesebroeck (2013) show that previous vertical relationships with customers lead to focal firms choosing locations near those present customers. These studies that identify present and potential customers at firm level significantly improve our understanding. However, they show only average effect of each customer types, and the question about how these effects varies in different circumstances remains unanswered. This paper targets this gap by exploring variations in differentiated effects of present and potential customers' presence.

Another gap this study targets is related to the measurement of customers' presence. Martin et al. (1998) adopted a context about entry into US market by Japanese auto suppliers. In a one-country context, however, presence of customers is considered only in the host country. It is not a flaw of the study itself because at the time of the sample, 1989-1990, most of firms had just started to enter foreign markets, and the scope of their operations was usually confined to the host countries. However, as globalization develops, firms have established multiple subsidiaries around the world and developed subsidiary network where each subsidiary is inter-connected with offering and receiving goods and services within or across firm boundaries (Ghemawat, 2005). Reflecting this development, studies in international economics have started to take into account effects of other countries as well as host country (Baltagi et al., 2007; Blonigen et al., 2007; Chen, 2011). Borrowing these techniques in international economics, this study considers presence of customers both in the host country and other countries.

## **THEORY AND HYPOTHESES**

The overall research question of this paper is how firms choose locations differently in relation to their present and potential customers in different circumstances. More specifically, firms may be attracted by either present or potential customers differently, or they may be attracted by customers' presence either in the host or target country, or in other nearby countries. To answer this question, real option logic is applied as a theoretical guideline. In this section, this paper will explain how real option theory can be applied, and posit concrete hypotheses based on the theoretical arguments.

### **Real Option Theory**

Real option theory regards firm's investment as generation of opportunities (Dixit & Pindyck, 1995; Myers, 1977). For example, building production capacity in a country gives a firm options to either utilize and further develop the capacity or to leave the capacity unused depending on situations (Kogut & Kulatilaka, 1994). This option is valuable if business conditions in the future is unpredictable, and if adapting to the new condition requires significant time or cost. Klingebiel and Adner (2015) has defined three conditions of real option investments: sequencing, low initial commitment, and reallocation. Real option investments are initiated by partial investments with preparation for sequential changes of commitment level upon resolution of uncertainty. Once future conditions are realized, the focal firm reallocates resources so that they can reap profit to their maximum from the new business conditions. Real option theory has been applied to many strategic fields including diversification (Folta & O'Brien, 2004), divestiture (Damaraju et al., 2015), joint ventures (Kumar, 2005), innovation (Klingebiel & Adner, 2015), and location choice in view of exchange rate (Kogut & Kulatilaka, 1994; Rangan, 1998) and labor cost (Fisch & Zschoche, 2012).

This paper applies real option theory to a new context: firm's location choice in relation to their customers. There are two kinds of real option investments involved in this context. First, a firm may choose a location close to potential customers in order to generate alternative revenue source for the future. This is especially important when present customers are not reliable as a future revenue source. For example, performance of present customers may deteriorate, and they may cut down the

operation, which leads to lower demand of the focal firm's products. Taking into account such possibilities, focal firms would begin their operations near potential customers' locations, develop relationships with them, and sequentially expand or shrink the operation according to the updated information about demand from present and potential customers.

Second, firms may choose location not in the same country as customers, but in other country near customers' locations, and build export platform (Ekholm, Forslid, & Markusen, 2007) so that the subsidiary can cater to customers even after they change locations around. Chung, Lee, Beamish, and Isobe (2010) found that multinational firms invest more in export platforms rather than subsidiaries of local market orientation to manage uncertainty about future demand. Likewise, firms would like to invest in real options by locating in a country from which they can export to customers' locations when future location of customers is not predictable.

## **Hypotheses**

I will empirically test my argument by leveraging three kinds of variations in business environments: capital intensity of customers, uncertainty of customer performance, and capital intensity of focal firms. Each kind of business environment requires focal firms to manage different uncertainties. I will explain one by one and posit hypotheses. Note that all the hypotheses are not about the main effects, but about moderating effects of business environments. Both present and potential customers attract focal firms, but the degree of attraction should differ in the ways hypotheses predict.

*Capital intensity of customers.* When capital intensity of customers is low, customers are likely to change locations more frequently. It is because fixed cost of establishing subsidiaries is low, and giving up incumbent locations and opening new operation elsewhere more frequently makes economic sense. Bernard and Jensen (2007) confirms this by showing less capital intensive plants are more likely to be shut down using plant-level data in the US. Furthermore, Swenson (2005) demonstrates that US firm's choice of outsourcing destination is less sensitive to cost changes in host countries when the industry is more capital-intensive. The author argues that it is because outsourcing

firms require more tailoring of production, and searching production service providers that meet the requirements is more costly in capital-intensive industries. Due to the differences in fixed costs and requirements for tailoring production, capital intensities of customers affect their flexibilities (Kogut & Kulatilaka, 1994; Lee & Song, 2012).

Facing customers that are less capital-intensive and more footloose, focal firms want to manage the uncertainty over customers' locations in the future. In such a situation, investments in export platform, positioning near customer locations, generate relevant real options. An export platform can cater to multiple countries. Thus, even after a customer shuts down a subsidiary in one location, the export platform continues to operate for catering to customers in other locations, or for catering to a new location of the customer. Therefore, the real option of export platform is more valuable when the location of demand is uncertain (Chung et al., 2010). As a result, focal firms are less likely to locate in the same countries as present or potential customers, but more likely to locate in other countries having good access to customers.

*Hypothesis 1a: If capital intensity of customers is low, focal firms are less likely to locate in or enter the same country as their present customers (moderating effect)*

*Hypothesis 1b: If capital intensity of customers is low, focal firms are more likely to locate in or enter a country with good access to present customers locating in other countries (moderating effect)*

*Hypothesis 1c: If capital intensity of customers is low, focal firms are less likely to locate in or enter the same countries as their potential customers (moderating effect)*

*Hypothesis 1d: If capital intensity of customers is low, focal firms are more likely to locate in or enter a country with good access to potential customers locating in other countries (moderating effect)*

***Uncertainty of customer performance.*** In the context where customers are competing with their rivals, demand of focal firm's product by customers is not necessarily stable (Aggarwal & Wu,

2014; Tripsas, 2008). Customers may radically change their product design, and choose to use different set of components (Tripsas, 2008). Or customers may shift their emphasis across product categories (Aggarwal & Wu, 2014). More simply, customers may fail and exit the market.

