Exports, trade costs and FDI entry: evidence from Japanese firms*

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Abstract

Why does aggregate foreign direct investment (FDI) fall with distance? We conjecture that high trade costs adversely affect FDI entry decisions in a dynamic setting, even when controlling for previous export experience in foreign markets. We test this hypothesis using Japanese firm-level data for the period of 1995–2018, and find that the probability of FDI entry decreases with distance. We conclude that trade costs limit a firm's ability to assess foreign market uncertainty. As a result, a firm may exit a foreign market before realizing the potential profitability and never establish an affiliate there. This result is highly relevant for policymakers, as it proves that trade liberalization and FDI facilitation policies may reinforce each other, resulting in a compound effect for both exports and FDI.

Keywords: export dynamics, foreign direct investment, multinational enterprises

JEL classification codes: F10, F14, F21

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1. Introduction

Aggregate foreign direct investment (FDI) falls with distance, but at a slower rate than exports. This empirical regularity has been summarized by Antràs and Yeaple (2014) as a common fact about United States multinational enterprises (MNEs). A study by Matsuura and Sato (2014) suggests that a similar regularity holds for Japanese MNEs.[1]

Why does aggregate FDI fall with distance? The fact that FDI falls with distance is not obvious from the theoretical point of view. There are several competing theoretical mechanisms that relate FDI to distance. First, within the traditional proximity-concentration framework (Helpman et al., 2004), FDI and trade are substitutes. Firms establish foreign affiliates to serve distant markets in order to overcome per-unit trade costs. The least productive firms do not engage in any foreign activity. Firms that are more productive engage in trade. The most productive firms do FDI. Within this framework, aggregate FDI decreases in exports and increase in distance. Second, FDI and trade can complement each other if a parent company exports intermediate inputs to foreign affiliates (Irarrazabal et al., 2013). In this case, distance negatively affects both FDIs and exports. Third, Kiyota and Urata (2008), in their study of Japanese outward FDI activity, come to the conclusion that exporting behaviour is an important factor that determines a firm's propensity to become multinational. Finally, Conconi et al. (2016) suggest that firms engage in gradual internationalization by first exporting to a market and consequently engaging in FDI activity if the level of expected profitability is high enough. Under this hypothesis, trade costs are expected to have a negative effect on both exports and FDI activity.

The aim of this paper is to test how trade costs shape the FDI activity of Japanese MNEs, subject to their previous export experience. Our contribution is twofold. First, we document some regularities about the gradual internationalization process, using micro-level data from two basic surveys of Japanese firms, for the period of 1995–2018: the Basic Survey of Japanese Business Structure and Activities and the Basic Survey on Overseas Business Activities. In particular, we examine manufacturing parents and document that 68.5 per cent of Japanese MNE affiliates are established after being engaged in exports in the same region. This finding supports the hypothesis of the learning-by-exporting mechanism for Japanese MNEs. Moreover, we confirm that distance has a negative and significant effect on the outward FDI activity of such firms, where the outward FDI activity is measured by either local affiliate sales, or FDI stock, or FDI flows.

[1] Alfaro and Chen (2018) provide an overview of the literature, discussing the effect of distance on outward FDI activity.

Second, we hypothesize that, in a dynamic partial equilibrium setting, a domestic firm may start serving a foreign market by exporting, updating its prior beliefs about the potential demand and costs (uncertainty). In the process of learning, the firm decides whether to continue serving this market. If the expected profitability is high enough in the foreign country, the firm may decide to establish a foreign affiliate there. Alternatively, we conjecture that due to prohibitive trade costs, the firm may decide to stop serving the market before realizing its potential for profitability. This hypothesis guides our empirical analysis, in which we examine the probability of FDI entry by Japanese MNEs using a semiparametric proportional hazard model and a probit model with random effects. Export experience is confirmed to have a positive and significant effect on the probability of FDI entry. Moreover, we confirm that distance negatively affects the probability of FDI entry decision even when controlling for previous export experience. This latter finding is one of the key results of our paper, which suggests that the learning-by-exporting channel emphasized by Conconi et al. (2016) is not enough to explain why the FDI falls with distance.

