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Abstract

We examine how firms operating in three or more countries show different international spatial dependencies, compared to those operating in just two countries (home and one foreign country). In a multi-country model, we focus on the significance of rival locations abroad, which has not been considered in bilateral two-country models. We present a model in which a multinational enterprise (MNE) determines the spatial extension of operations (measured by the number of foreign countries per parent firm) and the intensity of production (measured by the volume of local sales or exports per foreign location). We call these "extensive decisions" and "intensive decisions," respectively. We then estimate how their affiliates' locations are substitutable or complementary with each other. We use panel data on Japanese-owned foreign affiliates from 2000-2007 and measure key determinants to trade and foreign direct investment (FDI) multilaterally, relative to other foreign locations. We find that 1) the setup of a new location for local sales is replaceable with the imports from surrounding economies, 2) the setup of a new location for exports is encouraged by the market size of surrounding economies, and 3) the export volume to the third foreign economies are also enhanced.

Keywords: Foreign Direct Investment (FDI), Multinational Firms, Spatial Dependency,
JEL classification: F14, F23, L25, R12

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1 Introduction

Japanese multinational firms have expanded their activities both in their volume of sales and in the number of foreign countries in which they operate. As of 2007, more than 55 percent of Japanese multinational firms (1,287 firms out of 2,325 firms) are operating in three or more countries including the home, according to *the Basic Survey on Overseas Business Activity* (METI). The total sales abroad by the affiliates of such firms accounts for 89 percent of the total aggregate sales abroad by Japanese multinational firms.

Table 1 shows the number of foreign countries and the number of foreign affiliates in which a Japanese corporation has invested capital of 10 percent or more in 2007. More than 1,000 parent firms operates in 2 to 5 countries holding 2 to 9 foreign affiliates. More than 100 parent firms in number have established global operation in more than 10 foreign economies. When a firm tries to optimize its scale and scope of multi-country operation, how does a a firm renew its existing foreign operations and balance those with a new project?

Table 1: (Insert Table 1 here)

We examine how firms operating in three or more countries show different international spatial substitutability or complementarity, compared to those operating in just two countries (home and one foreign country). In a multi-country model, we focus on the significance of the existing locations firms operate abroad, or "the third countries" which has not been considered in bilateral two-country models.

Two-country models fail to capture the role of the third locations as places for demand and supply in investment decisions by MNEs in spite of its increasing impacts on firms' decision. On one hand, the third locations may have large domestic consumers' markets. If a big consumer market exists, a firm is induced to set up an affiliate nearby and to export. For example, if a Japanese MNE with existing plants at China enters into Vietnam, a Vietnamese plant may export to serve Chinese consumers, not Japanese consumers. This means that the decision and the scale of operation at a new location (Vietnam) will depend on the presence of the third country (China). On the other hand, the third locations, may also serve as the rival platforms of exports. If an export platform exists abroad, a firm is discouraged to setup another export platform nearby. For example, if a Japanese MNE has an existing plant at Thailand that exports to other countries, a new plant candidate in Vietnam (host) is required to offer an incremental benefit in addition to the existing Thai plant (the affiliate in the third country).

Therefore, the operation at the new host location takes account not only the bilateral exports (vertical motives) or the local sales (horizontal motives), but also the trade and sales opportunity with the third countries. In other words, a firm renews its foreign operation,by balancing its past records of operation and a new operation.

The multi-country analysis of MNE behavior has gained importance specifically when we consider production and sales network in Asia. For Japanese multinational firms, East and South-east Asian countries are emerging as sales markets, as well as growing as intermediate production stages. As of 2009, 60.3 percents of total affiliates production in Asia are sold locally in domestic markets, 15.6 percents are exported to other Asian countries (except for Japan), and 18.5 percents are exported to Japan. This shows that the trade volume within other Asian economies are almost as large as that toward Japan for affiliates in Asia. In addition, the sales among Asia (except for Japan) has grown from 13,181 billion yen in 2000 to 32,536 in 2009, whereas the sales to Japan has increased only from 4,924 billion yen in 2000 to 7,934 in 2009. This shows that consumers' market are rapidly growing in Asia, and affiliates' operations are shifting within Asia without involving the home location. [1]

To account for the existence of the third foreign countries and the spatial dependencies for firms, we present a model in which a firm decides the spatial extension of operations (measured by the number of foreign countries per parent firm) and the intensity of production (measured by the volume of local sales or exports per foreign location) simultaneously. If the production at a candidate location is for exports, a higher trade costs (distance and trade barriers) discourages the incentive to invest. Existing plants in the third country, however, mitigates this effects by providing an exportable market nearby. If the production is for local sales, a higher trade cost encourages the incentive to invest. Existing plants in the third country weaken this effects by serving a candidate location through trade.

We use panel data on Japanese-owned foreign affiliates and their parents from 2000-2007. We examine how the local sales or exports of affiliates in a given country is prevalent in terms of its period of operation and its volume. For each firm, we measure "trade cost" (trade barriers) and "factor cost" (wage) of a location relative to other locations in operation, weighted by the market size in each location.

We find that the existing locations are both substitutable and complementary for firms. On one hand, we observe "economies of multiple operation", or complementary location choices for export platforms. The spatial proximity abroad reduces the trade costs to serve a new foreign market, and

[1] The original statistics are taken from *the Basic Survey on Overseas Business Activity* (METI). The total production volume in Asia is 42,845 billion yen in 2009, which is greater than that in North America (20,955 billion yen) and that in Europe (10,726 billion yen).

thus encourages opening a new export platform. On the other hand, we observe substitutable location choices for local sales. The local sales at a new location is substitutable by imports from existing affiliates in surrounding countries. We analyze complementary effects by observing locations selected into a firm's network, and analyze substitutable effects by observing locations selected out of a firm's network. The latter part adds a new insight in the empirical study of location dependencies.

2 Literature Review

How does the existing location abroad affect the decision of new spatial expansion? This would explain how firms combine the spatial expansion of operation (the extensive decision) and the intensity of production (the intensive decision). To answer these questions, we introduce papers that deals with spatial dependencies and complex integration strategies. In what follows, we briefly introduce these papers, and present what we try to contribute to the literature.

Carr, Markusen, and Maskus (2001) present the "knowledge-capital" model of multinationals. They assume that knowledge-generating activities can be geographically separated from production and can be provided to multiple location at low cost. The assumption creates a motive for vertical fragmentation of production. Firms locate research where skilled labor is abundant, and production where unskilled labor is abundant, seeking plant-level scale economies. There also exists a motive for horizontal investment. Firms may attain firm-level scale economies by replicating products or service at different locations with decreasing costs. Chaney (2011) applies this idea and explains the geographical distribution of firms and their export activities.

