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Role of Past Experience and Intra-firm Trade in FDI Decisions

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Role of Past Experience and Intra-firm Trade in FDI Decisions[1]

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Abstract

To what extent do multinational firms consider past experience of exporting and future expectations of intra-firm trade when they engage in outward foreign direct investment (FDI) activities? How do trade costs affect these decisions? Recent literature has shown that FDI entry decisions depend on past export experience in a potential destination. In addition, due to the growth of global value chains, intra-firm trade in both directions (from parent company to affiliate, and from affiliate to parent company) has been shown to have an important effect on affiliate sales' patterns. In this paper, we examine how both mechanisms shape Japanese multinational enterprises' (MNEs) outward FDI activity. We use firm-level data from two basic surveys of Japanese companies: the Basic Survey of Japanese Business Structure and Activities and the Basic Survey on Overseas Business Activities for the period 1995-2015, and we look for evidence that FDI entry decision into a country is a function of past export experience and future expectations of intra-firm trade. We also consider firms' attributes, market attractiveness, barriers to entry, and other factors that can impact FDI entry decision. The results of our analysis have important implications for economic policy since they can shed light on alternative ways to promote inward and outward FDI activity by Japanese firms.

JEL Classification Number: F10, F14, F21

Keywords: Export experience, Intra-firm trade, Foreign direct investment, Multinational enterprises

[1]This study is conducted as a part of the “East Asian Industrial Productivity” project undertaken at the Research Institute of Economy, Trade and Industry (RIETI). This study utilizes the data of the information based on the Basic Survey of Japanese Business Structure and Activities and the Basic Survey on Overseas Business Activities which are conducted by the Ministry of Economy, Trade and Industry (METI), and the Kikatsu Oyako converter, which is provided by RIETI. The authors are grateful for helpful comments and suggestions by Bulat Gafarov (University of California, Davis), Daisuke Fujii (University of Tokyo), and Nail Kashaev (University of Western Ontario), Makoto Yano (RIETI), Masayuki Morikawa (RIETI), Kyoji Fukao (Hitotsubashi University), Toshihiro Okubo (Keio University), and Discussion Paper seminar participants at RIETI. Ivan Deseatnicov acknowledges the financial support of JSPS Kakenhi Grant Number 17K13720. All remaining errors and shortcomings are our own.

Introduction

Recently, policymakers in developed countries have been concerned about the long term effects of multinational production on the welfare of a source country. Due to the growing forces of globalization and spread of global value chains the production of final goods has been split among different nations. This has led to redistribution of production in the FDI source countries, and loss of jobs in certain industries (Autor, Dorn, and Hanson 2016). However, multinational enterprises (MNEs) usually aim at optimizing their production in order to increase overall efficiency and maximize profits in all destinations, which leads to overall optimization of global production. In doing so, MNEs consider trade costs as well as future production processes. Thus, it remains of particular importance for policymakers to understand the ultimate driving forces of multinational production.

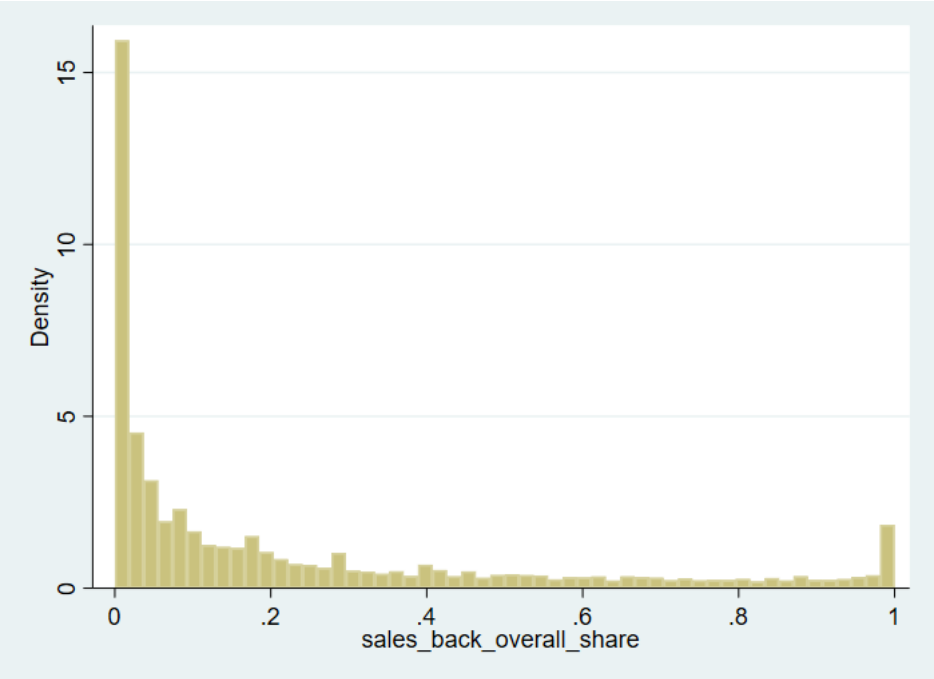

Figure 1: Overall share of Japanese MNEs' affiliates sales back to Japan in total sales