These findings are highly relevant for policymakers, as trade and FDI facilitation policies may reinforce each other. For instance, the establishment of trade agreements leads to a reduction of trade and non-trade barriers and thus facilitates trade and the ability of firms to reveal foreign market demand and costs. Therefore, the likelihood of FDI increases. In addition, FDI agreements create incentives for firms to experiment with exports, which leads to increased trade flows. Thus, trade liberalization and FDI promotion policies may have a compound effect on both trade and FDI between countries.

Our findings also strongly suggest that trade promotion does not fully translate into increased FDI. We still find that physical distance – our proxy for trade costs – negatively affects the likelihood of FDI, even if we are controlling for export experience. Thus, trade and FDI promotion policies should be complementing each other.

The remainder of the paper is organized as follows. Section 2 presents a literature review. In section 3 we discuss Japanese trade and FDI in the international context. Section 4 describes our data and variables. Section 5 investigates the effect of distance on affiliate sales, FDI stock and FDI flows. In section 6, we perform our empirical analysis of the effect of trade costs on FDI entry probability. An alternative estimation approach is presented in section 7. Section 8 concludes and discusses policy recommendations that can be drawn from our results.

2. Literature review

The behaviour of Japanese MNEs and exporters has been extensively studied in a number of previous works (e.g., Kimura and Kiyota, 2006; Kiyota et al., 2008; Hayakawa and Matsuura, 2011; Matsuura and Sato, 2014). To the best of our knowledge, Kiyota and Urata (2008) is the closest work to ours in which the authors use the same micro-level data for the period of 1994–2000 and analyse how the engagement of Japanese firms in international trade influences the probability of becoming an MNE. They concluded that for Japanese firms exports and FDI are complements. In contrast to these works, our study attempts to examine the dynamics of Japanese firms' FDI and export activity for the period of 1995–2018 and, in particular, to assess the separate roles of trade costs and exports in shaping FDI patterns.

Our paper belongs to a growing empirical literature that studies the joint dynamics of FDIs and exports. Using firm-level data from Belgium, Conconi et al. (2016) show that previous export experience increases the probability that a Belgian firm engages in FDI. Gazaniol (2015) finds that both import and export experience positively influence the probability of FDI by French firms. Ding et al. (2021) highlight a reverse link using Chinese firm-level data: that firms' export performance is better in destination countries where these firms previously engaged in FDI. Sleuwaegen and Smith (2021) examine what characteristics of Belgian producers of services determine their internationalization mode: FDI versus exports. They find that older, larger, and more productive and more human capital-intensive Belgian service producers are more likely to serve foreign markets through FDI rather than exports.

Chen et al. (2021) use one of the two Japanese firm-level data sets that we use in this paper (the Basic Survey on Overseas Business Activities) and show that large exports of Japanese affiliates to third markets increase the probability of the parent firms investing in these markets. Thus, like this paper, Chen et al. (2021) highlight the learning-by-exporting channel. This paper complements Chen et al. (2021) by exploiting a richer set of data and focusing on the export experience of parent firms rather than that of their affiliates.

Chen et al. (2020) use the same data sources as we do in this paper but use an aspect of these data that we ignore here: reports by firms of their forecast sales. Chen et al. (2020) show that forecast errors fall as firms gain experience, which the authors interpret as evidence of learning. They built an open economy model of firm life cycle that features endogenous entry into exporting and FDI and that is driven by uncertainty of demand. We differ from Chen et al. (2020) by being agnostic about the sources of uncertainty and focusing solely on the impact of export experience and distance on the propensity to engage in FDI.

Among the aforementioned papers, most closely related to our work is Conconi et al. (2016). They suggest that uncertainty in foreign market demand, local regulations and legal requirements induce firms to engage in a gradual internationalization process. In their framework, firms resolve market uncertainty through exporting, and then engage in FDI if the expected profitability is high enough. The important implication of this framework is that if trade costs are high, then FDI falls with distance because experimentation by exporting to foreign markets becomes costly. However, this framework does not explain why FDI may fall with distance conditional on export activity, which, as we document in this paper, is the case with the Japanese MNEs. Our work attempts to emphasize the learning-by-exporting mechanism and to explain the impact of trade costs on FDI entry decisions, showing that trade costs play a significant role in the attractiveness of countries, thus shaping Japanese MNEs' outward FDI behaviour.