As the simplest measure for uncertainty of demand by customers, this paper focuses on customer performance. When customer performance in the future is uncertain, focal firms are exposed to the risk of losing demand from present customers. Therefore, they should commit less to locations close to present customers.

*Hypothesis 2a: If performance of customers is uncertain, focal firms are less likely to locate in or enter the same country as their present customers (moderating effect)*

*Hypothesis 2b: If performance of customers is uncertain, focal firms are less likely to locate in or enter a country with good access to present customers locating in other countries (moderating effect)*

In addition, it is beneficial for a focal firm to seek real option by investing in locations near potential customers, and developing relationships with them to broaden customer base. With broader customer base, the focal firm can manage potential loss of demand from a present customer more effectively because they have potential alternative revenue sources as well as capability of expanding business with other customers more rapidly taking advantage of experience they have already accumulated with them.

However, seeking limited potential customers locating a specific country is still risky because performance of potential customers is also uncertain. Instead, focal firms should invest in export platforms from which they can cater to wider range of potential customers located in multiple countries. Therefore, I posit the following hypotheses on the effects of location by potential customers.

*Hypothesis 2c: If performance of customers is uncertain, focal firms are less likely to locate in or enter the same country as their potential customers (moderating effect)*

*Hypothesis 2d: If performance of customers is uncertain, focal firms are more likely to locate in or enter a country with good access to potential customers locating in other countries (moderating effect)*

**Capital intensity of focal firms.** The last set of hypotheses is related to capital intensity of focal firms. Capital intensity affects the ease of changing locations as is discussed above. If the same logic is applied to focal firms, subsidiaries of capital-intensive focal firms stay in the same locations longer, and turn out to be more exposed to any risks of events that can happen as time passes. First, while a subsidiary of a focal firm is operating in a country, it may lose demand from present customers because of deterioration of present customer's profitability, or change of present customer's preferences. Therefore, to pursue real option value under this uncertainty, focal firms should invest more in relationships with potential customers. This is similar to hypothesis 2 where customer's profitability in the future is uncertain. However, potential customers' profitability is not particularly uncertain, and therefore, focal firms can engage in developing relationships with specific potential customers in the host countries in this case. Hence, potential customer's presence in the host or target country as well as in other nearby countries should attract focal firms.

Second, subsidiaries of capital-intensive firms may be exposed to a risk of customer's location changes. Though customers are not particularly footloose, their time horizon is shorter than focal firms'. However, products in capital-intensive industries are typically more firm-specific or user-specific (Nunn & Trefler, 2013). Thus customers are likely to be required to source the same product from focal firms even after they change locations. As such, the uncertainty in locations of customers should not affect significantly.

*Hypothesis 3a: If capital intensity of a focal firm is high, focal firms are less likely to locate in or enter the same country as their present customers (moderating effect)*

*Hypothesis 3b: If capital intensity of a focal firm is high, focal firms are less likely to locate in or enter a country with good access to present customers locating in other countries (moderating effect)*

*Hypothesis 3c: If capital intensity of a focal firm is high, focal firms are more likely to locate in or enter the same countries as their potential customers (moderating effect)*

*Hypothesis 3d: If capital intensity of a focal firm is high, focal firms are more likely to locate in or enter a country with good access to potential customers locating in other countries (moderating effect)*

## **EMPIRICAL ANALYSIS**

### **Summary of Test**

To better comprehend how customers' locations around the globe affect focal firm's location choices, this paper examines (a) the effect of present and potential customers' presence in the host country, (b) the effect of present and potential customers' presence in other countries, and (c) how the effects of (a) and (b) are contingent on characteristics of different business environments. By analyzing differentiated effects of present and potential customers, and of their presence in the host country and other countries, this scheme of analysis is able to show that focal firms are operating real option strategy so that they manage uncertainties originating from business environment they are facing.

This analysis is possible only if the data set satisfies the following conditions. First, pairs of focal firms and present customers need to be identified. In agglomeration literature, supplier-buyer relationships have typically been identified at industry level (Alcácer & Chung, 2014; Alfaro & Chen, 2014). However, to find focal firm's strategic balance between present and potential customers, present customers need to be identified at firm level. Second, the global level analysis like this study requires comprehensive list of subsidiaries owned by focal firms and present and potential customers. The question of this paper is which country focal firms choose from possible alternatives, which obviously demands information of firm's location around the globe. In addition, this analysis requires information about customer's presence not only in the host country, but also in other countries. Comprehensive list of subsidiaries is needed to construct the variable for customer's presence in other countries. Third, the data set should include, at least, major multinational firms around the world

because customers of a focal firm are not necessarily from the same country. For a US auto supplier such as Johnson Controls, for example, not only US assemblers but also foreign assemblers like Volkswagen and Toyota Motor are present or potential customers. Thus, unlike conventional data sets (e.g. Directory of Japanese Companies Abroad published by Toyo Keizai) used in previous studies, the data set in this study should include all the major multinational firms around the world. Fourth, to scrutinize different effects of customers in different business environments, the data set needs to have enough variation in focal firms' business environments. For instance, focal firms or customers should be represented from a variety of industries. Previous studies do not satisfy all of these conditions.

This paper's approach is threefold. First, the effects of present and potential customers' presence in host country and other countries are assessed. Then, moderating effects of various business environments are examined. Finally, in addition to static analysis of focal firms' locations, dynamic analysis of entry is conducted, and I compared those sets of results to infer what decisions focal firms make and how those decisions result in current locations in relation to their customers.

## **Data and Sample**

The sample of firms with present customer information comes from COMPUSTAT Customer Segment file between 2006 and 2011. By regulation, firms are required to report their major customers if sales to each customer exceed 10% of total revenues, or if firms regard the sales to those customers as important to their business. Frequently, firms also report values of sales to each major customer. This data set is often used by finance or accounting researchers (Hui, Klasa, & Yeung, 2012; Johnson, Karpoff, & Yi, 2015). My sample consists of manufacturing firms reporting their major customers.