The multinational production theory proposed two main motives of FDI decision for a firm: market-seeking via so-called horizontal FDI and efficiency-seeking via so-called vertical FDI (Antras and Yeaple 2014). These motives were thought of as being two incompatible alternatives. However, the empirical evidence suggests that firms tend to simultaneously pursue each of these motives to some degree (Baldwin and Okubo, 2014). Figure 1 shows histogram of overall share of Japanese MNEs' affiliates sales back to Japan in total sales. It is evident from this figure that Japanese firms differ a lot in their degree of verticalization.

In addition, recent literature suggests that firms pursuing horizontal FDI motivation tend to

engage in gradual internationalization process (Conconi, Sapir, and Zanardi 2015; Deseatnicov and Kucheryavyy 2017). Prior to establishing foreign affiliate they are concerned with future market demand. Therefore, they first engage in exports in order to infer about market profitability. If they perceive that the market is profitable enough then they will engage in outward FDI by establishing a foreign affiliate in the country. Thus, past exports play an important role in FDI entry decision.

In this paper, we provide empirical evidence of past experience and verticalization effect on the decision of FDI entry in the foreign market. We test two hypotheses. First, we ask whether previous export experience in the market plays a role in FDI entry decision. Next, we directly address the effect of expected degree of verticalization on the decision to engage in multinational production.

To test these hypotheses we use firm-level data from two basic surveys of Japanese companies: the Basic Survey of Japanese Business Structure and Activities and the Basic Survey on Overseas Business Activities for a period of 1995-2015. First, we uncover how past export experience and the fundamental firm characteristics such as labor productivity and employment affect FDI entry decision in a country. Second, we examine the probability of sales back to Japan by established affiliates which is followed by prediction of expected intra-firm trade for all firms in the economy given fundamental firm characteristics if they decide to engage in outward FDI activities. Importantly, we cover all potential MNEs including local firms and exporters. Finally, we use the predicted level of expected intra-firm trade to examine the probability of FDI entry decision.

Our findings suggest that both previous export experience and expected level of verticalization play a significant role in FDI entry decision. The contribution of our work, if any, consists in an attempt to unify ex-ante (past experience) and ex-post (future intra-firm trade) motivations for multinational production. To the best of our knowledge there were no such attempts in the previous studies.

The behavior of Japanese MNEs has received a great deal of attention (Kimura and Kiyota 2006; Kiyota and Urata 2008; Kiyota, Matsuura, Urata, and Wei 2008; Hayakawa and Matsuura 2011; Matsuura and Sato 2011). The role of intra-firm trade was examined in several theoretical and empirical works (Helpman, Melitz, and Yeaple 2004; Ramondo, Rappoport, and Ruhl 2013). Past exports and FDI experience has received a particular attention in recent literature (Conconi, Sapir, and Zanardi 2015; Deseatnicov and Kucheryavyy 2017; Gazaniol 2015; Gumpert, Moxnes, Ramondo, and Tintelnot 2017). Our work attempts to extend this literature to consider both export hysteresis effect and expected level of verticalization as factors that influence Japanese outward FDI activities.

The remainder of the paper is organized as follows. Section 1 describes our data and variables.

Section 2 presents the empirical methodology. Our empirical results of the effect of past experience and expected verticalization on FDI entry probability is given in Section 3. Section 4 summarizes our findings.

1 Data

We use two micro-level confidential databases that are compiled annually by Research and Statistics Department of the Ministry of Economy, Trade and Industry (METI). The first database, the Kigyou Katsudou Kihon Chousa Houkokusyo (the Basic Survey of Japanese Business Structure and Activities: the basic survey hereinafter) provides information on various business and strategic activities of Japanese companies. This survey is compulsory for all firms with over 50 employees and for all firms with capital of more than 30 million yen.[1] We have access to the data that cover a period of 1995-2015 years from which we can identify export activities of Japanese firms in seven regions, namely North America, South America, Asia, Middle East, Europe, Oceania and Africa.