Yeaple (2003) presents a three-country model, to analyze why firms might follow a strategy of complex integration, where firms mix vertical and horizontal integration depending on locations. He shows that the complex strategies create complementarities between potential host countries. He also argue that falling transport cost between countries may increase the likelihood of complex integration strategies.[2]

The gravity theory captures geographical substitutability and complementarity more comprehensively. Anderson and van Wincoop (2003) have developed a multi-country gravity theory of trade flows. They show that, in the presence of trade frictions, bilateral characteristics do not entirely determine bilateral trade; the characteristics of other nations also matter.

[2]Helpman, Melitz and Yeaple (2004) consider a multi-country, multi-sector general equilibrium model of domestic firms (serving foreign markets by exporting) versus horizontal MNEs. Although they study the impact of firm-heterogeneity on US outward activity, the research is abstract from the vertical motives of FDI.

Chaney (2008) revises the gravity model of trade incorporating the distribution of productivity across firms.[3]

Baltagi, Egger and Pfaffermayr (2007) present a 3-country model with spatial interactions of FDI. Regarding third-country effects, there are two effects called "demand effect" and "supply effect." The "demand effect" means substitution, where a new setup of an affiliate is discouraged, since the demand in the third location is large enough to keep its existing operation. The "supply effect" means complementarity, where a new setup of a firm is encouraged, since a new operation assists the existing operation, by fragmenting the production processes and providing intermediate inputs through trade.

Compared to the volume of theoretical insights, empirical work allowing for the impact of third countries, especially the general interdependence across multiple host markets, is relatively scarce and the results are diffused.

As an empirical analysis, Baltagi et al. (2007) use bilateral FDI stock data and foreign affiliate sales data of the U.S. in 1989-1999, covering 11 industries and 51 host countries, including both developed and developing destinations. Their results lend support to the substantial spatial interactions.

Blonigen, Davies, Waddell and Naughton (2005) use the industry-level data of outbound FDI from the U.S. during 1983 to 1998. They find that bilateral determinants are robust even after they include some terms to capture spatial interdependence. However both the effects of bilateral relation and the effects of interdependence are quite vulnerable to the sample destination countries to examine. They show positively robust spatial interdependence in non-OECD and European OECD groups, but negatively robust results at other locations.

There exists some empirical evidence regarding Japanese firms. Head and Mayer (2004) examine 452 Japanese affiliates in 9 European countries from 1984 to 1995.[4] They consider how the scale of demand in adjacent regions works to attract incoming FDI to a given region. They find that the location of affiliates are positively explained by the GDP of the region itself and the distance weighted measure of the GDP of surrounding regions.

Head, Ries, and Swenson (1995) use 751 Japanese manufacturing plants in the U.S. in 1980-1984.[5] In this paper, they look for the evidence on the positive network externality. They test the tendency of firms to make the same location decision as previous firms with similar attributes (e.g. industry, national origin) do. Their conditional-logit specification provides

[3]Crozet and Koenig (2010), based on Chaney (2008), clarify the elasticity of trade costs with respect to distance and the elasticity of substitution between goods separately.

[4]The data are mainly extracted from *JETRO's survey of Current Manufacturing Operations of Japanese Firms in Europe*,in 1996.

[5]The data come from a survey of Japanese manufacturing investment in the U.S. conducted by the Japan Economic Institute.

positive agglomeration effects between bordering states especially for automobile industry's FDI into the U.S.[6]

Charlton (2005) and Alfaro and Charlton (2009) use 568 MNEs from various countries (with 8135 affiliates in 53 countries) to clarify the vertical motives of FDI and its distribution. He finds the importance of geography, specifically the size of the markets of neighboring countries. He also finds that factor costs are important only relative to those of other countries where the MNEs could alternatively invest.

In general, complementary location choices are observable and its impacts are quantitative since a firm actually sets up an affiliate there. however, substitutable location choices are not observable nor countable, since such locations are not visibly selected by a firm. To take both effects into account, we need to check all the potential locations.

Our research contributes to the literature first by adding firm-level evidence, since location and production is a firm-level decision, where each firm faces different scale and scope endowment for each additional decision. Most of the other research discusses the industry-level bilateral FDI stock or industry-level sales by foreign affiliates.

Secondly, we classify local sales and export volume per location, because they are driven by different factors, or factors act oppositely for local sales and exports. Lastly, we try to analyze substitutable effects in location choice quantitatively, since trade-offs between existing locations and potential locations are not visible.

3 Model

Based on Alfaro and Charlton (2009), with its original comes from the Chapter 4. of Fujita, Krugman, and Venables (1999), we provide the analytical framework. Producers are making final goods and are in monopolistic competition, where they face fixed costs of production, trade costs, and constant marginal cost of production.

3.1 Preference

We assume the CES type demand over $x(q)$ quantity with variety q, provided by n_i firms in country i and provided for country j. The utility of consumers in country j is,

$$U_j = \left\{ \sum_i^n \int_{ni} x_{ij}(q)^{\frac{\sigma-1}{\sigma}} dq \right\}^{\frac{\sigma}{\sigma-1}} \tag{1}$$

[6]Coughlin and Segev (2000) consider US FDI into provinces in China, using spatial maximum likelihood estimation. They find that FDI into one location within China is found to be increasing in the FDI into other proximate Chinese provinces. Head, Ries, and Swenson (1999), using the same data shown above, describe that the investment promotion policies by US states are also effective on inbound FDI.

where $\sigma > 1$ is the constant elasticity of substitution, which is uniform for all countries. The price index in country j is,

$$G_j = \left\{ \sum_i^n \int_{ni} p_{ij}(q)^{1-\sigma} dq \right\}^{\frac{1}{1-\sigma}} \tag{2}$$

If we denote the total expenditure in country j as, M_j, we derive country j's demand for each variety is,

$$x_{ij} = \frac{p_{ij}^{-\sigma} M_j}{G_j^{1-\sigma}} \tag{3}$$

3.2 Production

The cost of each good supplied to country j by production facility in country i (exporting from i) consists of the constant marginal cost, $c_i > 1$, the iceberg trade cost, $t_{ij} > 1$, and the fixed plant cost, $\frac{c_i}{Z_i}F$. The fixed cost is proportional to the marginal production cost.[7] Z_i denotes the technical efficiency in i, which is a random variable and observable upon investment. [8]Then, the total profit of a firm is defined by,

$$\pi_i = x_i[\frac{p_{ij}}{t_{ij}} - \frac{c_i}{Z_i}] - \frac{c_i}{Z_i}F \tag{4}$$

where $x_i = \sum_j^N x_{ij}$ and $p_{ij} = \frac{\sigma}{\sigma-1}\frac{c_i t_{ij}}{Z_i}$ (the first term counts the mark-up). There is a free entry of firms until they reach the zero profit condition. The condition solves the output x_i^* as $x_i^* = (\sigma - 1)F$.