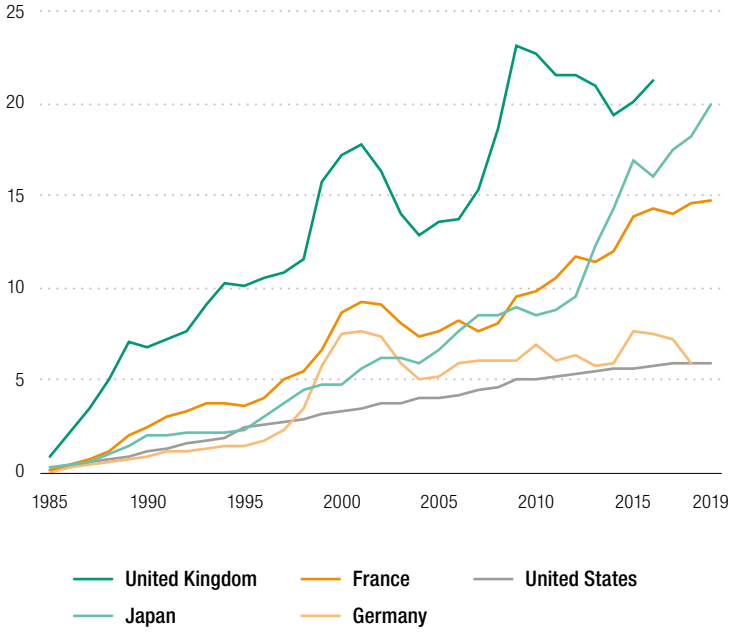
Finally, for the gradual internationalization process Gumpert et al. (2020) provide an alternative explanation to learning-by-export. They use a combination of French, Norwegian and German firm-level data sets to document a number of facts about exporters and MNEs. They then construct a dynamic version of the proximity-concentration framework that matches the observed facts. In their framework, the learning-by-exporting channel is absent, and the gradual internationalization process is driven by the assumption that each firm's productivity follows a Markov process. This assumption, incorporated into the proximity-concentration framework, naturally generates the outcome that as firms become more productive, they first export and then conduct FDI.

3. Japanese FDI and exports in the international context

The main objective of this section is to discuss the patterns of Japanese FDI and exports in the international context with a particular reference to other major outward FDI and trading developed countries. Figure 1 presents the evolution of the share of manufacturing outward FDI stock to gross domestic product (GDP) for Japan, France, the United States, Germany and the United Kingdom for the period 1985–2019.

Overall, we observe that Japanese outward FDI activity increased considerably from the mid-1980s to the mid-2010s. In comparison, the United States outward FDI activity was growing at a slower pace. As Japan's GDP is smaller than that of the United States, from the macroeconomic point of view Japan deploys a lot of outward FDI activity, and perhaps, even more than the United States. On top of that in the mid-2000s Japanese outward FDI activity surpassed that of French firms, in the mid-2010s it surpassed that of German firms and recently it shows signs of surpassing that of firms from the United Kingdom.

Figure 1. Evolution of the share of manufacturing outward FDI stock per GDP, 1985–2019 (Per cent)