Then, information about subsidiaries of sample firms and their customers is taken from vintages of ORBIS disks published between January and March of each year from 2007 to 2012. ORBIS is published by Bureau van Dijk, and contains information about more than 50 million public and private companies worldwide. Due to its uniquely broad coverage, ORBIS including its subset data base such as AMADEUS (European company subset of ORBIS) has been used in numerous

studies (Belenzon, Pataconi, & Zarutskie, 2015; Belenzon & Tzolmon, 2015; Bloom, Sadun, & Van Reenen, 2012; Dharmapala & Riedel, 2013), and its practical manual has been published by economists recently (Kalemli-Ozcan, Sorensen, Villegas-Sanchez, Volosovych, & Yesiltas, 2015). ORBIS tracks and constantly updates the list of firms included in the data, and their ownership information. Allowing a certain time lag for reflecting the latest information, it could be assumed that a vintage published in early months of a year represents ownership information of the previous year. Staff from Bureau van Dijk confirmed that this assumption is reasonable. Therefore, it could be said that the ORBIS data sets between 2007 and 2012 provide ownership information between 2006 and 2011.

Firm-customer data from COMPUSTAT are linked with ORBIS data by the following steps. First, focal firms in COMPUSTAT are matched with ORBIS data by comparing CUSIP from COMPUSTAT and ISIN from ORBIS. This matching is especially easy for US firms because their CUSIP is a part of ISIN. Other firms are matched by comparing company names and tickers from the both databases. Second, present customer names from COMPUSTAT are matched with ORBIS data. This step is challenging because customer information from COMPUSTAT provides only company names reported by focal firms, and those names are often abbreviated or misspelled. To tackle this challenge, after conducting full-name matching, I standardized both present customer names from COMPUSTAT and company names from ORBIS using STATA codes developed by NBER Patent Data Project. Through the standardization, for instance, “Internatl” and “International” in company names are changed to “INT”, and annotations such as “Incorporation” and “Inc.” are changed to “Inc”, and then dropped. Those present customer names that are not matched even with the standardization procedure are matched manually.

Subsidiaries are identified when firms are owned by a parent company with more than 25% equity ownership. In ORBIS, the first set of subsidiaries is identified by finding firms whose ultimate owner is among the sample firms (either focal firms or customers). In addition, the second set of subsidiaries is identified by following equity ownership linkages starting from the sample firms down

to 10<sup>th</sup> level of hierarchical ownership structures. The final list of subsidiaries is a combination of these two.

Furthermore, potential customers are determined as follows. First, top present customers are identified in each year. Those are top present customers if they are the sole customers to the focal firms or they are the largest source of revenue for the focal firms. The 4 digit NAICS of top present customer for each focal firm is defined as the customer industry. To avoid ambiguity about the customer industry, those observations are dropped if 4 digit NAICS of top present customers is not consistent throughout the sample period. Then, potential customers of a focal firm are defined. Potential customers are all the customers from the customer industry recorded in COMPUSTAT customer segment file except for the present customers of the focal firms and the focal firms themselves.

Finally, the sample is limited to those focal firms that have at least one-nonfinancial foreign subsidiary, and at least five identified potential customers, and whose top customer is from manufacturing industry (i.e. NAICS 31-33). Resulting sample consists of 886 firm-year with 251 different focal firms in years from 2006 to 2011. Table 1 reports the size of focal firms in the sample compared with that of all North American manufacturing firms in COMPUSTAT. The mean of total assets in the sample is comparable to that of COMPUSTAT. However, extremely small and extremely large firms are not included in the sample. As a result, the standard deviation of firm size in the sample is much smaller than that of COMPUSTAT. Table 2 shows industries of focal firms in the sample compared with COMPUSTAT firms. Transportation equipment manufacturers are clearly overrepresented in the sample. Other than that, chemical product manufacturers count lower proportion of the sample, and electronic product manufacturers are slightly overrepresented. Table 3 shows industries of customers. Again, transportation equipment manufacturers are overly represented. Proportion of chemical manufacturers is lower, and proportion of computer and electronic products manufacturers is higher than it is in COMPUSTAT.

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To the location data of these firms, country controls are added. Included country controls are average labor cost, GDP, quality of institution (average of control of corruption, government effectiveness, and regulatory quality), average tariff on imported products, and distance from the headquarters. They are derived from World Bank Database.

For each focal firm-year, 155 countries are recorded after excluding focal firms' headquarters and tax havens. This is the final data used for regression estimates.

## **Variables**

***Presence.*** The unit of analysis in this paper is firm-year-country, and the first dependent variable is presence of a focal firm in a country. This variable is equal to 1 if a focal firm has at least one manufacturing subsidiaries in the focal country, and is equal to 0 otherwise. Country-level variable instead of subsidiary-level is adopted because appearance or disappearance of subsidiaries is hard to interpret. Subsidiaries may be established to start new operations in the focal country, or to create legal entities for tax reasons. Also, subsidiaries may disappear because a firm terminates operation in the country, or because their business is transferred to other legal entities without any physical change. By adopting country-level observations, these issues could be avoided.

Another issue related to this variable is that ORBIS data sometimes fail to record the presence of subsidiaries. Some subsidiaries recorded in 2007, for example, disappeared in 2008, but they come back to the data again in 2009. To alleviate the effect of recording errors, I recognized the absence when focal firms do not appear in the focal country for two consecutive years. As a result, the first and the last years of observation should be dropped while analyzing presence of firms because finding no record of presence in those years cannot be regarded as absence if presence is reported in the next or previous year. Therefore, the sample period of presence analysis is 2007-2010.

***Entry.*** The second dependent variable is entry which is equal to 1 if firms enter the focal country, and is equal to 0 otherwise. For entry analysis, year 2006 and 2007 should be dropped. This

is because absence in 2006 or 2007 is defined by two-year observations in 2006 and 2007. Therefore, first observation of entry should be in 2008.

For both presence and entry, manufacturing subsidiaries of focal firms are analyzed in the main analysis, and sales and service subsidiaries are examined as an additional analysis.