The second database, the Kaigai Jigyou Katsudou Kihon Chousa Houkokusyo (the Basic Survey on Overseas Business Activities: the FDI survey hereinafter) provides information on foreign affiliates that are established by Japanese parent companies. We define a foreign affiliate as a company abroad in which a Japanese parent holds at least 10% share of the capital, or a subsidiary of foreign affiliate abroad in which it holds at least 50% share of the capital. We have access to the data that cover a period of 1995-2015 years from which we can identify Japanese MNEs' FDI activities. The FDI survey provides information of an affiliate's year of establishment and the country where it is located. We can identify regional distribution of foreign affiliates using the correspondence of countries and regions defined in the survey.[2]

In order to analyze the past export experience and intra-firm trade of Japanese firms we merge the information from the basic survey and from the FDI survey using the converter prepared at the Research Institute of Economy, Trade and Industry (RIETI). This converter provides a matching of the unique identifiers from both surveys for each year. However there are several complications related to this converter. First, not all firms from the FDI survey could be matched using the

[1] However, the available data sample is reduced since some of the questionnaires are not completed correctly. We assume that such cases occur randomly and, thus, do not create endogenous sample selection bias.

[2] The response rate of surveyed companies in the FDI survey ranges 60-70% for various years. It is possible that there exists a rule by which companies decide not to participate in the survey. If it is true then we may face endogeneity problem originating from the sample selection bias. We assume that this is not the case for our main empirical analysis. Although Japanese MNEs may be interconnected, it is unlikely that they exhibit a common behavior in their relationship with authorities, i.e., METI that conducts the study. Nevertheless, we are planning to do robustness checks by relaxing this assumption, and it remains on our working agenda.

converter. We suspect that the non-matched firms do not appear in the basic survey for random reasons. Second, for some of the FDI survey identifiers there may exist more than one unique identifier in the basic survey. In order to maximize the matching we create a panel of all identifiers and match all possible combinations of unique identifier-year that exist in the FDI survey, the converter and the basic survey. We focus only on the manufacturing parent companies in our data set.[3] As a result we obtain a dataset of 23877 firm of which 10145 exporters and 4719 multinational firms.[4] We examine decision of FDI entry by Japanese firms in 141 country/territory.[5] At least one manufacturing Japanese firm created an affiliate in one of these countries/territories during 1995-2015 years.

We exclude tax heaven countries as a choice of FDI location since the main motive of such FDI is likely to be different from vertical or horizontal FDI motives.[6] There are 413 such affiliates owned by 106 Japanese parent firms (of which 33 firms are from manufacturing industry).

We observe each firm's characteristics at the moment of FDI entry in a country for multinational firms, or at the moment the firm last appeared in our survey for exporters and domestic firms. It can be either year 2015 (the last year of our survey data) or a year earlier if the firm disappeared from the survey. Each firm has an option to do FDI in one of 141 countries/territories. As a result we examine a dataset of 3,509,940 observations.

2 Empirical methodology and variables

We would like to know what determines decision to make an FDI in a particular country. We conjecture that there are two important variables that impact this decision: the cumulative amount of exports, $E_{r,i}$, that a headquarter company i exports to a region r before establishing a foreign affiliate in country c in this region; and the share of output to total sales, $S_{c,i}^{Japan}$, that a foreign affiliate sells back to Japan after FDI entry in country c. We calculate $E_{r,i}$ as cumulative exports to a region r for three, five or ten consecutive years before an FDI entry in country c that belongs to region r happened. Before summing up exports we deflate them using Japan's GDP deflator.[7] We observe cumulative exports a year before FDI entry. We calculate $S_{c,i}^{Japan}$ as sum of total sales of affiliates in a country c to Japan from their year of establishment to year 2015 or to the year

[3] Some firms report an industry code that belongs to manufacturing in one year, and belongs to non-manufacturing in another year. We treat such firms as manufacturing in our study.

[4] Among 10145 exporters there are 4214 multinational firms. Note, that there is a problem of affiliates reporting in one year, disappearing in another year, and reporting again in the following years in the FDI survey data. In our case it will not affect the results because we use average sales back to Japan for all years that we observe an affiliate as our main explanatory variable.

[5] The list of countries/territories is given in Appendix A.

[6] Tax heaven countries that we exclude are British Virgin Islands, Cayman Islands, Netherlands Antilles, Bahamas, and British Bermuda.

[7] The GDP deflator data come from the World Bank World Development Indicators (WDI) database.

firm i stopped activities in a country c divided by total sales of affiliates in a country c for the same years.