In addition, we assume that labor is the unique production factor, and exogenous for each country. To normalize, we assume marginal labor requirement for each unit of output is constantly 1. Therefore the labor demand in each firm is l_i^* and the equilibrium number of firms is n_i^*, dividing each firm's demand by total available labor force.

$$\begin{aligned} l_i^* &= x_i^* + F = \sigma F \\ n_i^* &= \frac{L_i}{\sigma F} \end{aligned}$$

3.3 FDI for Local Sales

We now consider a multinational firm who chooses, for each foreign location, whether to export or to serve locally by establishing an affiliate. If a multinational firm in i supplies to j by exporting, the profit from the exports to

[7]This implies that fixed plant cost is proportional to the cost of product produced in that plant. Without loss of generality, we can simplify the cost as F, but it has a computational mess.

[8]We assume that Z_i is the same for firms operating in the same country. We can relax this assumption (i.e. random Z_i for each firm) without losing our main proposition.

j is described by plugging equation (3) into equation (4).

$$\pi_{ij} = B_j M_j (\frac{c_i t_{ij}}{Z_i})^{1-\sigma} \text{ where } B_j = (\frac{G_j}{\sigma - 1})^{\sigma-1} \sigma^{-\sigma} \tag{5}$$

If a multinational firm in i, instead supplies to j by setting up an affiliate in j, we assume a fixed cost, $H = H(q)$, which is defined by the variety a firm provides. Since a firm can provide the same variety in more than one location by this horizontal FDI, the volume of H is a firm-specific term. The profit by supplying from an affiliate in j is,

$$\pi_{ij} = B_j M_j (\frac{c_j}{Z_j})^{1-\sigma} - H(\frac{c_j}{Z_j}) \tag{6}$$

We argue that this horizontal FDI actually realizes if the expected profit from local production is higher than the expected profit from exporting goods from home or from existing locations, the set of countries called Ω. The condition is,

$$E[B_j M_j (\frac{c_j}{Z_j})^{1-\sigma}] - H(\frac{c_j}{Z_j}) > E[B_j M_j \max_{v \in \Omega} (\frac{c_v t_{vj}}{Z_v})^{1-\sigma}] \text{ where } v \neq j \tag{7}$$

3.4 FDI for Export Platforms

We here consider a multinational firm who chooses to serve country j whether from a home country i or from another new location k. The profit by exporting from an affiliate in k is

$$\pi_{kj} = B_j M_j (\frac{c_k t_{kj}}{Z_k})^{1-\sigma} - H(\frac{c_k}{Z_k}) \tag{8}$$

We argue that this vertical FDI actually realizes if the expected profit from exporting from k is higher than the expected profit from exporting goods from rival locations (i.e. home or from existing locations). The condition is,

$$E[B_j M_j (\frac{c_k t_{kj}}{Z_k})^{1-\sigma}] - H(\frac{c_k}{Z_k}) > E[B_j M_j \max_{v \in \Omega} (\frac{c_v t_{vj}}{Z_v})^{1-\sigma}] \text{ where } v \neq j, k \tag{9}$$

In 3.3. and 3.4., a firm performs its production processes throughout in one country. Trade of intermediate inputs are considered if the inputs have firm-specific varieties in monopolistic competition.

3.5 Location Decision

Integrating equation (7) and (9), we discuss the decision of a firm whether it will add another affiliate or not. We assume a set of countries called Φ, composed of J members in which the MNE has subsidiaries, and a set of countries called Φ^{-1}, including $N - J$ members without subsidiaries. Then

a multinational firm with existing J affiliates makes a choice to add a plant in $k \in \Phi^{-1}$. The addition yields a change in the global profit for the MNE as follows.

$$W_k = E[\Delta\pi_{\Omega,k}] = E[B_k M_k \left\{ (\frac{c_k}{Z_k})^{1-\sigma} - \max_{v\in\Phi}(\frac{c_v t_{vk}}{Z_v})^{1-\sigma} \right\} + \sum_{i=1}^{N-1} B_i M_i \left\{ \max_{v\in\Phi\cup k}(\frac{c_v t_{vi}}{Z_v})^{1-\sigma} - \max_{v\in\Phi}(\frac{c_v t_{vi}}{Z_v})^{1-\sigma} \right\}] = E\Delta\pi_{kk} + \sum_{i=1}^{N-1} E\Delta\pi_{ki} \quad (10)$$

The new plant in k will be established if $W_k > H(\frac{c_k}{Z_k})$. The first term in equation (10) represents the new location choice for horizontal FDI if the country k is newly supplied through on-the-spot production. This production pattern takes the benefit by saving trade cost, and having different production costs. The second term in equation (10) represents the new location choice for vertical FDI if the plant newly established in country k works as an export platform, supplying to $N-1$ country. This production pattern takes the benefit of cost savings compared to the exports from other countries where a multinational firm already owns affiliates.[9] These two terms mean that, both horizontal and vertical motives are possible for any new location k.

The firm chooses to begin production in location k, such that a variable W_k is maximized.

$$\max_{k\in\Phi^{-1}} W_k = E\Delta\pi_{kk} + \sum_{i=1}^{N-J-1} E\Delta\pi_{ki} \quad (11)$$
$$\text{subject to } W_k > H(\frac{c_k}{Z_k})$$

This setup is a static optimization problem, but repeated at every time event for all N countries.[10] H is a one-time setup cost at each location, and it does not affect the volume of production at the next time period.

An MNE sets up an affiliate in country k with the highest W_k, and the investment occurs sequentially in descending order to the second and third largest W_k as long as the constraint holds. Since the constraint allows more locations as c_k is lower, H is lower, and Z_k is higher, we conclude that the probability of the marginal multinational firm investing in location k is a negative function of the production costs or fixed plant cost, and the positive function of the technological efficiency.

[9]The exports from country k to $j \in \Phi$ is viable, if an affiliate in j does not serve to the local market in the same industry as k's.

[10]In empirical analysis, we pick up major 24 economies.

In addition, an increase in trade costs t_{vk} have positive effects on the first term of W_k, since horizontal FDI in any location is promoted by the increased cost of serving to k by exporting. However, trade costs t_{ki} have negative effect on the second term of W_k, since vertical FDI to any location from k is discouraged by the increased trade cost. The trade costs t_{vi}, trade cost from a rival location to a new foreign market, have the opposite effect, as it makes k relatively better off as a new production platform. The overall effect depends on the relative size of market to serve.