***Level of presence by present customers in the host country.*** The first explanatory variable is the level of presence by present customers in the host country. Only manufacturing subsidiaries of them are counted as presence. This variable is measured by the following formula.

$$Chost_{i,t,c} = \sum_{j \in J} W_{i,j,t} * c'host_{j,c,t}$$

$Chost_{i,t,c}$  is the level of presence by present customers of focal firm  $i$  in the host country  $c$  in year  $t$ , and  $J$  represents all the present customers of focal firm  $i$  in year  $t$ .  $W_{i,j,t}$  is a weight for customer  $j$  calculated by

$$W_{ijt} = \frac{CS_{i,j,t-1}}{\sum_{j \in J} CS_{i,j,t-1}},$$

where  $CS_{i,j,t}$  is focal firm  $i$ 's sales to customer  $j$  in year  $t-1$ . Customer sales used for the weight is from previous year because customer sales influenced by focal firm's own behavior including location choice. This endogeneity is avoided by lagging one year.  $c'host_{j,t,c}$  is normalized presence of customer  $j$  in host country  $c$  in year  $t$ , and it is calculated by

$$c'host_{j,c,t} = \frac{P_{j,c,t}}{\sum_{c \in C} P_{j,c,t}} * 100.$$

$P_{j,c,t}$  is a dummy variable which is equal to 1 if customer  $j$  has subsidiary in country  $c$  in year  $t$ , and is equal to 0 otherwise.  $C$  represents all the countries in the sample. Denominated by  $\sum_{c \in C} P_{j,c,t}$ ,  $c'host_{j,c,t}$  is a normalized presence of customer  $j$ . The reason of this normalization is that the variable of interest,  $Chost_{i,t,c}$ , should reflect the weight of sales to each customer, not of number of countries where each customer is operating.

**Level of presence by potential customers in the host country.** The second explanatory variable, level of presence by potential customers in the host country, or  $PChost_{i,t,c}$ , is measured by the following formula. Again, note that only manufacturing subsidiaries are considered.

$$PChost_{i,c,t} = \frac{\sum_{p \in P} P_{p,c,t}}{\sum_{c \in C} \sum_{p \in P} P_{p,c,t}} * 100$$

where  $P_{p,c,t}$  is the presence of potential customer  $p$  in country  $c$  in year  $t$ . Regarding presence of one potential customer as a unit,  $PChost_{i,c,t}$  is the percentage of units in the host country.

**Level of presence by (either present or potential) customers in other countries.** This variable captures the level of presence by present or potential customers around a host country, and is a proxy of opportunity for export platform in the host country. Particularly, their presence near the host country is more important for an export platform, thus presence by customers should be inversely weighted by distance from a host country. The measurement is,

$$LPother_{i,c,t} = \sum_{\bar{c} \neq c} \frac{LP_{i,\bar{c},t}}{D_{c,\bar{c}}}$$

where  $LP$  is  $C$  when it is about present customer, or  $PC$  when it is about potential customers. This formula applies to both present and potential customers.  $LP_{i,\bar{c},t}$  means level of customer presence for firm  $i$  in country  $\bar{c}$ , which is any country other than host country  $c$ , in year  $t$ .  $D_{c,\bar{c}}$  is a distance measure that is logged distance in km between host country  $c$  and other country  $\bar{c}$ . As a whole, this is summed customer presence in other countries inversely weighted by logged distance.

**Capital intensity of customers.** Capital intensity, the moderating variable of interest, is captured at industry level. Industry average of capital intensity is calculated by capital expenditure divided by worker's wage in each 4 digit NAICS from 2006 to 2011. The data is from Annual Survey of Manufacturers published by US Census Bureau. Because the capital expenditure is significantly influenced by macro-economic conditions, capital intensity of industry is averaged throughout sample period.

To capture moderating effect of customer's capital intensity, a dummy variable, which is equal to 1 if customer's capital intensity is low, is created. Here, a potential issue is that industry of focal firms and that of customers are correlated. For example, when the customer industry is transportation equipment manufacturing, industry of most focal firms are also transportation equipment manufacturers. Therefore, if the whole sample was split by customer's capital intensity, industry of focal firms related to high capital intensity of customers would be significantly different from that of firms related to low capital intensity. As a result, it is difficult to tell whether the moderating effects are driven by customers or focal firms. To solve this issue, the capital intensity of customers is compared within groups of focal firms in the same industry (at 3 digit-NAICS level), and the dummy for high capital intensity customers is assigned to those focal firms whose customer's capital intensity is above mean of their groups. Following this procedure, characteristics of focal firms are reasonably controlled for. For example, among focal firms in transportation equipment manufacturing industry, those with motor vehicle manufacturing customers are coded as 1 for capital intensive customer dummy, and those with aerospace product and parts manufacturing customers are coded as 0. The empirical analysis exploits such variations within each industry of focal firms.

When there is no variance in capital intensity of customers within an industry group of focal firms, the observations are dropped.

***Uncertainty of performance by customers.*** The second moderator of interest is uncertainty of customer's performance. Based on previous studies (McGahan & Porter, 2003; Villalonga, 2004; Waring, 1996), "firm-specific profitability" is estimated by the following OLS regression model with firms in the same industry at 4-digit NAICS.

$$f_{i,j,t} = \beta_{0,j} + \beta_{1,j} * f_{i,j,t-1} + e_{i,j,t}$$

where, the estimated coefficient  $\beta_{1,j}$  represents the persistent of firm-specific profitability in industry  $j$ .  $f_{i,j,t}$  is firm-specific profitability of firm  $i$  in year  $t$ , and it is calculated by (operating profit) – (average operating profit in industry  $j$ ). Conceptually,  $\beta_{1,j}$  means how much of firm-specific profitability of the previous year is carried out to the current year. Larger  $\beta_{1,j}$  means stable structure

of industry where firms are more likely to continue current level of performance, whereas smaller  $\beta_{1,j}$  means instable and dynamic circumstance of industry where firm's performance in the future is uncertain. I used data on North American firms from COMPUSTAT from 1997 to 2006. I dropped industries with less than 6 observations.

Then, I assigned a dummy variable which is equal to 1 if the estimated persistence of firm-specific profitability in customer industry is low, and is 0 otherwise. Again, in order to control focal firm's industry, I calculated the median of persistence within each group of focal firms from the same industry (at 3-digit NAICS), and make the dummy variable 1 if the persistence in the customer industry is lower than the median within the group. The observations are dropped when there is no variance within a group.

