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Abstract

This paper examines and compares the location choice of Japanese and Taiwanese MNEs in China. Furthermore, we investigate the relationship between location choice and firm characteristics, specifically firms' productivity. Due to Taiwan's linguistic and cultural advantages in China, it is expected that the location choice mechanics are different between Japanese and Taiwanese MNEs. As a result, our main findings are that, while the less productive Japanese firms prefer a location in an area with a larger agglomeration of Japanese affiliates or in an area closer to Japan, the more productive Taiwanese firms prefer a location in an area with a larger agglomeration of Taiwanese affiliates or in an area closer to Taiwan.

Keywords: Multinational enterprises; China; Productivity
JEL classification: D24; F23

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Location Choice of Multinational Enterprises in China: Comparison between Japan and Taiwan

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1. Introduction

China has attracted a vast volume of foreign direct investment (FDI). Since 1979, the country has attracted foreign firms as part of her export promotion policy. Afterwards, the increase of inward FDI has been outstanding since 1990. In particular, it expanded rapidly after Xiao-Ping Deng's "Southern Tour Speech" in 1992. Furthermore, the rate of its increase seems to have been steadier since the country joined the WTO. As a result, in 2008, according to FDISTAT (UNCTAD), the inward FDI flow in China is ranked 3rd in the world (the United States 1st and France 2nd). Its stock is ranked 10th in the world and 1st among developing countries. There are also a wide variety of FDI in terms of industry. Indeed, the amount of inward FDI in services is as large as that in manufacturing (China Statistical Yearbook 2009). China is one of the most important countries as a destination of FDI in the world.

Taking a closer look at the location of multinational enterprises (MNEs) in China, there seems to be a clear difference among investing countries. For example, Japanese MNEs had mainly invested in the eastern region of China, Taiwanese MNEs in its southern region, and Korean MNEs in its northeastern region. Such a difference among investing countries yields important consequences. If the main location of MNEs differs by their nationality, differences in the amount of FDI among investing countries lead directly to differences in the amount of inward FDI among provinces. Since the existence of MNEs is considered to be a driving force for economic development particularly in developing countries, such differences in the amount of inward FDI result in differences in economic growth among regions within the nation. Indeed, as is well known, the economic gaps among regions have been serious in China. In order to direct inward FDI to underdeveloped areas, it is important to know the determinants of MNEs' locations in China. In particular, since such determinants may be different among investing countries, their clarification by MNEs' nationality is necessary.

The mechanics of MNEs' location have been examined by employing the logit model in the literature on location choice. There are a large number of previous studies.[1] In the analysis, demand size, productive factor prices, price of intermediate goods, trade costs, and fixed costs are examined as location factors determining firms' locations. In this literature, there are two topics. The first examines various kinds of

[1] The recent references are as follows: Head, Ries, and Swenson (1999) for Japanese MNEs in the US; Belderbos and Carree (2002) for Japanese MNEs in China; Head and Mayer (2004) for Japanese MNEs in Europe; Disdier and Mayer (2004) for French MNEs in Europe; for MNEs in Great Britain; Castellani and Zanfei (2004) for large MNEs in the world; Mayer, Mejean, and Nefussi (2007) for French MNEs in the world; Crozet, Mayer, and Mucchielli (2004) for MNEs in France; and Basile, Castellani, and Zanfei (2008) for MNEs in Europe.

location factors such as the agglomeration of firms belonging to the same firm-group (e.g., Belderbos and Carree, 2002) or investment climate-related elements (free trade zones in the US, Head, et al., 1999; special economic zones and opening coastal cities in China, Belderbos and Carree, 2002; Objective 1 structural funds and cohesion funds in Europe, Basile, et al., 2008). The second topic explores the substitution of location by examining inclusive values in the nested-logit model. For instance, using firm-level data on French investments both in France and abroad over the 1992-2002 period, Mayer, et al. (2007) investigate the determinants of location choice and assess empirically whether the domestic economy has been losing attractiveness over the recent period or not. The estimated coefficient for inclusive value is strongly significant and near unity, indicating that the national economy is not different from the rest of the world in terms of substitution patterns.

The purpose of this paper is to examine and compare the location choice of Japanese and Taiwanese MNEs in China. Although there are a large number of previous studies as listed above, few studies have explicitly compared the location choice among MNEs from different countries. However, as mentioned above, since Japanese and Taiwanese MNEs have concentrated on different regions in China, there seems to be a systematic difference in the location choice in China between Japanese and Taiwanese MNEs. Thus, those two kinds of MNEs would be a good candidate for an analysis on differences in the crucial location factors among investing countries. In particular, one source of such differences is that Taiwanese MNEs have an advantage in terms of communication because they also speak Mandarin and have a similar cultural background to that of China. In other words, they will have an advantage over Japanese MNEs when negotiating with indigenous firms or finding the preferences of local consumers. Actually, it has been revealed that such a Chinese network plays a significant role in international trade through helping to match buyers and sellers (Rauch and Trindade, 2002). Based on this advantage, industry cluster and market potential may have different influences on the location choice between Japanese and Taiwanese MNEs.