3.6 Local Sales or Export Volumes

We here also show the MNE's total expected local sales and exports. The expected exports from an existing affiliate in $k \in \Phi$ sold in country $i \in \Phi^{-1}$ is shown, using equation (3), as below.

$$\begin{aligned} E[x_{ki}] &= E[\frac{p_{ki}^{-\sigma} M_i}{G_i^{1-\sigma}}] \\ &= E[(\frac{\sigma}{\sigma-1}\frac{c_k t_{ki}}{Z_k})^{-\sigma} G_i^{\sigma-1} M_i] \end{aligned} \tag{12}$$

Then, the MNE's total expected local sales in k and exports to all $N-J$ potential markets are,

$$\sum_{k=1}^{J} Ex_k = \sum_{k=1}^{J} \left\{ E[x_{kk}] + \sum_{i=1}^{N-J} E[x_{ki}] \right\} \tag{13}$$

The first term in equation (13) is increasing in the home market size of k, and the second term is increasing in the exportable market size of i. The production volume is decreasing in production costs and trade costs, and increasing in the technological efficiency in k.

3.7 Comparative Statics and Testable Predictions

	Extension		Production	
Analysis	local sales	export	local sales	export
Local market size	+	n.a.	+	n.a.
Exportable market size	n.a.	+	n.a.	+
Trade cost to serve	+	-	n.a.	-
Factor cost in production	-	-	-	-
Fixed plant cost	-	-	n.a.	n.a.

Table 2: Theoretical Predictions

Table 2 summarizes the comparative statics derived from our theoretical setup. We first argue whether a new country k induces FDI from a

multinational firm with affiliates in $k-1$ countries. We describe how the variables positively or negatively influence the probability of new entry into k. Here we need to keep in mind that trade cost and production cost at k are to be defined in relative terms to those of existing locations. Similarly, the home market size of k and the export market sizes change by firm and by year. Therefore, production costs and market size are the firm-level variables. All the inference from the setup is intuitively straightforward, although construction of variables are complicated.

First, we expect that the home market size to positively affect the probability of establishing a local affiliate, $dW_k/dM_k \geq 0$, if the local production has a lower expected cost of serving to local market compared to the imports from any other countries. Second, we expect that the local production costs to negatively affect the probability of a new establishment, $dW_k/dc_k \leq 0$. With a higher production costs, imports from abroad has become a relatively better choice to serve the local markets. In addition, with higher production costs, exporting opportunity from the location has become less desirable. Third, a higher trade costs (trade barriers) increase the desirability of local production relative to foreign imports, $dW_k/dt_{vk} \geq 0$. However, higher trade costs reduce the location's export opportunity, $dW_k/dt_{ki} \leq 0$. The size of exportable markets strengthen the export opportunities. The industries' average costs of establishing and maintaining production facilities reduces the optimal size of global network, $dW_k/dH \leq 0$.

We next show how the local sales volume (for horizontal motive) and export volume (for vertical motive) changes given an entry. We have the following predictions. First, local market size positively affects the local production volume, $dEx_k/dM_k > 0$. Second, we expect that a higher local wage reduces local production because it reduces the desirability of the location from which to export to other foreign countries. In addition, the local production costs will affect the local price through the cost of production, and potentially affect the local demand, $dEx_k/dc_k < 0$. The higher trade costs reduce the location's export potential. The size of the potential export market strengthens the export opportunity and production, $dEx_k/dM_i > 0$.

4 Data

4.1 Firm Data

The main data for the analysis comes from *The Basic Survey of Overseas Activity* from 2000-2007. The database includes individual observations on around 4,000 parent firms in Japan and about 18,000 Japanese-owned foreign affiliates. (As of 2009, the active number of parent firms are 4,203 and active number of foreign affiliates are 18,201. Among the questioned firms, 73.5 percents of them answered to the questionnaire.) The data includes information on the location, industry, current sales, current employment,

compensations to employees, net value of plant, property and equipment, and year of establishments for each business. Subsidiaries and headquarters are reported separately. In every three years, detailed surveys are conducted and firms are asked to report their sources of purchase, and destinations of sales. The affiliates report how much they purchase locally from domestic markets, import from Japan, or import from the third countries. Similarly, they report how much they sell locally, export to Japan, or export to third countries. The years of detailed survey are for 2007, 2004, 2001, and each reports the activities of the previous years: 2006, 2003, and 2000. We measure industry-level wage and fixed plant cost for each foreign economies. (See Table 3 for the list of constructed variables.) To avoid the bias of using small number of observation, we select 38 industries with 100 or more of Japanese foreign affiliates. We also limit host foreign economies to 24, in which 100 or more of Japanese owned foreign affiliates are in operation.

4.2 Labor costs

Let w_i^s be the cost per unit of labor in country i for firms in industry s. We use the data of *Industrial Statistics Database* by UNIDO. [11]Here, at least 2-digit SIC level (coded from 20 to 39) wages are available to the countries we investigate. The average wage for each industry is calculated as the total compensation of employees divided by the total number of employees. We then denote the relative production costs between location i and h in industry s as:

$$\omega_{hi}^s = \upsilon^s[1 - (\frac{w_h^s}{w_i^s})] \tag{14}$$

where υ^s is the share of labor costs in total production costs calculated for each industry, using Japanese industrial statistics. Therefore, ω_{hi}^s is a cost advantage weighted by cost shares.

4.3 Trade costs

Let f_{hi} be the bilateral trade costs with iceberg form. We use CIF/FOB ratios, derived from the *Direction of Trade Statistics* by the IMF: $f_{hi} \equiv CIF_{hi}/FOB_{hi} = f(X_{hi}, X_h, X_i)$, where X_{hi} is the vector of characteristics relating to the relation between country h and i, X_h, X_i are vectors of country characteristics. From OLS regression of $\ln(CIF/FOB - 1)$ on bilateral country characteristics (border shares, landlocked, GDP per capita, infrastructure) we derive fitted values, $\tilde{f}_{hi}$, as our measure of bilateral transport

[11]Although we also have the information of wage per worker of multinational firms, the figures may not reflect the local wage level, because the amount include the compensation of both Japanese workers and local workers. As the wage data of UNIDO does not record the information of Hong Kong and Taiwan, we supplement the data sets by using the compensation cost data of *the Direct Investment Abroad* by U.S. BEA (Bureau of Economic Analysis).

costs.
This measure does not take into account the industrial differences in transport cost. We then deal with this problem by adjusting our transport cost using an industry weighting derived from Bernard, Jensen, and Schott(2003). The authors compute average CIF/FOB ratios, t^s, for different industries using product level data on U.S. imports compiled by Feenstra(1996). We denote the deviation of an industry's trade cost from industry average, $\bar{t}^s$ as $\hat{t}^s = [1 + (t^s - \bar{t}^s)/\bar{t}^s]$. The industry level set of trade costs for country pairs of h and i we define is:

$$\tilde{t}^s_{hi} = \tilde{f}_{hi}\hat{t}^s - 1 \tag{15}$$

4.4 Export market size

To incorporate the third country's effect, we construct the variable to capture the export market size. It is the function of own production costs, its proximity to other large markets with existing affiliates, and the characteristics of other rival supplying locations without affiliates.
For each firm, given its existing international network, Φ, a firm in industry s chooses location k, to supply goods to country i by minimizing:

$$\min_{k \in \Phi} D^s_{ki} = \tilde{t}^s_{ki} - \omega^s_{ki} \tag{16}$$

We then limit a firm's export markets to countries where a firm could supply with the lowest cost.