**Capital intensity of focal firms.** The last moderator of interest is capital intensity of focal firms. The measure of capital intensity is the same as the one used for calculating capital intensity of customers. Though this variable is supposed to capture variances in focal firms' characteristics, it is not desirable if this analysis compared very different industries such as chemical products manufacturing and computer and electronic product manufacturing. In such a case, it is hard to tell which differences of industry characteristics are driving the results. The purpose of this variable is to capture focal firm's capital intensity while keeping other characteristics reasonably under control. Therefore, dummy variable for high capital intensity of focal firms is defined within each group of focal firms from the same 3-digit NAICS industry. This is possible because capital intensity is defined at 4-digit NAICS level.

**Control variables.** I added the following control variables. First, I controlled the level of presence by focal firm in other countries. The formula used for "level of presence by customers in other countries" is applied using dummy variable representing focal firm's presence. The coefficient of this variable would be positive if presence of focal firm is complementary and it attracts other subsidiaries in nearby country. It would be negative if presence of focal firm is substitute and they avoid locations near incumbent subsidiaries. Then, country characteristics such as average labor cost,

GDP, quality of institution (average of control of corruption, government effectiveness, and regulatory quality), average tariff on imported products, and distance from the headquarters are controlled. Data on country characteristics are cited from World Bank Database. Finally, fixed effects for focal firms and years are added. Table 4 and 5 show descriptive statistics of the variables.

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 Insert Table 4 about here  
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### **Empirical Model**

The dependent variables of this analysis are presence or entry of the focal firm, and take 0 or 1. To estimate a model with such dependent variables, logit model is appropriate. In particular, because there are fixed effects for focal firms and years, conditional logit model is adopted. The model estimates which country the focal firm chooses for presence or entry conditional on that the focal firm have presence or entry in at least one country based on the following specification.

$$\Pr[Y_{i,t,j} = 1|X] = \frac{\exp(\beta_1 X_{i,j,t} + \beta_2 X_{i,j,t} * E_i + \beta_3 Z_{j,t})}{\sum_{j \in J} \exp(\beta_1 X_{i,j,t} + \beta_2 X_{i,j,t} * E_i + \beta_3 Z_{j,t})}$$

$Y_{i,t,j}$  is the dependent variable for firm  $i$  in country  $j$  in year  $t$ , and  $J$  is a set of country choices. This model is estimated by maximum likelihood method, and obtained coefficients  $\beta_2$  can be used for testing how effects of customers' presence are moderated by business environments.  $X_{i,j,t}$  represents variables about presence of present or potential customers in the host or target country or other countries which is unique to focal firms, country, and year.  $E_i$  means business environments focal firms face. This is unique to focal firms. Due to firm fixed effects, only its interaction term is included.  $Z_{j,t}$  is country controls.

### **Results**

Table 5 shows the results of conditional logit regressions. I will explain the baseline, main, and additional results.

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Insert Table 5 about here  
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**Baseline results.** First, effects of customers are estimated as a baseline. As expected, presence of both present and potential customers in both host or target country and other countries is shown to attract focal firms. Except the effect of potential customers' presence in other countries on entry, all variables about customer presence have positive and highly significant coefficients.

Coefficients of control variables are also reasonable. Focal firm's own presence in other countries is negatively associated with their location choice. This shows substitution effects of their own subsidiaries. Besides, both presence and entry are negatively associated with average wage and distance from the headquarters, and positively with GDP, institutions and tariff of the host country. All of these results are consistent with previous studies.

**Main results.** Next, I looked at the moderating effects of customers' capital intensity on focal firms' location choices. I expected that when customers are less capital-intensive, or more footloose, focal firms are less likely to choose the same country as customers, and instead more likely to choose nearby countries to develop an export platform. The results are consistent, concerning the effect of potential customers. According to the main effects, focal firms are attracted by the presence of potential customer both in the same and other countries. But the moderating effects suggest that the effect of potential customers in the host or target country is lower and that in other countries is higher if customers are less capital intensive. On the other hand, concerning present customers, the results are not consistent with the prediction. In entry phase, there is no moderating effect. As a result, presence analysis shows that focal firms' locations are less associated with present customers' presence either in the host country or other countries. My interpretation is that since focal firms do not engage in real option strategies for present customers, they do not keep proximity to their customers that are moving around.

Then, the results about uncertainty on customer's performance are mostly consistent with the predictions. I expected that focal firms are less likely to seek presence of present customers overall,

and presence of potential customers in the host or target country. Although the moderating effects related to present customers' presence are weak, and often statistically insignificant, signs of coefficients are consistent. Coefficients related to presence of potential customers are significant and consistent with the predictions.

Finally, the moderating effects of focal firm's capital intensity are also found to be generally consistent with the predictions. I expected that focal firms of high capital intensity seek potential customers more, because they are exposed to uncertainty about demand from present customers during the longer time horizon of investment. Even though only the effect of presence in the host or target country on focal firm's presence is significant, all the coefficients related to present customers are negative and consistent with the predictions. Regarding the effects of potential customers, presence in the host or target country is positively associated with focal firm's location choice, and the association is highly significant. Effects of potential customers' presence in other countries are not statistically significant.

In summary, the three sets of hypotheses are generally supported. Even if customer's capital intensity does not moderate the effects of present customer's presence as expected, the combined results over presence and entry suggest a mechanism that is consistent with the hypotheses. Hypotheses about uncertainty over customer performance and capital intensity of focal firms are generally supported.

***Placebo test.*** The main analysis was about focal firm's manufacturing subsidiaries. As a robustness check, I run the same analysis to study how focal firms choose locations for sales and service subsidiaries (not reported in this draft). A notable finding is that there is consistently no moderating effect related to present customer's presence in the host or target country. This may be because establishing sales and service subsidiaries is not as costly as manufacturing subsidiaries, so real option strategy is not relevant. For example, even if customers are footloose, focal firms can establish sales and service subsidiaries near the customers, and follow them if they move. Other than that, sales and service subsidiaries shadow manufacturing subsidiaries. When manufacturing

subsidiaries are more attracted by presence of customers in other countries, for example, sales and service subsidiaries show the same tendencies. This is an evidence of co-location of complementary functions (Chen, 2011).