This paper further investigates the relationship between location choice and firm characteristics. Belderbos and Carree (2002) categorized Japanese MNEs according to the number of their employees and examined the relationship between firms' size and location choice in China. As a result, they found significant differences in the location choice between large MNEs and small MNEs. This paper, on the other hand, focuses on the relationship between firms' productivity and location choice. Since productivity is the more fundamental attribute of firms than employment, our result will provide a

more primary picture of the relationship between location choice and firm characteristics. Indeed, we obtain different results from those in Belderbos and Carree (2002).

The rest of this paper is organized as follows: Section 2 introduces the empirical framework for the location analysis of Japanese and Taiwanese MNEs in China. Section 3 provides a brief overview of their location in China. The estimation results are reported in Section 4. Lastly, Section 5 presents the conclusions of the study.

2. Empirical Framework

This paper investigates the location choice of Japanese and Taiwanese MNEs in China between 1996 and 2005. We assume that MNEs choose the locations of their affiliates among provinces. The empirical analysis of the location choice in the previous studies was based on estimates of firms' profit function, which is often derived from the new economic geography model. Based on any models, the profit function mostly includes market scale, productive factor prices, the prices of intermediate goods, transaction costs with other regions, and fixed costs, which are called "location factors" (see Head et al., 1999; Head and Mayer, 2004, for more details). We follow this empirical model and explain proxies for those location factors in this section.

2.1. Location Factors

This subsection explains proxy variables for market scale, productive factor prices, the prices of intermediate goods, transaction costs with other regions, and fixed costs. Harris's (1954) market potential variable is used as the market scale variable. In general, firms in provinces with larger markets can supply their products to a larger number of consumers at low transport costs and thus obtain higher profit. In addition, the market scale of the surrounding area will also matter in firms' location choice because firms need to pay only relatively cheap transport costs for supplying to such an area. In order to take not only the own market but also the market in the surrounding area into account, the market potential variable of province r is calculated as follows:

$$MP_r = \sum_s \frac{Y_s}{d_{rs}},$$

where d_{rs} is the distance from provinces r to s. In this measure, the transaction costs with other regions are taken into account by the geographical distance. This market potential index is known to work well from an empirical point of view (Head and Mayer, 2004). Gross regional domestic production (GRDP) of each province is used to calculate its

income Y_s.

Proxies for productive factor prices and intermediate goods prices are as follows. The wages by industry and province are used as a proxy for productive factor prices. Other things being equal, lower wages lead to lower production cost, cheaper product prices, and larger supply of products. As a result, since firms in provinces with lower wages obtain higher total profit, they are more likely to choose to locate in provinces with lower wages. As in previous studies, some agglomeration variables are used as proxies for the prices of intermediate goods because firms can procure intermediate goods with cheaper prices in a region with a larger industrial agglomeration. Two kinds of variables are employed in this paper. One is the number of manufacturing plants with the same nationality in a province, and the other is the number of all plants in the same industry in a province. These variables may also capture partly the extent of competition within the province.

Two variables are used as proxies for fixed costs. The first is the geographical distance between MNEs' home country and the province in which their overseas affiliates are located. For example, the shorter the geographical distance between them, the lower the monitoring costs, which are a part of fixed costs, because more frequent information exchange is possible between headquarters and their overseas affiliate. But, this variable may also work as a proxy for a part of the trade costs between home and the province. Second, GRDP per capita is included in order to control the level of economic development in a province. Like GDP per capita in cross-country analysis, this variable will be closely related to the province's infrastructure and extent of risks.

These variables are elements in our profit function. MNEs choose as a location of their affiliates a province in which they can obtain the highest profit. Defining $\mathbf{X}$ as a vector of all above location factor variables and $\mathbf{b}$ as their coefficient vector, we can formalize the profit function as: $\ln \Pi_r = \mathbf{X}_r \mathbf{b} + u_r$. Subscript r indicates province. The error term u is introduced, which is assumed to be independent and to follow an identical type I extreme value distribution across provinces. Then, as McFadden (1974) demonstrates, the probability that province k is chosen by a representative investor can be shown as:

$$P_k = \frac{e^{\mathbf{X}_k \mathbf{b}}}{\sum_r e^{\mathbf{X}_r \mathbf{b}}}.$$

We can estimate the vector of coefficients by maximum likelihood procedures. This model is also called a conditional logit model. The sample years are 1996 and 2005. In order to avoid a possible simultaneous issue between the location choice of affiliates and the location factors, the time point of location factor variables is lagged by one year.