5 Estimation Methodology and Results

To clarify the difference between the results assuming bilateral relation and those assuming spatially dependent relation (multi-country features), we compare the estimation using multilateral variables (weighted by trade volumes) explained above with the bilateral variables. We investigate the two interrelated decisions: location decisions and production decisions by two stages. In the first stage, we use a discrete choice model to determine whether an MNE chooses to locate production or sales facilities in a particular country. We then analyze the sales volume of affiliate operation in a particular country.

5.1 Location Decision

The MNE's latent propensity $y^{q^*}_k$ to invest in country k, is determined by its expected profits/costs in a new location. We have the following decision equation.

$$y^{q^*}_k = W_k - Hc_k + \alpha^q + \epsilon^q_k \tag{17}$$

In the above equation, W_k is the expected profits, H is the fixed costs, c_k is the factor costs (wage), α^q are the MNE specific effects, ϵ_k^q are distributed with $N(0, \sigma_e^2)$. Although the latent variable y^{q^*} is not observable, we have the information of firms' entry: 1 denotes an entry (or an active operation in the surveyed year), and 0 denotes no operation i.e. (a firm is not entered yet or it has stopped its operation by the surveyed year).

$$y_k^q = \begin{cases} 1 & \text{if } y_k^{q*} > 0 \\ 0 & \text{otherwise} \end{cases}. \tag{18}$$

We estimate y_k^q with a fixed effects logit model:[12]

$$\text{Prob}\left(y_k^q = 1\right) = q\left(M_k, c_k, (t_k)_{j \in I_k}, (c_j)_{j \in I_k}, (M_j)_{j \in I_k}\right) \tag{19}$$

where

$$\begin{aligned} I_k &= \{1, \ldots, N\} \backslash k \\ M_k &: \text{ size of home market} \\ M_j &: \text{ size of exportable market} \\ t_k &: \text{ trade costs to exportable markets} \end{aligned}$$

We then reorganize the specification as follows. (The lower case letters indicate logarithms.)

$$\text{Prob}\left(y_k^q = 1\right) = m_k + \omega_{\Omega k}^s + t_{\Omega k}^s + m_{k\Omega} + \epsilon_k^q, \tag{20}$$

where

$$\begin{aligned} \epsilon_k^q &= \alpha^q + \nu_k^q \\ m_k &: \text{ log of market sizes} \\ \omega_{\Omega k} &: \text{ relative labor cost at } k \text{ compared to trade partners} \\ &\quad \text{weighted by the bilateral trade volume} \\ t_{\Omega k} &: \text{ trade costs to exportable market} \\ &\quad \text{as weighted average of the bilateral trade cost} \\ \omega_{\Omega k}^s &= \sum_{k=1}^{N} \omega_{hk}^s \frac{Q_{hk}}{Q_k} \\ t_{\Omega k}^s &= \sum_{k=1}^{N} t_{hk}^s \frac{Q_{hk}}{Q_k} \end{aligned}$$

Table 6 reports the results. The dependent variable is the indicator variable to show whether there exists an affiliate of an MNE at the country in

[12] Due to the complexity of the W_k variable,a structural estimation does not show interesting insights and not comparable to previous studies either.

question. For each MNE, there are choices of 24 economies for location during the two time periods. For column 1 and 2, we check whether an affiliate has a positive value of local sales, to investigate the motivation of FDI for market seeking. For column 3 and 4, we check whether an affiliate has a positive value of exports, to investigate the motivation of export platforms. The estimations in column 1 and 3 use the multi-country weighted trade cost and wage, whereas column 2 and 4 use the bilateral variables.

The local market size clearly promotes the entry of affiliates for local sales. In contrast, exportable market size encourages the entry of affiliates for exporting. The expected market sizes for sales are significant factor for both types of entry, and the size of local market (for local sales) is more directly influential than those for export platform. The production costs have negative effect on both motives. When the wage cost is high, local sales at that country are substituted by imports from other locations. In addition, the exports from that location becomes less competitive than those from other rival export platforms. The trade costs to serve shows different effects for two motives. When the cost of imports is high, there are small opportunities of importing from the third location, then MNEs may set up affiliates directly. Conversely, high trade costs to serve to other country are the disadvantage for export platforms, and entry is discouraged. The fixed setup costs of plant are expected to be the negative factors, although the results are not strong enough.

Table 8 replicates the estimation using key variables computed by additional data source. As for the entry to local sales markets, the robust positive results of local market sizes and the robust negative results of production (wage) costs are maintained. When we specifically compare the bilateral wage difference and the multi-country weighted wage difference, a relatively high wage costs compared to trading partners is a significantly negative factor for the entry, because the entry is substitutable by the imports from surrounding countries.

The purpose of this estimation is to compare the influence and significance between multi-country variables and bilateral variables. We observe that the negative effects of high wage and high trade costs are mitigated in multi-country measurements, compared to the bilateral measurements. The disadvantage of high wage costs (and high prices of products to export back) and high trade costs (to serve to home or abroad) are mitigated when we take into account the other surrounding exportable markets.

We comment briefly for the rest of the variables. The MNEs' aggregate sizes (the sales volume and the number of affiliates) have positive and significant results for any new form of entry. These results remind us to consider the unobserved firm heterogeneity as well as the simple endogeneity between overall entries and a single entry. A high rule of law (a sophisticated legal system) has positive effect specifically for local sales operation. The exchange rate control has negative effects for both local sales and exports, due

to its barriers to trade both in importing and exporting.

5.2 Production Decision

We next investigate the scale of vertical and horizontal foreign investments measured by the value of local sales and exports. We estimate the following relationship:

$$x_k^q = m_k + m_{k\Omega} + \omega_{\Omega k}^s + t_{\Omega k}^s + \epsilon_k^q, \tag{21}$$

where x_k^q is the annual sales of an MNE's affiliate at k. We estimate it with a random-effect GLS model to control for other omitted MNE-specific variables.

Table 7 reports the results. The dependent variable is the log of local sales values (for column 1 and 2) and the log of export values (for column 3 and 4). The estimations in column 1 and 3 use the multi-country weighted trade cost and wage, whereas column 2 and 4 use the bilateral trade cost and wage cost differences.

The home market size strongly promotes the production volume for local sales, and not significantly for exports. In contrast, exportable market size encourages the export volumes of affiliates, and not significantly for local sales. The production (wage) costs do not show significant results, but have negative implications on production volumes as predicted by the model. Whereas, trade costs are predicted as the key factor for production. The results show the significant and negative sales volume for both. For local sales, it turns out that high trade costs do not lead to tariff-jumping FDI (involving an increase in production volume). In contrast, for exporting, a higher trade costs reduces the advantage to export from the location. The fixed setup costs of plant are expected to be not significant once after they enter, in the model. The results are overall compatible with our prediction.