The logic for the sales back is the following. If a foreign affiliate sells a lot back to Japan instead of selling locally (or to third countries), then this foreign affiliate was established with a purpose of using some cheap foreign inputs to produce its goods and to serve the Japanese market. This is so-called "vertical" FDI. If a foreign affiliate mostly serves the local market, then this is so-called "horizontal" FDI. The reason for horizontal FDI is to save on shipping goods from Japan to a particular country. This motive is different from the "vertical" FDI motive. For firms with the same low share of sales back to Japan (for horizontally-oriented foreign affiliates), the further away is a particular country, the more likely that these firms will do FDI in this country. This is the opposite relationship compared to vertically-oriented foreign affiliates.

Intuitively, we would like to estimate the following equation:

$$Prob\left[FDI_{c,i}\right] = \boldsymbol{\beta X} + \gamma_1 E_{r,i} + \gamma_2 S_{c,i}^{Japan} + \gamma_3 d_c + \varepsilon, \tag{1}$$

where $\boldsymbol{E_{r,i}}$ is cumulative exports one year before FDI entry, X is a list of controls (GDP of a foreign country, firm characteristics, etc.), and d_c is distance from Japan to a foreign country.

We use distance from Japan to FDI host country c as a proxy for trade costs, $log(Dist)_c$. The data come from CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) database. We also use real GDP in constant 2005 US$ as a proxy for market size, $log(RealGDP)_c$.[8] Finally, we use Free Trade Agreements with Japan, FTA_c as a measure of barriers to entry for Japanese firms.[9] Ideally, there are many country level variables that may influence FDI entry decision by Japanese firms like cost differentials, political stability, cultural differences etc. In this study we focus on gravity control variables since they are considered to be of crucial importance for horizontal/vertical FDI motivation (Antras and Yeaple 2014). It remains on our future agenda to augment the model with additional explanatory variables.[10]

Firm level controls are given by total employment, $log(Emp)_i$, and labor productivity, $log(Prod)_i$. Total employment is the sum of headquarters employees, non-headquarters employees and employees seconded to other companies. Labor productivity is calculated as the value added divided by total employment. Value added is defined as difference between sales and intermediate inputs.[11] We take average of employment and productivity for all years that we observe the firm i. We

[8] The real GDP data come from the World Bank World Development Indicators (WDI) database.

[9] The data come from CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) database.

[10] We thank Makoto Yano for pointing out to the need of such discussion.

[11] We compute intermediate inputs as follows: (Cost of sales + Selling, general and administrative expenses) - (Advertising expenses + Information processing communications expenses + Premises rent + Packing transportation costs + Gross pay + Depreciation and amortization + Welfare expense + Taxes and dues + Interest expense discount fee + Lease payments).

assume that these are fundamental characteristics of the firm that will influence implicitly the manager's decision of FDI entry in the foreign market.

The problem with the estimation of equation (1) is that we know $S_{c,i}^{Japan}$ only after FDI was made. First, we estimate the probability of $S_{c,i}^{Japan}$ given fundamental firm characteristics and countries' fixed effects. In order to do this we estimate the following equation:

$$S_{c,i}^{Japan} = \beta_1 + \beta_2 log(Prod)_i + \beta_3 log(Emp)_i + \gamma_1 CountryFE + \epsilon, \tag{2}$$

Our dependent variable ranges in between zero and one. Moreover, we observe many zero and one realizations (see figure 1 given in Introduction). This suggests that we need to treat carefully such response variable. To estimate equation (2) we employ two empirical methods: zero-one inflated beta model and generalized linear model. We use this estimation to predict $S_{c,i}^{Japan}$ for all firms in our sample including local firms and exporters. Finally, we use the predicted levels of $S_{c,i}^{Japan}$ in our regression that estimates probability of FDI entry in a country given by equation (1). We conjecture that firms have a prior expectation of a degree of intra-firm trade with affiliates when they decide to invest. Our first proxy for this expectation is the observed sales back to Japan after MNEs entered the foreign country summed up for the whole period of affiliate's activity. Our second proxy is the expected sales back that we estimate from equation (2). The expected sales back are a function of firm fundamental characteristics (employment and productivity) and country fixed effects.