Our data sources are as follows. The location data of overseas affiliates in China are the "Overseas Japanese Companies Data" (Toyo Keizai Inc.) in the case of Japan and "China Investment Data Collection Table" (Taiwan Stock Exchange Market Observation Post System) in the case of Taiwan. The details of these two data sources are provided in the next section. GRDP for each province and GRDP per capita for each province are derived from "China Statistical Yearbook"; the average wages of each province and industry are obtained from "China Labour Statistical Yearbook"; the numbers of plants in each province and industry are gleaned from "China Industrial Economy Statistical Yearbook". To calculate the distance between a home country and a province, the longitudes and latitudes of Japan's and Taiwan's capitals as well as those of the capital city of each province in China are adopted. The longitudes and latitudes of each province's capital city are also used to calculate the distance between two provinces in order to construct the market potential variable.

The Global Reference Solution (GRS) Database by Dun and Bradstreet (D&B) is used for the calculation of the number of manufacturing plants with the same nationality. GRS is a database that collects information on branch offices of over 100 million companies from over 200 countries. It includes information about the headquarters, location, industry, number of employees, earnings, and set-up year of each branch office. From the database, the numbers of Japanese and Taiwanese affiliates investing in each province of China each year were obtained. The enterprises in the database are not limited to listed companies, allowing for a broader coverage than the above mentioned "China Investment Data Collection Table" (Taiwan Stock Exchange Market Observation Post System), in which sample firms are restricted only to listed companies.

2.2. Productivity and Nationality

We further investigate how the crucial location factors change according to the firm characteristics and nationality of MNEs. For the sake of comparison with Belderbos and Carree (2002), the relationships of firm characteristics with the agglomeration and the distance from the home country are examined. According to Belderbos and Carree (2002), small MNEs cannot invest as a great amount of resources as large enterprises do in selecting their location, and hence tend to follow the location choice of other enterprises with the same nationality; that is, compared to large enterprises, small MNEs have a higher tendency to invest in a location where other enterprises with the same nationality cluster. In addition, on the whole, a failed investment has a greater impact on the survival of small MNEs than it does on the

survival of large enterprises; therefore, the former favor locations with lower investment risks. As a result, small MNEs tend to choose locations where they can frequently exchange information with their headquarters, i.e., locations closer to their home countries.

Belderbos and Carree (2002) included the interaction terms of a large enterprise dummy with variables of the agglomeration and distance from its home country. The large enterprise dummy takes unity if the number of employees in a firm is over 500 and zero otherwise. Instead of this dummy variable, we include the interaction terms of firms' productivity, which is the more fundamental attribute of firms, and then examine whether or not the above-mentioned hypotheses in Belderbos and Carree (2002) are valid also in the case of productivity. That is, we examine if firms with lower productivity have a higher tendency to invest in a location with an agglomeration of same-nationality enterprises or a location closer to their home countries.

As for productivity index, we used the total factor productivity (TFP) database for East Asian Listed Companies (EALC) which was estimated by Fukao et al. (2009)[2]. Their estimation methodology was as follows. First, they defined the TFP index within each country as the following formula:

$$TFP_{imt} = \left(\ln Q_{imt} - \overline{\ln Q_{mt}}\right) - \sum_{f=1}^{F} \frac{1}{2}\left(s_{ifmt} + \overline{s_{fmt}}\right)\left(\ln X_{ifmt} + \overline{\ln X_{fmt}}\right)$$

$$+ \sum_{s=1}^{t}\left(\overline{\ln Q_{ms}} - \overline{\ln Q_{ms-t}}\right) - \sum_{s=1}^{t}\sum_{f=1}^{F}\left(\overline{s_{fms}} + \overline{s_{fms-1}}\right)\left(\overline{\ln X_{fms}} - \overline{\ln X_{fms-1}}\right),$$

where Q_{imt}, s_{ifmt} and X_{ifmt} denote the shipments of firm i in country m in year t, the cost share of input f for firm i in country m in year t, and input of factor f for firm i in country m in year t, respectively. The inputs are labor, capital, and intermediates. Variables with an upper bar denote the industrial average for that variable. Second, they constructed the relative TFP index for Korea, China, and Taiwan against Japan using the industrial averages of output and input for the benchmark year.