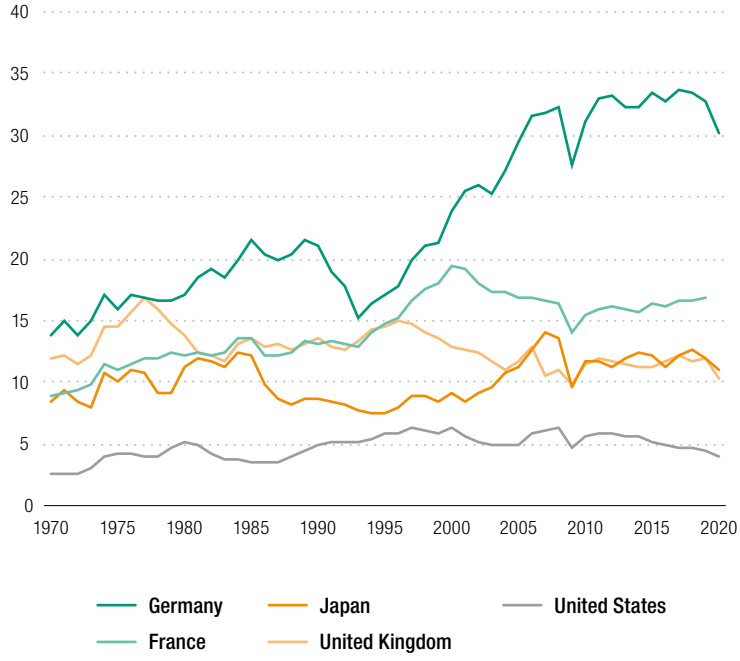
Source: Data on FDI are from the OECD International Direct Investment Statistics (https://doi.org/10.1787/idi-data-en) and on GDP are from the World Bank's World Development Indicators database. FDI stock is computed as cumulated flows.

Our empirical analysis that uses firm-level data covers this important period of increase in outward FDI activity by Japanese firms. Prior to the 1990s Japanese outward FDI was mainly in real estate, banking, commerce and other non-manufacturing activities. However, manufacturing activities have increased considerably since about 1990, as we see in figure 1.

There are a few key reasons for such a change in the behaviour of Japanese MNEs. First, the appreciation of the yen led to an increase in the option value of FDI sourced in Japan. Second, international production specialization has evolved, and, in particular, the cost of global value chain creation has become relatively low. Therefore, a boom occurred in the international division of labour, and Japanese MNEs actively joined in this trend. As shown in table 2, most FDI in this period went to Asian countries. The key industries of Japanese MNEs' competitive advantage were electric machinery, automobile production and computer, electronic and optical equipment.

Figure 2. Evolution of manufacturing export of goods to GDP ratio, 1970–2020

(Per cent)



Source: Data on manufacturing exports and GDP in current US dollars are from the World Bank's World Development Indicators database.

Figure 2 shows the evolution of the export-GDP ratio in the manufacturing sector for Japan, France, the United States, Germany and the United Kingdom for the period 1970–2020. In recent years, the ratio in Japan is comparable to that in the United Kingdom. Since 2000 Japan has become somewhat more open – less so than France and Germany but more so than the United States. Manufacturing exports have been stable at about 8–13 percent of GDP. Previously, after the Plaza accord of the mid-1980s, the ratio of manufacturing exports to GDP in Japan had declined substantially because of the considerable appreciation of the yen. That stagnation continued until early 2000. At the same time, as we see in figure 1, Japanese firms increased their FDI activity.

4. Description of data and variables

This section presents data sources and the variables used in the analysis.

4.1. Data

We use two confidential micro-level databases that are compiled annually by the Research and Statistics Department of the Japanese Ministry of Economy, Trade and Industry.[2] The first database, the Kigyou Katsudou Kihon Chousa Houkokusyo (the Basic Survey of Japanese Business Structure and Activities", the "basic survey" hereafter) provides information on various business and strategic activities of Japanese firms. This survey is compulsory for firms with more than 50 employees and for firms with capital of more than ¥30 million.[3] We have access to the data that cover the period of 1994–2018, from which we can identify the export activities of Japanese firms in seven regions: North America, South America, Asia, Middle East, Europe, Oceania and Africa.[4]

The second database, the Kaigai Jigyou Katsudou Kihon Chousa Houkokusyo (the Basic Survey on Overseas Business Activities, the "FDI survey" hereafter) provides information on foreign affiliates of Japanese parent companies. A foreign affiliate is defined as a company abroad in which a Japanese parent holds at least a 10 per cent share of the capital or as a subsidiary of a foreign affiliate abroad in which the affiliate holds at least a 50 per cent share of the capital.[5] We have access to the data that cover the period of 1995–2018, from which we can identify FDI activities of Japanese MNEs. The FDI survey provides information on each affiliate's year of establishment and the country where it is located.