In order to examine all potential options of Japanese firms we structure our dataset in the following way. The dataset is a cross-section of manufacturing local firms (19663 firms), exporters (10145 firms) and MNEs (4719 firms). Each firm has an option to establish foreign affiliate in 141 country. Thus, if we observe a new affiliate by a firm in a country where it hadn't invested prior to 1995 we consider it as FDI entry. For all other countries where this firm didn't establish an affiliate we associate zero FDI entry. Same zero observations of FDI entry are associated with local firms and exporters. In case of local firms and exporters we look at the firm when it appeared last time in the basic survey or at last year of the survey (year 2015). Note that we don't make use of time dimension in our analysis. However, all our variables are in real terms to mitigate the price effect. Thus, we end up with many zero observations of FDI entry and only a small fraction of positive FDI (8168 observations out of 3,509,940 observations).

3 Empirical results

3.1 Effect of past experience on FDI entry decision

First, we examine the effect of past export experience $E_{r,i}$ on FDI entry decision. We employ logit model to estimate equation (1). Our main control variables are foreign market size measured by real GDP, trade costs proxied by distance to a country, regional trade agreements between Japan and the respective country, firm's labor productivity and employment. Our main variable of interest is cumulative exports one year prior to FDI entry. At this point we abstract from expected level of verticalization in the decision of the firm. We examine three cases: cumulative exports for three, five and ten years prior to firm's FDI entry, at the time of firm's exit from the survey or last year of survey (year 2015).

Table 1: Effect of past experience on FDI decision

	(1)	(2)	(3)	(4)
	Logit	Logit	Logit	Logit
VARIABLES	Probability of FDI entry	Probability of FDI entry	Probability of FDI entry	Probability of FDI entry
Log(GDP) (constant 2010 US$)	0.565*** (0.007)	0.537*** (0.007)	0.534*** (0.007)	0.534*** (0.007)
Log(Distance to Countries)	-1.305*** (0.012)	-1.249*** (0.014)	-1.240*** (0.014)	-1.243*** (0.014)
Log(Average employment)	0.831*** (0.008)	0.637*** (0.011)	0.628*** (0.011)	0.612*** (0.011)
Log(Average labor productivity)	0.517*** (0.021)	0.382*** (0.024)	0.365*** (0.024)	0.351*** (0.024)
1=RTA (Source: WTO, 2015)	-0.025 (0.035)	-0.093** (0.037)	-0.100*** (0.037)	-0.109*** (0.037)
Log(Exports in N years before FDI entry)		0.158*** (0.004)	0.158*** (0.004)	0.154*** (0.004)
Export years before FDI entry		3 years	5 years	10 years
Constant	-15.060*** (0.256)	-13.660*** (0.265)	-13.627*** (0.264)	-13.544*** (0.262)
Observations	3,020,780	2,947,707	2,947,707	2,947,707
Firms	All	All	All	All
FDI entry level	Country	Country	Country	Country
Log likelihood	-38503	-36453	-36359	-36378

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results are presented in Table 1. All variables have predicted effect on the probability of FDI entry. Market size proxied by real GDP is positive and significant. Trade costs proxied by

distance have the strongest effect on the probability of FDI and they are statistically significant. Regional trade agreements negatively affect FDI entry probability when we include export experience variables. This result implies that trade facilitation will induce firms towards more exporting activity and less FDI activity since fixed costs of exports are reduced, and it becomes more attractive for firms to serve foreign market via exports. This is consistent with learning by exporting hypothesis since lower trade costs will increase the incentive for Japanese firms to experiment in foreign markets via exporting activity prior to engaging in outward FDI activity. Such export experimentation opportunity is particularly important for Japanese small and medium enterprises (SMEs) due to their financial constraints. Fundamental firm characteristics (average productivity and employment) exhibit positive affect on FDI entry decision implying that bigger firms and firms with higher productivity tend to become multinational firms. This is consistent with the previous theoretical literature emphasizing proximity-concentration hypothesis (Helpman, Melitz and Yeaple 2004).

The effect of past experience has a robust positive and significant sign. The magnitude's differences for all three measures of previous cumulative exports are negligible. Thus, previous export experience in the region plays an important role in FDI entry decision. From these results we can infer that firms with at least three years of experience in the region have higher probability of establishing a foreign affiliate in a country in this region. We use cumulative exports for three years prior to FDI entry as our benchmark variable in the following analysis.

3.2 Prediction of expected verticalization and its effect on FDI entry decision

3.2.1 Prediction of verticalization

We conjecture that each firm takes into consideration its implicit prediction of future sales back to Japan when it faces FDI decision. This prediction is governed by firm's fundamental characteristics as well as destination country's characteristics. Therefore, we estimate the probability of sales back to Japan as a fraction of total sales given firm's labor productivity and employment and country fixed effects (equation (2)). Given the properties of our dependent variable we use zero-one inflated beta model and generalized linear model. For zero-inflated beta model we report the probabilities of zero sales back to Japan, a fraction of sales back to Japan, and total sales back to Japan.