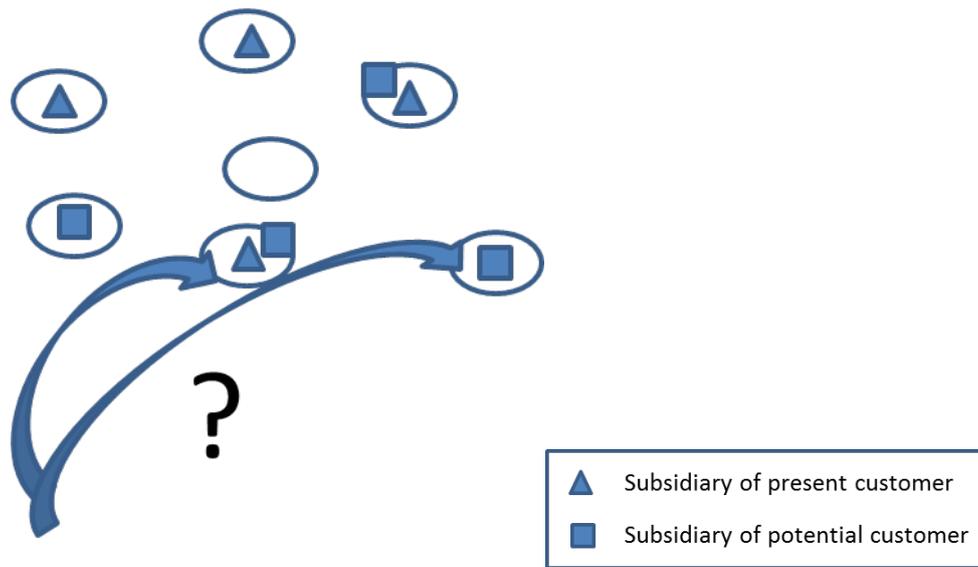
## **CONCLUSION**

This study demonstrated that manufacturing firms pursue real option strategy when they choose locations in relation to their customers. As shown by previous studies, presence of customers' manufacturing subsidiaries facilitates firms' establishing manufacturing subsidiaries. Recognizing this as baseline, this study found differentiated and non-monotonic effects of present versus potential customers, and of their presence in the host or target country versus other countries depending on business environments that focal firms face.

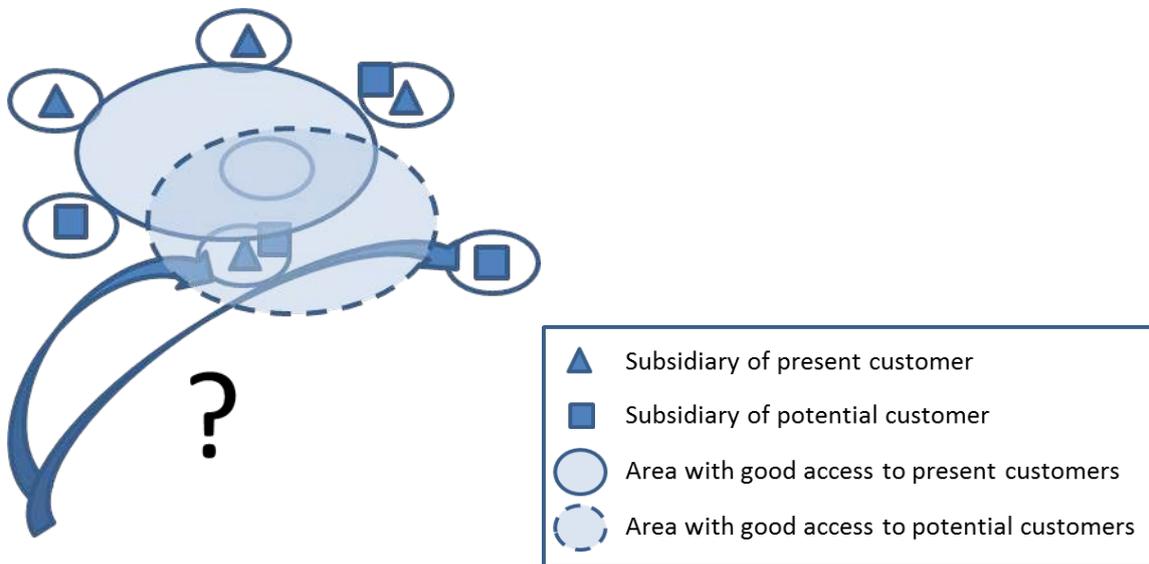
This study opens up new strategic aspect of firm's location choice. It is not a simple question for firms how much they should trace present customers versus potential customers, and how closely they should locate with them. This is a new strategic choice to be studied in location choice strategy research. In addition, this study has an implication on the customer orientation research. Revising the conventional image of suppliers collaborating very closely with customers, researchers have advocated more balanced relationships with customers. This is critical because demand from present customers can change dramatically (Aggarwal & Wu, 2014; Tripsas, 2008), and because opportunities to learn new technologies may reside out of present relationships (Danneels, 2003). Uncertainty is the key, and real option theory is a strong tool to deal with it.

Lastly, this study provides a theoretical framework for practitioners about location choices in relation to customers. Location choices should not be unilateral, and this theoretical framework considering relationships with customers can be a practical guide.

**Figure 1: An illustrative explanation of the research question**



**Location choices in relation to present and potential customers**



**Location choices in relation to present and potential customers taking into account customers' presence in both host or target countries and other countries**

**Table 1: Summary statistics of focal firms (as of 2009)**

Variable	Mean	Median	Min	Max	Std Dev
N of countries with operation	7.791139	3	1	48	9.618887
Total asset (million USD)	2054.58	428.991	6.848	26812	4134.55
Ref: Total asset of North American manufacturing firms from COMPUSTAT (million USD)	2260.87	139.539	0.003	233323	11387.29

**Table 2: Top 8 industries of focal firms, cumulatively accounting for more than 90% of the sample (as of 2009)**

NAICS (3 digit)	Descriptions	N of firms	%	Ref: % in COMPUSTAT
334	Computer and electronics	50	32%	26%
336	Transportation equipment	36	23%	6%
325	Chemical	30	19%	27%
333	Machinery	11	7%	8%
332	Fabricated metal	6	4%	3%
322	Paper	4	3%	2%
331	Primary metal	3	2%	2%
335	Electrical equipment, appliance, and component	3	2%	4%