In order to analyse the FDI and export dynamics of Japanese firms, we merge the information from the basic and FDI surveys using the converter built at the Research Institute of Economy, Trade and Industry. This converter provides a matching of the unique identifiers from both surveys for each year. The merged data set contains 7,254 parent companies and 47,604 affiliates.

[2] There are no conflicts of interest regarding the data use. All aggregated data and materials are available upon request. Confidential micro-level data are not available.

[3] The available data sample does not contain all firms included in the survey, because some firms do not fill in questionnaires correctly. We assume that such cases occur randomly and, thus, do not induce endogenous sample selection bias.

[4] The number of countries from all world regions is 144. The list of countries is available a request.

[5] The Ministry of Economy, Trade and Industry targets all Japanese companies that have subsidiaries overseas as of the end of March each year except for those in the financial, insurance and real estate industries.

We hypothesize that firms reveal foreign market uncertainties (demand and costs) by exporting to these markets, and we consider only parent companies belonging to manufacturing industries. We do not restrict our analysis only to manufacturing affiliates. A non-manufacturing foreign affiliate can engage in wholesale or some other type of distribution-oriented FDI. In such cases, revealing foreign market uncertainties is equally important for production-oriented FDI and distribution-oriented FDI. Out of 7,254 parent companies in the matched data set, we keep 4,745 manufacturing parent companies with 28,663 affiliates that can be either manufacturing or non-manufacturing.

Foreign market uncertainty is likely to have an impact on the market entry decision for horizontal and platform-type FDI but, arguably, not for vertical FDI, which serves the Japanese market with goods produced abroad. As argued in Conconi et al. (2016) and reported in other recent studies (e.g. Ramondo et al., 2013), the number of vertical FDI affiliates is lower than those engaging in horizontal or platform-type FDI. Following Conconi et al. (2016), we define an affiliate as a vertical FDI "if in any of the years following FDI entry exports to the parent company exceed one third of the affiliate's sales". In our empirical analysis, we exclude vertical FDI affiliates and focus on the remaining ones, which are assumed to be either horizontal or platform-type (23,495 affiliates, 82 per cent of the total number of affiliates).

4.2. Variables

Affiliate sales, FDI stock, and FDI flow

Table 1 provides definitions and sources of the variables in our study. We use three measures to capture FDI activity of Japanese MNEs: local affiliate sales, $\mathrm{AfSales}_{f,c,t}$, volume of FDI investment, $\mathrm{FDIStock}_{f,c,t}$, and FDI flows, $\mathrm{FDIFlows}_{f,c,t}$.

In our regression analysis, we want to use logarithmic transformations of $\mathrm{AfSales}_{f,c,t}$, $\mathrm{FDIStock}_{f,c,t}$, and $\mathrm{FDIFlows}_{f,c,t}$. However, $\mathrm{AfSales}_{f,c,t}$ can take a zero value because some firms report zero local affiliate sales in some years. Also, $\mathrm{FDIFlows}_{f,c,t}$ can take a negative value if firms decrease their investment. For these two variables, instead of logarithmic transformations, we use the inverse hyperbolic sine transformation (Burbidge, Magee and Robb, 1988), which for any variable y_t is given by $g(y_t,\theta) \equiv \frac{1}{\theta}\sinh^{-1}(\theta y_t) = \frac{1}{\theta}\log\left(\theta y_t + (\theta^2 y_t^2 + 1)^{1/2}\right)$ where θ is a parameter.[6]

[6] The inverse hyperbolic sine transformation can be applied to data defined on $\mathbb{R}$. For large values of y_t it behaves like a log transformation, regardless of the value of θ. Also, $g(y_t,\theta) \to y_t$ as $\theta \to 0$.