Table 9 replicates the estimation using key variables computed by additional data source. As for the production toward local sales markets, the robust positive influences of local market sizes are maintained. Interesting enough, the positive effects of the size of exportable markets on local sales volumes are observed. Instead, the negative effects of production costs on sales volume is not observed. For the exporting, the robust positive influences of exportable market size on production volume is clear. Similarly, a high trade costs to serve has negative and significant results.

When we specifically compare the bilateral wage difference and the multi-country weighted wage difference, spatial dependencies or the third country effect is not clear as we predicted. However, when we compare the effect of bilateral and multi-lateral trade costs, we observe that bilateral disadvantage in terms of high trade cost to export (to home) is significantly mitigated by the export opportunity to the third foreign economies.

We add comments for the rest of the variables. The MNEs' aggregate size (the sales volume and the number of affiliates) now do not show the significant effect on the sales and export volume at each location. A high rule of law (a sophisticated legal system) is a positive factor for both local sales and exporting operation. The exchange rate control now shows positive effect for exportd. This outcome is driven by the impact of the exports from China. (Most of the multi-country MNEs have foreign affiliates in China where exchange rates are controlled.)

6 Conclusion

In this paper, we specifically consider the significance of spatial substitutability and complementarity of MNEs' network of affiliates. This question is motivated by the expanding operation of Japanese MNEs in number of countries, and their large shares in sales volume. We find that the third country effects is an important factor, both for the location choices and for the production decision. In addition, we find that we have over-estimated the impact of the home (Japanese) market, when we do not take other foreign locations into an account. Through the model specification, we know that the factors to promote vertical and horizontal FDI are different and have effects in opposite direction sometimes. Therefore, we separate local sales and export volume of each MNE for each foreign location. Then we estimate the impacts of each motive. Our main specification highlights the following results. (1)Location decisions for local sales: A relatively high wage costs compared to trading partners is a significantly negative factor for the entry, because the entry is substitutable by the imports from surrounding countries. (2) Location decisions for exporting: The disadvantage of high wage costs (and high prices of products to export) and high trade costs are mitigated when we take into account the other surrounding exportable markets. Here we infer a complementary effect, where a new candidate location can take advantage of the large consumers' markets in neighbor locations. (e.g. from South-east Asia to China, or from Mexico to the U.S.)

(3) Production decisions for export: When we compare the effect of bilateral and multilateral trade costs, we observe that bilateral disadvantage in terms of high trade cost to exports is significantly mitigated by the export opportunity to the third foreign economies.

This research discuss the determinants of location choice and production by proposing the substitutability and complementarily that each MNE's existing foreign affiliates provide. The factors of third locations are measured by relative trade costs and production costs differences compared to a candidate location. We estimate the quantitative impact of those, separately for local sales and export motives.

However, we still need to consider the firms' incentives in dynamic set-

ting. We also need to construct the data with longer time periods to control the year specific effects and clarify the long-run impacts. The endogeneity issues proposed in this paper are to be solved as well.

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Table 1:
The Number of Foreign Countries and Foreign Affiliates of Japanese MNEs

The Number of Foreign Countries with Affiliates	The Number of Affiliates: 100 or More	The Number of Affiliates: 50～99	The Number of Affiliates: 10～44	The Number of Affiliates: 5～9	The Number of Affiliates: 4	The Number of Affiliates: 3	The Number of Affiliates: 2	The Number of Affiliates: 1	Total
30 or More	12	5	0						17
15～29	0	20	0						20
10～14	0	0	39						39
9	0	0	44	3					47
8	0	0	37	14					51
7	0	0	30	37					67
6	0	0	27	67					94
5	0	0	12	144					156
4	0	0	4	96	100				200
3	0	0	3	42	58	191			294
2	0	0	2	24	30	77	404		537
1	0	0	0	6	8	32	108	884	1038
Total	12	25	198	433	196	300	512	884	2325

Table3:
Variables for Location and Production Decisions

Wage (Weighted Average)	Labor costs for foreign firms in each industry in each country 1 Basic Survey on Overseas Business Activity (Total Compensation/Number of Employees, weighted average per industry) 2 US BEA's Direct Investment Abroad (Total Compensation/Number of Employees) 3 UNIDO's INDSTAT4 (Hourly Compensation Costs) Share of labor costs in total production cost in each industry US BEA's Direct Investment Abroad (Total Compensation/Total Value Added)
Trade Cost (Weighted Average)	1.CIF/FOE *Source: Venables and Limao (2001) IMF's Direction of Trade Statistics 2.Fitted values for bilateral trade costs Regressed on "border dummies", "minimum distance", "infrastructure", "landlocked dummies" "Real GDP per capita" * Source: Venables and Limao (2001) Aggregate costs for each country are converted into country industry trade costs using industry weights from Bernard, Jensen, Schott (2003)
Local Market Size	Log GDP in real US Dollars *Source World Bank's "World Development Indicators"
Exportable Market Size	The sum of log GDP of all countries (including home) where affiliates of a parent MNE are located
Fixed Plant Cost	Industry Specific Fixed Cost of Investment Basic Survey on Overseas Business Activity (Net Plant, Property, and Equipment for all affiliates/Total Number of Affiliates)
MNE Size in Number	Total Number of Foreign Affiliates in MNE Network
MNE Size in Sales	Log average sales of MNE across all its affiliates
Rule of Law Index	*Source: Dollar and Kraay (2002)
Exchange Rate Controls	*Source: Dollar and Kraay (2002)
Sachs and Warner	Trade Openness * Source: Sachs and Warner (1995)