$$\ln \mu^{m,Japan} = \left(\overline{\ln Q_m} - \overline{\ln Q_{Japan}} - \ln q_Q^{m,Japan}\right)$$

$$- \sum_{f=1}^{F} \frac{1}{2}\left(\overline{s_{fm}} + \overline{s_{f,Japan}}\right)\left(\overline{\ln X_{fm}} - \overline{\ln X_{f,Japan}} - \ln q_X^{m,Japan}\right).$$

$\ln q_Q^{m,Japan}$ and $\ln q_X^{m,Japan}$ indicate the output and input price in country m relative to those in Japan in each industry in the benchmark year. All variables are converted to

[2] The data are available at the Japan Center for Economic Research (JCER) web site; http://www.jcer.or.jp/report/asia/detail3735.html#database. Details of the measurement methodology and results are provided in the paper by Fukao et al. (2009).

Japanese Yen monetary value by using Purchasing Power Parity (PPP). Finally, they define the TFP level of firm i in country m in year t as $TFP_{ijmt} - \mu^{m,\ Japan}$. Using this methodology, firms' TFP is comparable between Japan and Taiwan not only in terms of its growth but also in terms of its level.[3] The use of this TFP measure forces us to restrict sample parent firms only to listed companies in Japan and Taiwan, but such restriction enables us to link easily the parent firms' TFP with Japanese and Taiwanese affiliate data (i.e. the Overseas Japanese Companies Data and the Taiwan Stock Exchange-Market Observation Post System) by employing the identification number of listed companies.

We also examine the relationship of firms' nationality with the local suppliers- and consumers-related variables. It is apparent that Taiwanese MNEs have an advantage in terms of communication because they also speak Mandarin and have a similar cultural background to that of China. Indeed, Rauch and Trindade (2002) show that ethnic Chinese networks increase international trade. In short, the Taiwanese MNEs have an advantage over Japanese MNEs when negotiating with local firms or finding the preference of local consumers. Unlike the same-nationality agglomeration variable, the same-industry agglomeration variable includes the number of local firms. Also, the market potential measure includes the demand of local consumers. Hence, the same-industry agglomeration and market potential will have different influence on the location choice between Japanese and Taiwanese MNEs. In order to examine these hypotheses, we introduce the interaction terms of the Taiwan dummy variable with those two variables, which takes unity if a sample MNE comes from Taiwan, with the two variables.

3. Data Issues

This section explains the data on the location of Japanese and Taiwanese affiliates in China. The samples used in the analysis are limited to Japanese or Taiwanese manufacturing affiliates in China. The industries of parent firms are also restricted only to manufacturing. Lastly, we give a brief overview of their location in China.

3.1. Japanese MNEs

The data on the location of Japanese affiliates in China are obtained from Toyo

[3] It is possible to calculate TFP by estimating production function by Olly - Pakes or Levinshon - Petrin methodologies. However, the estimation of production function forces us to assume that production factor shares are common both for Japan and Taiwan. We believe that this assumption is too strong and unrealistic. Therefore, we used the TFP index proposed by Fukao et al. (2009).

Keizai's "Overseas Japanese Companies Data," which has been widely used by many researchers, such as Head and Ries (2002). The data focus on the survey of 6,000 listed and non-listed enterprises, which collect their overseas affiliate data on: location, investment year, investment type (new establishment, capital investment, and acquisition), amount of capital, total number of employees, number of employees from Japan, earnings, business content, purpose of investment, and funding relationship. The sample affiliates included in this database are those in which a Japanese firm has invested capital of 10% or more.

Although the response rate of the questionnaire was only 60%, items that were not responded to were followed up using survey methods such as phone interview, securities reports, and annual reports. As a result, the total number of overseas affiliates in 2001 was 17,041, among which 2,855 invested in China. This number is larger than that reported in the government statistics: their number is 14,991, among which 2,530 invested in China, in "The Basic Survey of Overseas Business Activities" conducted by the Ministry of Economy, Trade and Industry of Japan in March 2001. In other words, the sample coverage of our dataset is broader than that in "The Basic Survey of Overseas Business Activities". This is probably because the latter does not include the financial services and insurance industries and does not follow up the affiliates which do not respond to the survey.

3.2. Taiwanese MNEs

The data on the location of Taiwanese affiliates in China are obtained from "China Investment Data Collection Table" by Taiwan Stock Exchange Market Observation Post System. The total number of affiliates in 2005 was 2,530 in China. "China Investment Data Collection Table" gathers data from 1996 to the present and provides the data of the listed companies' affiliates in China, in which items include located province, industry, primary business items, paid-in capital, investment method (e.g., investment through a third country or not), amount of investment, the direct or indirect funding rate of the mother companies, and investment gain or loss. In this dataset, Taiwanese affiliates are ones in which a Taiwanese firm has invested capital of at least 1%.