Table 1. Variables and sources used in the study

Abbreviation	Definition, description, measurement	Data source
$AfSales_{f,c,t}$	Inverse hyperbolic sine transformation of the sum of local sales of parent f affiliates in country c in year t multiplied by the parent f ownership share in each affiliate's capital.	FDI survey
$FDIStock_{f,c,t}$	Log of the sum of total capital of parent f affiliates in country c in year t multiplied by the parent f ownership share in the capital.	FDI survey
$FDIFlows_{f,c,t}$	Inverse hyperbolic sine transformation of the change in FDI stock for parent company f in country c between years t and t - 1.	FDI survey
$FDIEntry_{f,c,t}$	Dummy equal to 1 if and only if a firm f established an affiliate in country c in year t.	FDI survey
$FDIEntry_{f,r,t}$	Dummy equal to 1 if and only if a firm f established an affiliate in region r (in any country that belongs to r) in year t.	FDI survey
$ExportEntry_{f,r,t}$	Dummy equal to 1 if firm f reports positive exports to region r in year t and zero exports in years t - 1 and t - 2.	Basic survey
$Log(CumulativeExports_{f,r,t})$	Log of sum of exports for a period of three, five, or ten years by firm f in region r prior to FDI entry in year t in country c from this region.	Basic survey
$Experience0_{f,r,t}$	Dummy equal to 1 if firm f reports zero years of exports experience in region r in year t.	Basic survey
$Experience12_{f,r,t}$	Dummy equal to 1 if firm f reports 1-2 years of exports experience in region r in year t.	Basic survey
$Experience3plus_{f,r,t}$	Dummy equal to 1 if firm f reports more than 3 years of exports experience in region r in year t.	Basic survey
$Experience14_{f,r,t}$	Dummy equal to 1 if firm f reports 1-4 years of exports experience in region r in year t.	Basic survey
$Experience5plus_{f,r,t}$	Dummy equal to 1 if firm f reports more than 5 years of exports experience in region r in year t.	Basic survey
$Log(Dist_c)$	Log of population-weighted distance between Japan and country c.	CEPII
$Log(Dist_r)$	Log of population-weighted distance between Japan and region r.	CEPII

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Table 1. Variables and sources used in the study

Abbreviation	Definition, description, measurement	Data source
$\text{Tariff}_{c,t}$	Weighted average applied tariff (import as weights) to imports from Japan by country c in year t.	UNCTAD TRAINS
$\text{Tariff}_{r,t}$	Weighted average applied tariff (import as weights) to imports from Japan by region r in year t.	UNCTAD TRAINS
$Population_{c}$	Population of country c in year 1995	World Development Indicators, World Bank
$\text{Log}(RealGDP_{c,t})$	Log of real GDP in constant 2010 USD of country c in year t.	World Development Indicators, World Bank
$\text{Log}(RealGDP_{r,t})$	Log of the sum of real GDP for all countries within region r in year t.	World Development Indicators, World Bank
$\log(\text{Emp}_{f,t})$	Total employment of firm f in year t defined as the sum of headquarters employees, non-headquarters employees, and employees seconded to other companies.	Basic survey
$\log(\text{Prod}_{f,t})$	Labor productivity of firm f in year t defined as as the value added divided by total employment.	Basic survey
$\log(\text{ImportJP}_{f,c,t})$	Log of total imports from Japan of firm f's affiliates in country c.	FDI survey
$\text{FDIbefore1995}_{f,c}$	Dummy equal to 1 if and only if a firm f established an affiliate in country c before 1995.	FDI survey

Source: Authors' definitions.
Note: CEPII stands for Centre d'Etudes Prospectives et d'Informations Internationales. We use the GeoDist database (Mayer and Zignago 2011).

FDI and export entries

One of the key variables in our analysis is the year of establishment of an overseas affiliate by a Japanese MNE (here called FDI entry), and one of the key relationships in the data that we seek to uncover is the impact of export experience on FDI entry. As we explained in section 4.1, our FDI data are at the country level, while our exports data are at the regional level (with all countries in the world grouped into seven regions). We make FDI and exports data comparable by replacing the information about the hosting country of each FDI affiliate with the (coarser) information about the hosting region to which the corresponding country belongs to.