**Table 3: Top 6 industries of customers, cumulatively accounting for more than 90% of the sample (as of 2009)**

NAICS (3 digit)	Descriptions	N of firms	%	Ref: % in COMPUSTAT
336	Transportation equipment	49	31%	6%
334	Computer and electronics	47	30%	26%
325	Chemical	30	19%	27%
333	Machinery	9	6%	8%
324	Petroleum and coal products	5	3%	2%
335	Electrical equipment, appliance, and component	3	2%	4%

Table 4: Descriptive statistics

Variable	N	Mean	Min	Max	Std Dev	1	2	3	4	5	6
1 Focal firm's presence (manufacturing subsidiary)	103850	0.017	0	1	0.12922						
2 Focal firm's presence (sales and service subsidiary)	103850	0.011	0	1	0.104603	0.264					
3 Focal firm's entry (manufacturing subsidiary)	103850	0.004	0	1	0.064214	0.491	0.096				
4 Focal firm's entry (manufacturing subsidiary)	103850	0.003	0	1	0.055338	0.131	0.525	0.124			
5 Present customer's presence in host or target country	103850	0.508	0	100	2.529734	0.173	0.132	0.075	0.070		
6 Present customer's presence in other countries	103850	11.407	0	16.328	0.882438	0.050	0.064	0.008	0.024	-0.201	
7 Potential customer's presence in host or target country	103850	0.465	0	45.946	1.303976	0.352	0.259	0.140	0.127	0.456	0.065
8 Potential customer's presence in other countries	103850	11.503	6.264	14.239	0.612846	0.059	0.074	0.004	0.027	0.037	0.664
9 Focal firm's presence in other countries (manufacturing subsidiary)	103850	0.434	0.103	4.010	0.544473	0.219	0.121	0.079	0.055	0.015	0.084
10 Focal firm's presence in other countries (sales and service subsidiary)	103850	0.324	0.103	3.032	0.398684	0.133	0.189	0.056	0.086	0.012	0.062
11 Capital intensity of customers	103850	0.770	0.095	3.042	0.470774	-0.032	0.002	-0.013	0.002	-0.008	-0.212
12 Persistence (contrary to uncertainty) of customer profitability	100595	0.755	0.460	0.961	0.088787	0.038	0.010	0.018	0.006	0.008	-0.039
13 Capital intensity of focal firms	103850	0.673	0.115	3.042	0.418629	-0.044	-0.008	-0.014	-0.003	-0.011	-0.185
14 Average wage of workers	53908	1013.020	0.012	5.38E+03	1188.22	0.158	0.199	0.050	0.088	0.250	0.201
15 GDP	103850	2.373E+11	0.000	1.368E+13	6.47E+11	0.284	0.254	0.117	0.125	0.383	0.000
16 Institution	103850	-0.163	-2.345	2.268	0.945561	0.160	0.166	0.064	0.079	0.228	0.238
17 Average tariff on importet goods	83752	6.055	0.020	21.210	4.41897	-0.105	-0.102	-0.044	-0.051	-0.164	-0.249
18 Logged distance in km	103850	9.013	6.594	9.701	0.479341	-0.090	-0.059	-0.047	-0.032	-0.081	-0.181

Variable	7	8	9	10	11	12	13	14	15	16	17
1 Focal firm's presence (manufacturing subsidiary)											
2 Focal firm's presence (sales and service subsidiary)											
3 Focal firm's entry (manufacturing subsidiary)											
4 Focal firm's entry (manufacturing subsidiary)											
5 Present customer's presence in host or target country											
6 Present customer's presence in other countries											
7 Potential customer's presence in host or target country											
8 Potential customer's presence in other countries	0.077										
9 Focal firm's presence in other countries (manufacturing subsidiary)	0.032	0.081									
10 Focal firm's presence in other countries (sales and service subsidiary)	0.015	0.040	0.559								
11 Capital intensity of customers	-0.025	-0.096	-0.141	0.032							
12 Persistence (contrary to uncertainty) of customer profitability	0.018	0.021	0.164	0.057	0.291						
13 Capital intensity of focal firms	-0.024	-0.071	-0.197	-0.022	0.577	0.015					
14 Average wage of workers	0.457	0.316	0.022	0.024	0.001	-0.001	-0.001				
15 GDP	0.732	0.002	0.001	0.002	-0.001	-0.001	0.000	0.414			
16 Institution	0.429	0.363	0.017	0.019	0.000	0.000	0.000	0.874	0.374		
17 Average tariff on importet goods	-0.277	-0.365	-0.024	-0.025	-0.001	0.002	0.001	-0.467	-0.242	-0.590	
18 Logged distance in km	-0.182	-0.355	-0.019	-0.023	0.000	0.000	0.000	-0.215	-0.084	-0.209	0.169