Table 4: Industry Data Summary

Industrial Classification (2006) Basic Survey of Business Activity (2006)			Plant Fixed Cost	Wage Level	Share of Labor Cost
2021	Wholesale trade	Service/Non-Manufacturing	303.2	3.15	0.083
1602	Motor Vehicle Parts and Accessories	Manufacturing	1723.1	1.11	0.283
1503	Electric Parts, Devices and Electronic Circuits	Manufacturing	1026.8	0.39	0.212
2012	Warehousing and Services incidental to Transport	Service/Non-Manufacturing	169.9	1.16	0.344
1304	Miscellaneous General-purpose Machinery and Machine parts	Manufacturing	475.6	1.06	0.366
2074	Miscellaneous Services	Service/Non-Manufacturing	349.6	1.46	0.444
2022	Retail trade	Service/Non-Manufacturing	494.9	1.47	0.159
2031	Finance and Insurace	Service/Non-Manufacturing	285.4	0.85	0.389
1501	Communication equipment and related products, Image and Audio equipment	Manufacturing	1589.3	1.01	0.202
0703	Industrial Organic Chemicals	Manufacturing	3217.8	2.36	0.222
2011	Transport (railway, road passenger, road freight, water, and air)	Service/Non-Manufacturing	1208.2	0.98	0.225
0401	Manufacture of Food	Manufacturing	810.6	0.59	0.275
1806	Miscellaneous Manufacturing Industries	Manufacturing	533.2	1.50	0.443
0301	Construction	Service/Non-Manufacturing	185.3	0.92	0.150
1404	Miscellaneous electrical machinery equipment and supplies	Manufacturing	911.4	0.71	0.255
2003	Information Services	Service/Non-Manufacturing	50.3	0.95	0.298
0504	Apparel and miscellaneous fabricated textile products	Manufacturing	192.2	0.23	0.437
1803	Manufacture of Plastic Products	Manufacturing	569.1	0.61	0.461
1601	Motor Vehicle, motor vehicle bodies,and trailers	Manufacturing	6182.6	0.85	0.130
0704	Chemical and Allied Products (oil, soaps, synthetic detergent, and paints)	Manufacturing	1063.7	1.77	0.476
1202	Miscellaneous fabricated metal products	Manufacturing	384.7	0.70	0.410
0707	Miscellaneous chemical and allied products	Manufacturing	1384.9	1.39	0.200
2041	Real Estate	Service/Non-Manufacturing	615.5	0.60	0.256
1401	Industrial Electrical Apparatus	Manufacturing	748.1	0.47	0.256
2071	Professional and Technical Services	Service/Non-Manufacturing	95.9	0.81	0.122
1102	Manufacture of Non-ferrous metals and Products	Manufacturing	1124.2	0.39	0.191
1302	Manufacture of business-oriented machinery	Manufacturing	624.8	2.23	0.217
2072	Goods Rental and Leasing	Service/Non-Manufacturing	546.1	0.45	0.139
1402	Household Electric Appliances	Manufacturing	1134.3	0.42	0.159
0705	Drug and Medicines	Manufacturing	541.0	2.96	0.815
0201	Mining and quarrying of stones and gravel	Manufacturing*	6530.0	0.97	0.107
1002	Castings and Forgings, and other Iron and Steel products manufacturing	Manufacturing	956.4	0.83	0.133
2073	Advertising	Service/Non-Manufacturing	4.7	0.07	0.342
1703	Semiconductorand flat-panel display manufacturing equipment	Manufacturing	415.3	1.28	0.808
0903	Miscellaneous stone, ceramic, and clay products	Manufacturing	786.0	0.31	0.287
1804	Manufacture of Rubber Products	Manufacturing	2014.8	0.07	0.056
1701	Optical instruments and Lenses	Manufacturing	586.8	0.61	0.146
1301	Metalworking machinery and its equipment	Manufacturing	436.3	2.27	0.408

Table 5
Relative wage and trade costs (compared to rival affiliates location) by Country (with 100 or more Japanese-owned foreign affiliates)

	Host Foreign Countries		Area	Number of Affiliates	Relative Wage Advantage	Trade Cost (Weighted)
1	320	China	Asia	2896	-2.24	1.43
2	101	U.S.A.	North America	2809	0.27	0.14
3	309	Thailand	Asia	1145	-1.57	0.77
4	314	Hong Kong	Asia	945	0.20	0.16
5	308	Singapore	Asia	887	0.22	0.19
6	315	Taiwan	Asia	720	0.03	0.16
7	307	Malaysia	Asia	665	-0.76	0.63
8	501	U.K.	Europe	659	0.17	0.11
9	310	Indonesia	Asia	590	-0.10	0.12
10	503	Germany	Europe	517	0.22	0.09
11	317	South Korea	Asia	478	0.15	0.37
12	601	Australia	Oceania	402	0.27	0.32
13	311	Phillippines	Asia	383	-1.31	1.13
14	508	Netherland	Europe	302	0.28	0.11
15	502	France	Europe	282	0.15	0.07
16	204	Brazil	South America	221	-0.27	0.54
17	102	Canada	North America	220	0.05	0.39
18	202	Panama	South America	218	-0.48	0.44
19	316	Vietnam	Asia	167	-1.62	0.49
20	201	Mexico	South America	156	-1.68	0.35
21	302	India	Asia	147	-2.42	1.53
22	509	Italy	Europe	131	0.16	0.11
23	511	Spain	Europe	116	0.06	0.12
24	504	Belgium	Europe	113	0.20	-0.06

Table 6
Logistic Regression Results for Location Decision (2004, 2007: Panel of 2 time series)

*We select 38 industries with 100 or more of Japanese-owned Foreign Affiliates
*We select 24 host foreign countries/economies with 100 or more of Japanese-owned Foreign Affiliates
*We drop affiliates' observations with 0 total sales volume.

	Setup of Local Sales Entity		Setup of Export Platform Entity	
Devendent Variable	1=There exists an affiliate an MNE (q) at Location (k) (with positive local sales)	1=There exists an affiliate an MNE (q) at Location (k) (with positive local sales)	1=There exists an affiliate an MNE (q) at Location (k) (with positive export values)	1=There exists an affiliate an MNE (q) at Location (k) (with positive export values)
Local Market Size (Log)	**0.63 (0.11)*** **	**0.66 (0.21)*** **	0.76 (0.37)*	0.71 (0.37)
Exportable Market Size (Log)	**0.02 (0.004)*** **	0.03 (0.03)	**0.03 (0.002)*** **	**0.05 (0.002)*** **
Wage Cost (weighted)	**-0.29 (0.06)*** **		-0.61 (0.40)	
Wage Cost (compared to home)		0.20 (0.33)		**-1.88 (0.37)*** **
Trade Cost (weighted)	**0.98 (0.34)** **		**-1.60 (0.12)*** **	
Trade Cost (bilateral with home)		0.30 (0.56)		**-4.59 (0.58)*** **
Fixed Plant Cost (Log)	-0.002 (0.001)	-0.09 (0.20)	0.05 (0.12)	-0.10 (0.15)
MNE Foreign Avg. Sales (Log)	**1.25 (0.20)*** **	**1.69 (0.15)*** **	**1.11 (0.43)** **	1.05 (0.63)
MNE Number of Affiliates (Log)	**0.97 (0.11)*** **	**0.60 (0.21)*** **	0.43 (0.32)	0.55 (0.50)
Number of Obs. (2 terms)	21024	21024	18960	18960

*Wage Cost from KAIJI Data
*Trade Cost from CIF/FOB

Table 7
Regression Results for Production Decision (2004, 2007: Panel of 2 time series)

*We select 38 industries with 100 or more of Japanese-owned Foreign Affiliates
*We select 24 host foreign countries/economies with 100 or more of Japanese-owned Foreign Affiliates
*We drop affiliates' observations with 0 total sales volume.