Table 2: Prediction of verticalization for MNEs at the moment of entry

	(1)	(2)	(3)	(4)
	Zero-one Inflated Beta	Zero-one Inflated Beta	Zero-one Inflated Beta	Generalized Linear Model
VARIABLES	Probability of a fraction of Sales back to JP	Probability of 100% Sales back to JP	Probability of Zero Sales back to JP	Probability of a fraction of Sales back to JP
Log(Average employment)	-0.104***	-0.315***	-0.109***	-0.146***
	(0.014)	(0.054)	(0.021)	(0.023)
Log(Average labor productivity)	-0.080*	0.210	0.354***	-0.152**
	(0.045)	(0.157)	(0.062)	(0.065)
Observations	8,159	8,159	8,159	8,159
Firms	MNEs at the moment of entry	MNEs at the moment of entry	MNEs at the moment of entry	MNEs at the moment of entry
FDI entry level	Country	Country	Country	Country
Country FE	Yes	Yes	Yes	Yes
Log likelihood	-2321	-2321	-2321	-3062

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, Constant term is excluded from results' presentation

Table 3: Prediction of verticalization for all MNEs

	(1)	(2)	(3)	(4)
	Zero-one Inflated Beta	Zero-one Inflated Beta	Zero-one Inflated Beta	Generalized Linear Model
VARIABLES	Probability of a fraction of Sales back to JP	Probability of 100% Sales back to JP	Probability of Zero Sales back to JP	Probability of a fraction of Sales back to JP
Log(Average employment)	-0.081***	-0.385***	-0.631***	0.331***
	(0.011)	(0.089)	(0.011)	(0.016)
Log(Average labor productivity)	-0.065*	0.290	-0.035	0.001
	(0.038)	(0.287)	(0.030)	(0.047)
Observations	660,104	660,104	660,104	660,104
Firms	all MNEs	all MNEs	all MNEs	all MNEs
FDI entry level	Country	Country	Country	Country
Country FE	Yes	Yes	Yes	Yes
Log likelihood	-16343	-16343	-16343	-8194

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, Constant term is excluded from results' presentation

The results are presented in Table 2 and 3. Average employment has a consistent negative

effect on the probability of some fraction sales back to Japan. The reason could be that bigger firms have enough labor supply at home, and thus they prefer to focus on serving the foreign markets via affiliate sales. Average productivity doesn't have a consistent sign. However, note that probability of a fraction of sales back to Japan is negatively and significantly affected by labor productivity for both zero-one inflated beta model and for generalized linear model. We infer that firms with higher productivity will tend to have lower degree of verticalization. This could be because FDI sunk costs are higher for horizontal FDI then for vertical FDI. Thus, firms need to be more productive to establish horzontal FDI affiliate in a foreign country.

Table 4: Summary statistics for predicted degree of verticalization of Japanese firms

VARIABLES	Mean	Standard Deviation	Min	Max
Prediction for MNEs only				
Overall share of the affiliates sales back to JP	0.00319	0.0464	0	1
Predicted sales back to JP (ZOIB for MNEs at the moment of entry)	0.136	0.158	0.00171	1
Predicted sales back to JP (ZOIB for all MNEs)	0.0459	0.156	5.39e-06	1
Predicted sales back to JP (GLM for MNEs at the moment of entry)	0.0577	0.101	7.06e-09	0.593
Predicted sales back to JP (GLM for all MNEs)	0.00319	0.0154	0	0.509
Prediction for all Japanese firms				
Overall share of the affiliates sales back to JP	0.000631	0.0207	0	1
Predicted sales back to JP (ZOIB for MNEs at the moment of entry)	0.148	0.164	0.00171	1
Predicted sales back to JP (ZOIB for all MNEs)	0.0487	0.159	5.12e-06	1
Predicted sales back to JP (GLM for MNEs at the moment of entry)	0.0644	0.111	7.06e-09	0.641
Predicted sales back to JP (GLM for all MNEs)	0.00245	0.0118	0	0.509

After estimating equation (2) we derive predicted values of sales back to Japan for all firms in our sample including local firms and exporters. This gives us expected degree of verticalization if firms decide to engage in multinational production given their fundamental characteristics i.e.

employment and productivity. We present summary statistics of observed and predicted sales back to Japan. First, we examine the prediction for MNEs only followed by prediction for all Japanese firms in our sample. The results are presented in table 4. If we observe minimum and maximum value the results suggest that zero-one inflated beta model predicts more accurately expected degree of veritcalization for firms if they decide to do FDI. If we focus on mean and standard deviation then generalized linear model shows a better prediction.[12]