Besides the "China Investment Data Collection Table", there are other databases related to overseas direct investment, such as "The Business Operations Survey of Enterprises Investing in China" conducted by the Chung-Hua Institution for Economic Research, which was commissioned by the Investment Commission, Ministry of Economic Affairs. The survey, starting from 2000, covers many items, but the response

rates are low. For example, in the 2006 survey, only enterprises investing at least 1 million USD were surveyed and the response rate was merely 30%. Other databases include "TEJ Taiwanese Enterprises-in-China Database," which is based on the "China Investment Data Collection Table" and provides founding years and retail revenues that are not needed in this study. Therefore, this study used the "China Investment Data Collection Table".

3.3. Overview of the Data

Employing the above-introduced datasets, this subsection gives a brief overview of Japanese and Taiwanese affiliates in China. Figure 1 shows the changes in the number of affiliates in China set up by Japanese and Taiwanese listed enterprises since 1996. The number of new investments after 1996 is mostly dominated by Taiwanese enterprises, which generally reflects the fact that Japanese listed enterprises had invested in China before 1995 and Taiwanese enterprises did not invest until slightly later. In addition, both Japanese and Taiwanese enterprises have increased new investments since China joined the WTO in 2001. The number of their investments approximately doubled from 2000 to 2001.

=== Figure 1 ===

Table 1 shows the geographic distribution of Japanese and Taiwanese MNEs in China in 2006. They both are most likely to locate their affiliates in Jiangsu Province (26% in Japanese affiliates and 37% in Taiwanese affiliates). However, the second most popular province is Shanghai for Japan (20%) and Guangdong for Taiwan (26%), respectively, though the number of affiliates in Shanghai and Guangdong is not so different particularly in Japanese MNEs. Since Shanghai is closer to Japan than Guangdong, and Guangdong is closer to Taiwan than Shanghai, the table shows that the distance to home country may have a significant influence on an enterprise's decision on invested location.

=== Table 1 ===

Table 2 shows the industrial distribution of parent firms which had affiliates in China in 2006. Most of the investors in China of both countries are in the machinery industry. However, Japanese enterprises, not limited to the electric machinery industry, also include general machinery and transportation machinery industries, while almost

all Taiwanese machinery enterprises are from the electric machinery industry. Because the production process of electric machinery can be easily divided geographically, the vertical division of labor for the production process is much easier than is the case for other industries. Therefore, most Taiwanese enterprises in China may not be aiming at supplying products for the Chinese market but rather at an international division of labor.

=== Table 2 ===

4. Estimation Results

This section reports our estimation results of the location choice model. The basic statistics are shown in Table 3. The baseline result is reported in column (I) of Table 4.

=== Table 3 and 4 ===

There are four points which are noteworthy: First, the coefficients for wages and market potential are estimated to be insignificant. These results indicate that the local labor market and final demand market do not affect multinational enterprises' location choice, though the data on wages may include labor quality, thereby affecting the result; since a higher quality of labor leads to higher wages, the negative effect of wages may be offset by their positive effect based on the quality of labor. Second, the agglomeration of the same-nationality firms and the industrial agglomeration have significantly positive coefficients. Third, the coefficient for geographical distance from home is estimated to be significantly negative, indicating that MNEs tend to invest in areas where various kinds of costs with home such as information costs are lower. Finally, GRDP per capita also has a significant result; thus the level of economic development is a key factor for enterprises of both countries in regard to their location choices.

Next, column (II) shows the estimation results of the equation with the interaction terms with Taiwan dummy. This estimation aims to investigate the relationship between location choice factors and nationality. The result of the previous variables is unchanged with that reported in column (I). The results of the interaction terms are as follows: First, the interaction term of industrial agglomeration has a significantly positive coefficient, implying that the existence of industrial agglomeration encourages the entry of Taiwanese MNEs more greatly than that of Japanese MNEs. This result might be

because Taiwanese MNEs can more easily communicate with indigenous firms in the agglomeration. Second, the interaction term of market potential has a significantly positive coefficient. In other words, market potential matters only in the location choice of Taiwanese MNEs. This result might be again because Taiwanese MNEs are better able to understand the needs of local Chinese consumers, thanks to their cultural advantage.