	Production at Local Sales Entity		Production at Export Platform Entity	
Dependent Variables	Log of Local Sales of an MNE (q) at Location (k) (summed if more than one plant)	Log of Local Sales of an MNE (q) at Location (k) (summed if more than one plant)	Log of Export Values of an MNE (q) at Location (k) (summed if more than one plant)	Log of Export Values of an MNE (q) at Location (k) (summed if more than one plant)
Local Market Size (Log)	**1.98 (0.09)*** **	**2.51 (0.21)*** **	1.13 (0.67)	**1.87 (0.90)** **
Exportable Market Size (Log)	0.43 (0.4)	0.51 (0.35)	**0.83 (0.12)*** **	**0.91 (0.07)*** **
Wage Cost (weighted)	-0.70 (0.38)		-0.61 (0.40)	
Wage Cost (compared to home)		0.06 (0.31)		-1.01 (0.58)
Trade Cost (weighted)	**-2.24 (0.34)** **		**-1.71 (0.42)** **	
Trade Cost (bilateral with home)		**-3.55 (0.61)*** **		**-4.16 (1.88)** **
Fixed Plant Cost (Log)	-0.008 (0.008)	-0.09 (0.10)	0.05 (0.03)	-0.12 (0.15)
MNE Foreign Avg. Sales (Log)	**1.45 (0.23)*** **	0.60 (0.51)	**3.87 (0.99)** **	0.90 (1.35)
MNE Number of Affiliates (Log)	0.23 (0.11)*	0.24 (0.20)	**1.37 (0.45)** **	0.5 (0.78)
Number of Obs. (2 terms)	21024	21024	18960	18960

*Wage Cost from KAIJI Data
*Trade Cost from CIF/FOB

Table 8
Logistic Regression Results for Location Decision (2004, 2007: Panel of 2 time series)

*We select 38 industries with 100 or more of Japanese-owned Foreign Affiliates
*We select 24 host foreign countries/economies with 100 or more of Japanese-owned Foreign Affiliates
*We drop affiliates' observations with 0 total sales volume.

	Setup of Local Sales Entity		Setup of Export Platform Entity	
Devendent Variable	1=There exists an affiliate an MNE (q) at Location (k) (with positive local sales)		1=There exists an affiliate an MNE (q) at Location (k) (with positive export values)	
Local Market Size (Log)	**0.69 (0.12)*** **	**0.71 (0.13)*** **	0.66 (0.39)*	0.61 (0.41)
Exportable Market Size (Log)	0.02 (0.004)***	0.02 (0.00)	**0.05 (0.002)*** **	**0.05 (0.002)*** **
Wage Cost (weighted)	**-0.25 (0.06)*** **		-0.71 (0.62)	
Wage Cost (compared to home)		**-0.8 (0.11)*** **		**-1.8 (0.25)*** **
Trade Cost (weighted)	0.42 (0.35)		-1.31 (1.01)	
Trade Cost (bilateral with home)		0.33 0.28		-2.56 (2.81)
Fixed Plant Cost (Log)	-0.05 (0.08)	-0.09 (0.13)	0.05 (0.12)	0.01 (0.01)
MNE Foreign Avg. Sales (Log)	1.45 (0.69)***	**1.55 (0.58)*** **	3.04 (0.06)**	**2.96 (1.00)** **
MNE Number of Affiliates (Log)	0.33 (0.11)***	**0.40 (0.19)** **	0.77 (0.39)*	**0.63 (0.38)** **
Rule of Law Index	0.14 (0.01)***	**0.14 (0.02)*** **	0.00 (0.01)	0.00 (0.00)
Exchange Rate Controls (1=Yes, 0=No)	-0.22 (0.04)**	**-0.26 (0.04)** **	-0.98 (0.03)***	**-0.88 (0.15)*** **
Sachs and Warner Trade Openness	0.57 (0.43)	0.33 (0.51)	0.22 (0.20)	0.29 (0.41)
Number of Obs. (2 terms)	21024	21024	18960	18960

*Wage Cost from UNIDO Data/BEA Data for Hong Kong and Taiwan
*Trade Cost from Regression Results (Table 10)

Table 9 Robustness Checks with Alternative variables
Regression Results for Production Decision (2004, 2007: Panel of 2 time series)

*We select 38 industries with 100 or more of Japanese-owned Foreign Affiliates
*We select 24 host foreign countries/economies with 100 or more of Japanese-owned Foreign Affiliates
*We drop affiliates' observations with 0 total sales volume.

	Production at Local Sales Entity		Production at Export Platform Entity	
Dependent Variables	Log of Local Sales of an MNE (q) at Location (k) (summed if more than one		Log of Export Values of an MNE (q) at Location (k) (summed if more than one	
Local Market Size (Log)	**2.11 (0.14)*** **	**3.61 (0.26)*** **	1.34 (0.98)	**2.01 (0.06)*** **
Exportable Market Size (Log)	0.41 (0.09)***	**0.51 (0.05)*** **	**1.03 (0.15)*** **	**0.88 (0.14)*** **
Wage Cost (weighted)	-0.79 (0.38)*		-0.34 (0.40)	
Wage Cost (compared to home)		-0.28 (0.16)		**-0.90 (0.26)** **
Trade Cost (weighted)	0.08 (0.34)		**-1.11 (0.28)** **	
Trade Cost (bilateral with home)		0.01 (0.41)		**-2.01 (0.19)** **
Fixed Plant Cost (Log)	-0.007 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
MNE Foreign Avg. Sales (Log)	0.45 (0.26)	0.51 (0.31)	3.01 (0.99)*	-1.01 (0.88)
MNE Number of Affiliates (Log)	0.48 (0.21)**	0.38 (0.30)	1.00 (0.65)	-1.05 (0.85)
Rule of Law Index	0.03 (0.00)***	**0.50 (0.12)*** **	0.04 (0.09)	**0.41 (0.13)*** **
Exchange Rate Controls (1=Yes, 0=No)	0.04 (0.10)	0.08 (0.08)	0.76 (0.07)***	**0.99 (0.08)*** **
Sachs and Warner Trade Openness	0.44 (0.28)	0.38 (1.00)	0.33 (1.12)	0.26 (0.19)
Number of Obs. (2 terms)	21024	21024	18960	18960

*Wage Cost from UNIDO Data/BEA Data for Hong Kong and Taiwan
*Trade Cost from Regression Results (Table 10)

Table 10: Regression results for Trade Costs

	Log (CIF/FOB-1)
Border Dummies	-0.45 (0.07)***
Distance (Minimum)	0.42 (0.15)**
GDP per capita (exporter)	-0.41 (0.02)***
GDP per capita (importer)	-0.35 (0.02)***
Landlocked Dummies (exp)	0.39 (0.60)
Landlocked Dummies (imp)	0.00 (0.05)
Infrastructure (exporter)	-0.13 (0.24)
Infrastructure (importer)	-0.07 (0.23)
Obs. R^2	552 0.30

*Data Sources: Venables and Limao (2001)