3.2.2 Effect of predicted verticalization on FDI entry decision

Now we turn to examine the effect of predicted verticalization on the decision of FDI entry by Japanese firms. We augment our previous analysis by the expected value of future sales back to Japan for all firms in our sample. The results are presented in Table 5. In column 1 we employ observed sales back to Japan from affiliate as our explanatory variable. We conjecture that it can be a proxy of expected value of intra-firm trade when a Japanese firms makes an FDI entry decision. In column 2 and 3 we use predicted values of sales back to Japan by GLM method. Sales back to Japan that are used in column 2 were predicted for all MNEs countries pairs, and in column 3 for only MNEs-countries pairs of observed FDI entries. In column 3 and 4 we use predicted values of sales back to Japan by ZOIB method. Sales back to Japan that are used in column 4 were predicted for only MNEs-countries pairs of observed FDI entries, and in column 5 for all MNEs countries pairs.

All explanatory variables have predicted signs and their effect on the probability of FDI entry doesn't change qualitatively. The effect of past export experience remains positive and significant. Trade costs (proxied by distance) continue to play an important role in FDI entry decision. Our findings suggest that expected degree of verticalization has an important explanatory power of FDI entry decision. The results differ drastically for degrees of verticalization that were predicted using different models. The effect of most accurately predicted sales using zero-one inflated beta model on the probability of FDI entry is much smaller (0.57) than the effect of real sales back to Japan (7.615). We conclude that predicted sales back to Japan may represent a good proxy of expected intra-firm trade for firms that consider engaging in multinational production. This implies that Japanese firms tend to increase outward FDI activities if they expect a higher level of intra-firm trade. Thus, vertical FDI motives must be as important for Japanese firms as horizontal FDI motives.

One limitation of our analysis consists in lack of a structural model to motivate our empirical exercise. From a theoretical point of view interaction terms between predicted sales back and

[12] Note, however, that the prediction is not accurate enough and it remains on our agenda to find a more precise method to estimate expected degree of verticalization.

Table 5: Effect of predicted veritcalization on FDI decision

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Log(GDP (constant 2010 US$))	0.52*** (0.01)	0.41*** (0.01)	0.53*** (0.01)	0.540*** (0.01)	0.54*** (0.01)	0.48*** (0.01)
Log(Distance to Countries)	-1.11*** (0.02)	-0.97*** (0.02)	-0.91*** (0.02)	-1.18*** (0.01)	-1.23*** (0.01)	-1.07*** (0.02)
Log(Average employment)	0.61*** (0.01)	0.57*** (0.01)	0.73*** (0.01)	0.66*** (0.01)	0.64*** (0.01)	0.64*** (0.01)
Log(Average labor productivity)	0.43*** (0.03)	0.39*** (0.02)	0.50*** (0.02)	0.40*** (0.02)	0.38*** (0.02)	0.36*** (0.02)
1=RTA (Source: WTO, 2015)	-0.23*** (0.05)	-0.07* (0.04)	-0.50*** (0.04)	-0.22*** (0.04)	-0.13*** (0.04)	-0.15*** (0.04)
Log(Exports in 3 years before FDI entry)	0.15*** (0.004)	0.17*** (0.004)	0.15*** (0.004)	0.16*** (0.004)	0.16*** (0.004)	0.16*** (0.004)
Overall share of the affiliates sales back to JP	7.62*** (0.15)	9.37*** (0.34)	4.89*** (0.13)	1.13*** (0.06)	0.57*** (0.06)	2.86 (2.02)
Sales Back*Distance						-1.28*** (0.25)
Sales Back*Log(real GDP)						0.36*** (0.04)
Constant	-14.47*** (0.30)	-12.48*** (0.30)	-17.99*** (0.28)	-14.74*** (0.26)	-13.93*** (0.27)	-13.88*** (0.32)
Observations	2,947,707	2,947,707	2,947,707	2,947,707	2,947,707	2,947,707
Method of Sales back to JP prediction	Observed values	GLM	GLM	ZOIB	ZOIB	ZOIB
Log likelihood	-31574	-35859	-35845	-36368	-36434	-36329

distance as well as between predicted sales back and GDP may show how stong is vertical and horizontal FDI motivation of Japanese firms. We augment our model with such interaction terms. The results are presented in column 6. First, the effect of expected sales back to Japan increased in magnitude. Second, the cross-term effect suggests a complex motivation of Japanese firms. Distance decreases the incentive for intra-firm trade. Market size proxied by GDP increases the incentive for FDI entry. Overall, Japanese firms seem to engage in diverse activities that result in both local affiliate sales in the foreign country (horizontal FDI) and in intra-firm trade with Japanese parent (vertical FDI).[13]

[13] We thank Kyoji Fukao for suggestion to include cross-terms in our analysis.