Table 5: Conditional logit results of location choice

Dependent variable		Baseline						Capital intensity of customers						
		Presence			Entry			Presence			Entry			
Explanatory variables		Predictions	coeff	s.e	p-value	coeff	s.e.	p-value	coeff	s.e	p-value	coeff	s.e.	p-value
Present customer	Presence in focal country		0.081	0.012	<.0001	0.118	0.023	<.0001	0.171	0.025	<.0001	0.138	0.042	0.001
	Presence in other country		0.315	0.077	<.0001	0.401	0.155	0.009	0.695	0.166	<.0001	0.633	0.319	0.047
Potential customer	Presence in focal country		0.523	0.023	<.0001	0.305	0.046	<.0001	0.652	0.039	<.0001	0.508	0.071	<.0001
	Presence in other country		0.342	0.090	0.000	-0.007	0.191	0.970	-0.049	0.175	0.782	-0.475	0.349	0.174
Focal firm	Presence in other country		-1.911	0.161	<.0001	-3.874	0.552	<.0001	-1.626	0.175	<.0001	-2.298	0.473	<.0001
Present customer	Presence in focal country	x low cap intensity of customer	-						-0.117	0.028	<.0001	-0.016	0.051	0.754
	Presence in other country	x low cap intensity of customer	+						-0.469	0.186	0.012	-0.246	0.370	0.506
Potential customer	Presence in focal country	x low cap intensity of customer	-						-0.201	0.042	<.0001	-0.181	0.080	0.023
	Presence in other country	x low cap intensity of customer	+						0.574	0.201	0.004	1.691	0.434	<.0001
Focal firm	Presence in other country	x low cap intensity of customer							-3.671	0.325	<.0001	-19.108	1.875	<.0001
Present customer	Presence in focal country	x high uncertainty of customer profitability	-											
	Presence in other country	x high uncertainty of customer profitability	-											
Potential customer	Presence in focal country	x high uncertainty of customer profitability	-											
	Presence in other country	x high uncertainty of customer profitability	+											
Focal firm	Presence in other country	x high uncertainty of customer profitability												
Present customer	Presence in focal country	x high cap intensity of focal firm	-											
	Presence in other country	x high cap intensity of focal firm	-											
Potential customer	Presence in focal country	x high cap intensity of focal firm	+											
	Presence in other country	x high cap intensity of focal firm	+											
Focal firm	Presence in other country	x high cap intensity of focal firm												
Average wage of workers			0.000	0.000	<.0001	-0.001	0.000	<.0001	0.000	0.000	<.0001	0.000	0.000	0.001
GDP			0.000	0.000	<.0001	0.000	0.000	<.0001	0.000	0.000	<.0001	0.000	0.000	<.0001
Institution			0.573	0.095	<.0001	0.799	0.193	<.0001	0.557	0.098	<.0001	0.643	0.198	0.001
Average tariff on importet goods			0.049	0.018	0.006	0.039	0.031	0.206	0.042	0.019	0.025	0.019	0.033	0.572
Logged distance in km			-0.568	0.058	<.0001	-0.677	0.098	<.0001	-0.577	0.060	<.0001	-0.668	0.104	<.0001
Firm FE		Yes				Yes			Yes			Yes		
Year FE		Yes				Yes			Yes			Yes		
N of obs			48237			27084			47368			27084		
N of events			1677			301			1655			301		
N of firms			237			106			155			106		
Model			Conditional logit			Firth logit			Conditional logit			Firth logit		
-2 Log likelihood			6439.803			1696.076			5667.555			1525.011		
LR test			<0.0001			<0.0001			<0.0001			<0.0001		

Table 5: Conditional logit results of location choice (continued)

Dependent variable	Explanatory variables	Predictions	Uncertainty of customer profitability						Capital intensity of focal firms						
			Presence			Entry			Presence			Entry			
			coeff	s.e	p-value	coeff	s.e	p-value	coeff	s.e	p-value	coeff	s.e	p-value	
Present customer	Presence in focal country		0.129	0.022	<.0001	0.158	0.041	<.0001	0.101	0.023	<.0001	0.159	0.043	0.000	
	Presence in other country		0.390	0.140	0.005	0.660	0.258	0.011	0.555	0.161	0.001	0.680	0.270	0.012	
Potential customer	Presence in focal country		0.775	0.039	<.0001	0.652	0.076	<.0001	0.345	0.035	<.0001	0.198	0.060	0.001	
	Presence in other country		0.156	0.152	0.307	-0.539	0.296	0.068	0.382	0.194	0.049	0.300	0.360	0.405	
Focal firm	Presence in other country		-1.534	0.175	<.0001	-2.430	0.477	<.0001	-3.762	0.426	<.0001	-8.725	1.553	<.0001	
Present customer	Presence in focal country	x low cap intensity of customer	-												
	Presence in other country	x low cap intensity of customer	+												
Potential customer	Presence in focal country	x low cap intensity of customer	-												
	Presence in other country	x low cap intensity of customer	+												
Focal firm	Presence in other country	x low cap intensity of customer													
Present customer	Presence in focal country	x high uncertainty of customer profitability	-	-0.059	0.026	0.026	-0.037	0.052	0.477						
	Presence in other country	x high uncertainty of customer profitability	-	-0.060	0.169	0.723	-0.298	0.337	0.377						
Potential customer	Presence in focal country	x high uncertainty of customer profitability	-	-0.323	0.042	<.0001	-0.346	0.083	<.0001						
	Presence in other country	x high uncertainty of customer profitability	+	0.486	0.188	0.010	1.899	0.407	<.0001						
Focal firm	Presence in other country	x high uncertainty of customer profitability		-4.562	0.352	<.0001	-16.672	1.771	<.0001						
Present customer	Presence in focal country	x high cap intensity of focal firm	-							-0.035	0.026	0.187	-0.070	0.050	0.161
	Presence in other country	x high cap intensity of focal firm	-							-0.348	0.183	0.056	-0.473	0.322	0.142
Potential customer	Presence in focal country	x high cap intensity of focal firm	+							0.278	0.040	<.0001	0.200	0.074	0.007
	Presence in other country	x high cap intensity of focal firm	+							-0.011	0.214	0.959	-0.272	0.407	0.503
Focal firm	Presence in other country	x high cap intensity of focal firm								1.971	0.413	<.0001	5.450	1.558	0.001
Average wage of workers			0.000	0.000	<.0001	-0.001	0.000	0.000		0.000	0.000	<.0001	-0.001	0.000	0.000
GDP			0.000	0.000	<.0001	0.000	0.000	<.0001		0.000	0.000	<.0001	0.000	0.000	<.0001
Institution			0.525	0.099	<.0001	0.620	0.201	0.002		0.583	0.097	<.0001	0.755	0.195	0.000
Average tariff on importet goods			0.038	0.019	0.043	0.019	0.033	0.566		0.045	0.018	0.014	0.037	0.031	0.239
Logged distance in km			-0.537	0.061	<.0001	-0.566	0.107	<.0001		-0.588	0.059	<.0001	-0.678	0.099	<.0001
Firm FE			Yes			Yes				Yes			Yes		
Year FE			Yes			Yes				Yes			Yes		
N of obs			47008			26930				46283			26777		
N of events			1652			300				1638			299		
N of firms			231			105				228			104		
Model			Conditional logit			Firth logit			Conditional logit			Firth logit			
-2 Log likelihood			6013.344			1517.646			5737.647			1657.534			
LR test			<0.0001			<0.0001			<0.0001			<0.0001			

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