Column (III) shows the estimation results of the interaction terms with firms' TFP to investigate the relationship between location factors and firms' productivity. The results of the previous variables are again unchanged: the coefficients for wages and market potential are insignificant, those for agglomeration variables and GRDP per capita are significantly positive, and the coefficient for distance from home is negatively significant. Unlike Belderbos and Carree (2002), who examined the interaction terms of firms' employment, our results for the interaction terms of firms' productivity are not significant. In other words, while Belderbos and Carree (2002) show that the crucial location factors differ by firms' employment, their location choice does not depend on the productivity level.

One source of the different results from Belderbos and Carree (2002) might be our sample of multi-investing countries. In order to examine whether or not the role of firms' attributes differs by their nationality, we introduce the interaction terms of productivity and Taiwan dummy with the same-nationality agglomeration and the distance from home. The results are reported in column (IV). Except for the fact that the coefficient for market potential turns out to be significant, the results in the previous variables are qualitatively unchanged. However, two kinds of interesting results in new interaction terms are obtained as follows.

First, the same-nationality agglomeration, its interaction term with TFP, and its interaction with both TFP and Taiwan dummy have significantly positive, negative, and positive coefficients, respectively. In short, the positive influence of the same-nationality agglomeration is smaller in the more productive firms in the case of Japanese MNEs and larger in the more productive firms in the case of Taiwanese MNEs. The result in the case of Japanese MNEs is qualitatively consistent with that in Belderbos and Carree (2002), who show that the existence of the same-nationality agglomeration matters more remarkably in the smaller Japanese MNEs in terms of their employment. In short, the hypothesis of Belderbos and Carree (2002) is not necessarily generally valid. It is valid at least in Japanese MNEs but not in Taiwanese MNEs. Such an opposite result leads to the insignificant result in column (III). One possible interpretation for the Taiwanese result is that the less productive Taiwanese firms may

prefer to enter an area without an agglomeration of other Taiwanese firms in order to avoid competition with them, rather than lowering the investment risk by entering an area with such an agglomeration because Taiwanese firms can obtain local information more easily.

Second, distance from home, its interaction term with TFP, and its interaction with both TFP and Taiwan dummy have insignificant, significantly positive, and significantly negative coefficients, respectively. In short, the less productive Japanese MNEs prefer a location in an area closer to Japan, while the more productive Taiwanese MNEs prefer a location in an area closer to Taiwan. As in the case of the same-nationality agglomeration, the result only in Japanese MNEs is again consistent with that in Belderbos and Carree (2002). But, it is a little difficult to interpret the result that the less productive Taiwanese MNEs are likely to locate their affiliates in an area farther from home. One possible interpretation is that the less productive Taiwanese MNEs prefer exporting from home to locating their affiliates in an area closer to home and thus the location of the less productive firms' affiliates is likely to be observed in an area farther from home. Such a difference in the less productive firms between Japan and Taiwan might be because fixed costs for not only investing in China but also exporting to China are trivial for Taiwanese firms.

5. Concluding Remarks

This paper examined and compared the location choice of Japanese and Taiwanese MNEs in China. Furthermore, we investigated the relationship between location choice and firm characteristics, specifically firms' productivity. As a result, our main findings are that, while the less productive Japanese firms prefer a location in an area with a larger agglomeration of Japanese affiliates or in an area closer to Japan, the more productive Taiwanese firms prefer a location in an area with a larger agglomeration of Taiwanese affiliates or in an area closer to Taiwan. Those results in the case of Japanese MNEs are qualitatively consistent with those in Belderbos and Carree (2002), who examined the relationship between their location choice in China and their size in terms of employment. In other words, the results in Belderbos and Carree (2002) are not necessarily valid in MNEs originated from any country. One possible source for such differences between Japanese and Taiwanese MNEs would be Taiwan's language and cultural advantages in China. If this is correct, cultural and linguistic similarities matter in the relationship between location choice and firm characteristics.

References

Basile, R., Castellani, D., and Zanfei, A., 2008, Location Choices of Multinational Firms in Europe: the Role of EU Cohesion Policy, *Journal of International Economics*, 74(2): 328-340.

Belderbos, R. and Carree, M., 2002, The Location of Japanese Investments in China: Agglomeration Effects, Keiretsu, and Firm Heterogeneity, *Journal of the Japanese and International Economies*, 16(2): 194-211.

Castellani, D. and Zanfei, A., 2004, Choosing International Linkage Strategies in the Electronics Industry: the Role of Multinational Experience, *Journal of Economic Behavior and Organization*, 53(4): 447-475.

Crozet, M., Mayer, T., and Mucchielli, J-L., 2004, How Do Firms Agglomerate? A Study of FDI in France, *Regional Science and Urban Economics*, 34(1): 27-54.