4 Summary

In this paper we address two important channels that affect Japanese outward FDI activities: learning by exporting prior to FDI entry and expected degree of verticalization. We suggest that learning by exporting mechanism plays an important role in MNEs behaviour. MNEs reveal the uncertainty of the foreign market via exports, and update their expected profitability. Thus, they take into consideration past experience when they decide to invest. However, MNEs also engage in intra-firm trade after establishing foreign affiliate, and thus they expect some level of sales back from affiliates to their parent. This degree of verticalization will affect the decision of FDI entry as well.

We test these hypotheses empirically using two confidential micro surveys compiled by Research and Statistics Department of the Ministry of Economy, Trade and Industry of Japan: the Basic Survey of Japanese Business Structure and Activities and the Basic Survey on Overseas Business Activities. We create a dataset of 23877 manufacturing firms with an option to invest in 141 country/territory. 4719 firms become multinational firms. We examine the activity of these firms for a period of 1995-2015.

We conduct empirical analysis of the effect of past export experience and expected degree of verticalization on the probability of FDI entry in a foreign country. We find that both channels play an important role in the decision of FDI entry by Japanese firms. Past export experience helps firms to reveal foreign market demand and uncertainty. In addition, although recent literature suggests that most of FDI are horizontal in nature (Ramondo, Rappoport and Kuhl. 2013) we find, in fact, that many firms consider some level of intra-firm trade when they decided to invest and this degree of verticalization will affect the probability of FDI entry. We conclude that traditional dichotomy into horizontal and vertical FDI is not prevalent, and in practice most firms engage in both local sales and intra-firm trade. This opens new possibilities for theoretical and empirical research to understand the properties and motivation of multinational firms that exhibit such complex behavior.

From the policy perspective the main implication of our paper is that openness to trade may play an important role in shaping Japan's outward FDI activity. For instance, if Japanese government promotes exports and reduces trade barriers in Japan it will indirectly induce FDI activity since the cost born by Japanese firms to reveal foreign market uncertainty and to engage in intra-firm trade will decrease. This is particularly important for SMEs as they cannot afford high costs of foreign activity. Thus, promoting exports and reducing Japan's trade barriers will facilitate FDI entry by SMEs due to learning by exporting mechanism and vertical FDI motivation. From the Japanese inward activities perspective, our results suggest that an import promotion policy and

participation in regional trade agreements with other countries could also induce inward FDI in Japan.

Nevertheless, our study still lacks a number of important considerations. From the theoretical point of view we need to identify how the presented channels shape export and FDI costs. In order to do it we need to develop a structural model and to estimate it quantitatively. This remains on our future agenda.

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Appendix

A List of countries/territories of FDI choice option

Asia (20)	Bangladesh, Brunei, China, Hong Kong, Indonesia, India, Cambodia, Korea, Laos, Sri Lanka, China Macao SAR, Myanmar, Malaysia, Nepal, Pakistan, Philippines, Singapore, Thailand, Taiwan, Viet Nam
Africa (35)	Angola, Canary Islands, Republic of Ivory Coast, Cameroon, DR Congo, Congo, Algeria, Egypt, Ethiopia, Gabon, Ghana, Guinea, Gambia, Kenya, Liberia, Libya, Morocco, Madagascar, Mozambique, Mauritania, Mauritius, Namibia, Niger, Nigeria, Rwanda, Sudan, Senegal, Sierra Leone, Swaziland, Tunisia, Tanzania, Uganda, South Africa, Zambia, Zimbabwe
Europe (37)	Austria, Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Germany, Denmark, Spain, Estonia, Europe, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Kazakhstan, Lithuania, Luxembourg, Latvia, Monaco, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Sweden
Middle East (11)	Afghanistan, United Arab Emirates, Bahrain, Iran, Iraq, Israel, Kuwait, Lebanon, Qatar, Saudi Arabia, Syria
North America (2)	Canada, USA
Oceania (11)	Australia, Fiji, Nothern Mariana Islands, New Caledonia, New Zealand, Oceania, Palau, Papua New Guinea, Solomon Islands, Vanuatu, Samoa
South America (24)	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominica, Ecuador, French West Indies, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, Puerto Rico, Paraguay, El Salvador, Suriname, Trinidad and Tobago, Uruguay, Venezuela