Disdier, A-C. and Mayer, T., 2004, How Different is Eastern Europe? Structure and Determinants of Location Choices by French Firms in Eastern and Western Europe, *Journal of Comparative Economics*, 32(2): 280-296.

Fukao, K., Inui, T., Ito, K., Kim, Y.G., and Yuan, T., 2009, An International Comparison of the TFP Levels and the Productivity Convergence of Japanese, Korean, Taiwanese and Chinese Listed Firms, Global COE Hi-Stat Discussion Paper Series gd09-089, Institute of Economic Research, Hitotsubashi University.

Harris, C., 1954, The Market as a Factor in the Localization of Industry in the United States, *Annals of the Association of American Geographers*, 44(4): 315-348.

Head, K. and Mayer, T., 2004, Market Potential and the Location of Japanese Investment in the European Union, *Review of Economics and Statistics*, 86(4): 959-972.

Head, K. and Ries, J., 2002, Offshore Production and Skill Upgrading by Japanese Manufacturing Firms, *Journal of International Economics*, 58(1): 81-105.

Head, K., Ries, J., and Swenson, D., 1999, Attracting Foreign Manufacturing: Investment Promotion and Agglomeration, *Regional Science and Urban Economics*, 29(2): 197-218.

Mayer, T., Mejean, I., and Nefussi, B., 2007, The Location of Domestic and Foreign Production Affiliates by French Multinational firms, CEPII Working Papers, No. 2007-07.

McFadden, D., 1974, Conditional Logit Analysis of Qualitative Choice Behavior, In P. Zarembka (eds.), Frontiers in Econometrics, New York: Academic Press.

Rauch, J.E. and Trindade, V., 2002, Ethnic Chinese Networks in International Trade, *Review of Economics and Statistics*, 84(1): 116-130.

Table 1. Geographic Distribution of Japanese and Taiwanese MNEs in China: 2006

	Japanese MNEs		Taiwanese MNEs	
	# of Affiliates	Share (%)	# of Affiliates	Share (%)
Beijing	12	2	47	3
Tianjin	27	5	35	2
Hebei	11	2	0	0
Shanxi	0	0	2	0
Inner Monglia	1	0	0	0
Liaoning	22	4	10	1
Jilin	4	1	5	0
Heilongjiang	1	0	6	0
Shanghai	108	20	179	12
Jiangsu	140	26	533	37
Zhejiang	44	8	84	6
Anhui	3	1	6	0
Fujian	11	2	50	3
Jiangxi	2	0	9	1
Shandong	22	4	35	2
Henan	6	1	6	0
Hubei	10	2	20	1
Hunan	2	0	5	0
Guangdong	96	18	367	26
Guangxi	0	0	2	0
Hainan	0	0	3	0
Sichuan	12	2	17	1
Guizhou	0	0	0	0
Yunnan	1	0	2	0
Shanxi	3	1	7	0
Gansu	0	0	0	0
Qinghai	0	0	1	0
Ningxia	0	0	0	0
Xinjiang	0	0	4	0

Sources: "Overseas Japanese Companies Data" (Toyo Keizai Inc.); "China Investment Data Collection Table" (Taiwan Stock Exchange Market Observation Post System)

Table 2. Industrial Distribution of Parents with their Affiliates in China: 2006

	Japanese MNEs		Taiwanese MNEs	
	# of Affiliates	Share (%)	# of Affiliates	Share (%)
Food	27	5	76	5
Fiber	17	3	25	2
Paper and pulp	6	1	30	2
Petroleum products	1	0	1	0
Chemical products	73	14	82	6
Nonferrous metals products	26	5	44	3
Primary metals	39	7	38	3
Metal products	19	4	7	0
General machinery	91	17	5	0
Transport machinery	112	21	51	4
Electronic machinery	107	20	1,076	75
Precision machinery	20	4	0	0

Sources: "Overseas Japanese Companies Data" (Toyo Keizai Inc.); "China Investment Data Collection Table" (Taiwan Stock Exchange Market Observation Post System)

Table 3. Basic Statistics

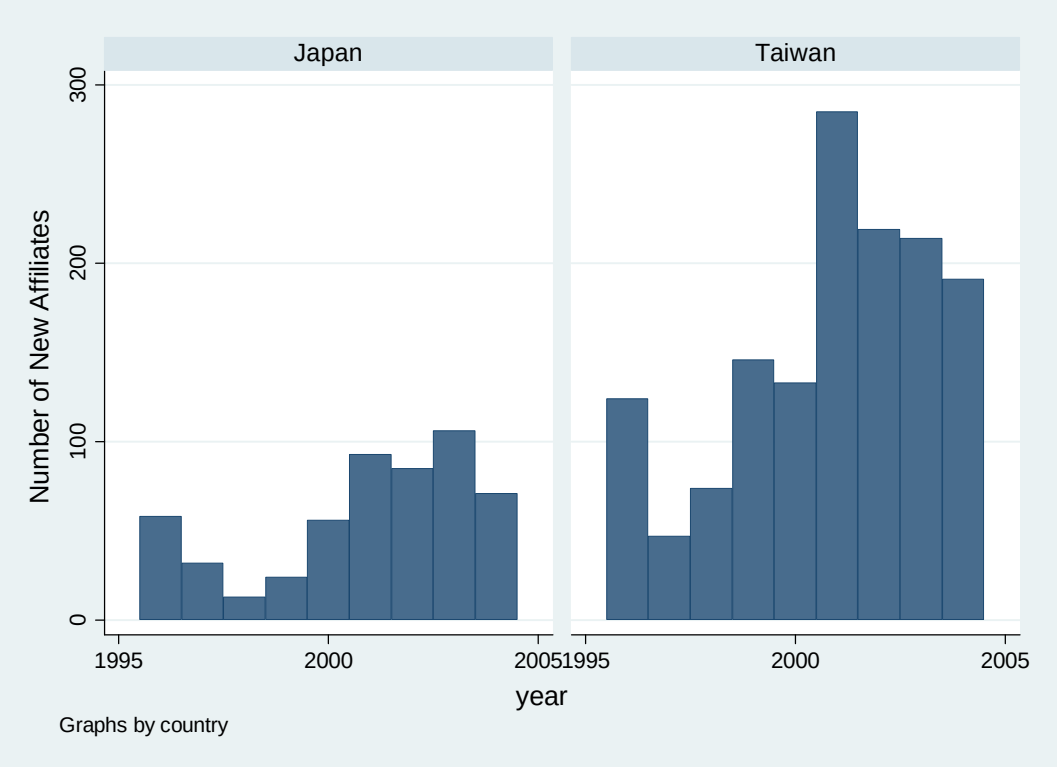
	# of Obs.	Mean	S.D.	Min	Max
Japanese MNEs					
Wages	14,512	9.16	0.46	7.77	10.92
Same-nationality agglomeration	14,512	1.02	1.28	0	4.56
Same-industry agglomeration	14,512	5.67	1.37	0	8.59
Market potential	14,512	5.01	0.51	3.75	6.19
Distance from home	14,512	7.80	0.27	7.33	8.41
GRDP per capita	14,512	-0.15	0.59	-1.61	1.53
Taiwanese MNEs					
Wages	38,691	9.16	0.46	7.77	10.92
Same-nationality agglomeration	38,691	0.36	0.76	0	3.26
Same-industry agglomeration	38,691	5.64	1.44	0	8.59
Market potential	38,691	5.01	0.51	3.75	6.19
Distance from home	38,691	7.16	0.53	5.52	8.22
GRDP per capita	38,691	-0.16	0.59	-1.61	1.53

Table 4. Estimation Results: Conditional Logit Analysis

	(I)	(II)	(III)	(IV)
Wages	0.182	0.200	0.200	0.107
	[0.164]	[0.164]	[0.164]	[0.167]
Same-nationality agglomeration	0.744***	0.762***	0.756***	0.780***
	[0.033]	[0.033]	[0.039]	[0.040]
* TFP			-0.027	-0.135**
			[0.047]	[0.055]
* TFP * Taiwan				0.230***
				[0.069]
Same-industry agglomeration	0.682***	0.535***	0.683***	0.643***
	[0.044]	[0.075]	[0.044]	[0.045]
* Taiwan		0.175**		
		[0.080]		
Market potential	0.102	-0.058	0.105	0.148**
	[0.072]	[0.108]	[0.072]	[0.073]
* Taiwan		0.269**		
		[0.116]		
Distance from home	-0.272***	-0.224**	-0.200*	-0.165
	[0.082]	[0.087]	[0.104]	[0.106]
* TFP			-0.168	0.493*
			[0.149]	[0.265]
* TFP * Taiwan				-0.790***
				[0.280]
GRDP per capita	0.313**	0.284**	0.304**	0.384***
	[0.124]	[0.124]	[0.124]	[0.127]
Observations	53,203	53,203	53,203	53,203
Pseudo R-squared	0.3756	0.3765	0.3757	0.3773
Log-likelihood	-4056	-4050	-4055	-4045

Notes: ***, ** and * indicate, respectively, 1%, 5% and 10% levels of statistical significance. Standard errors are in parentheses.

Figure 1. Changes in the Number of Affiliates in China



Source: Authors' calculation