Formally, our FDI entry variable, $\mathrm{FDIEntry}_{f,r,t}$, is equal to 1 if and only if a firm f established an affiliate in region r in year t. The distribution of FDI entry by years and regions according to our definition is provided in table 2. This table shows that during 1995–2018, most new FDI entry by Japanese MNEs occurred in Asia, followed by Europe and North America.[7]

Table 2. Distribution of country-level FDI entries by region of destination and year

Year	North America	South America	Asia	Middle East	Europe	Oceania	Africa
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1995	52	24	607	3	74	9	4
1996	63	17	425	3	68	6	13
1997	46	18	311	4	65	7	7
1998	35	10	140	3	56	4	2
1999	35	9	138	1	52	4	3
2000	30	14	228	4	69	5	3
2001	36	7	300	0	70	5	3
2002	49	17	431	3	66	4	1
2003	45	6	399	0	70	4	2
2004	32	5	391	3	59	5	4
2005	39	11	337	3	73	5	3
2006	31	17	248	4	52	3	5
2007	28	17	260	2	57	3	1
2008	15	15	209	2	50	4	6
2009	10	8	139	2	50	8	0
2010	16	15	260	6	37	2	6
2011	15	23	383	5	50	2	2
2012	18	48	399	7	53	3	5
2013	20	40	244	3	41	3	4
2014	17	30	115	6	49	2	0
2015	14	27	83	2	21	1	4
2016	10	20	66	1	25	3	3
2017	7	4	47	2	20	6	2
2018	4	5	32	0	15	0	1
Total	667	407	6,192	69	1,242	98	84

Source: Based on micro data presented in section 4.

[7] The numbers in table 2 are calculated from the matched data set. Since 2014 we observe a significant decrease in FDI entry in Asia. Several reasons can explain this pattern. First, since 2013 the yen depreciated due to the "Abenomics" economic policy. Second, Japan's engagement in free trade agreements and economic partnership agreements accelerated, which led to a decrease in tariffs and trade barriers. Therefore, export activity has begun to replace some outward FDI activity. Finally, Japan somewhat lost its comparative advantage in electric machinery. A similar pattern is observed if we calculate these statistics from the complete data set of Japanese affiliates before matching. The results are available upon request.

Our definition of $\text{FDIEntry}_{f,r,t}$ implies that a Japanese parent firm might have entered into FDI in several countries in a particular region r. Moreover, we might observe that a parent firm continues exporting to a region after an FDI entry in that region. Such coexisting exports and FDI activity in a region can happen for several reasons. One is that a parent firm enters into FDI in one country in a region and continues exporting to a different country in the same region. Unfortunately, owing to our data limitations, we cannot distinguish this case from the case when a parent company establishes an affiliate in a foreign country and continues exporting to the same country. The latter case can happen if a parent company supplies intermediate goods to its affiliates (the mechanism explored by Irarrazabal et al., 2013).

Table 3. Distribution of export entries by region of destination and year

Year	North America	South America	Asia	Middle East	Europe	Oceania	Africa
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1995	507	257	1006	231	505	290	200
1996	272	159	544	136	278	136	89
1997	236	125	446	104	237	129	61
1998	277	142	443	111	251	120	79
1999	295	145	499	128	273	197	97
2000	321	150	602	121	294	163	84
2001	279	137	505	129	260	129	96
2002	259	110	521	128	240	149	96
2003	263	118	543	111	248	138	84
2004	312	166	718	125	358	155	84
2005	267	153	537	120	246	148	91
2006	224	128	469	132	236	135	85
2007	283	170	542	144	283	149	91
2008	281	137	620	135	265	145	74
2009	348	..	648	174	310	..	..
2010	295	..	639	166	301	..	..
2011	284	..	562	135	288	..	..
2012	259	..	578	131	258	..	..
2013	271	..	478	139	256	..	..
2014	248	..	483	128	227	..	..
2015	221	..	384	124	198	..	..
2016	189	..	314	126	197	..	..
2017	178	..	317	125	196	..	..
2018	179	..	299	102	188	..	..
Total	6,548	2,097	12,697	3,205	6,393	2,183	1,311

Source: Based on micro data presented in section 4.

We identify export entry ($\mathrm{ExportEntry}_{f,r,t}$) by firm f in region r at time t from the basic survey for which we have data for the period of 1994–2018. $\mathrm{ExportEntry}_{f,r,t}$ is equal to 1 if firm f reports positive exports to region r in year t and zero exports in years t-1 and t-2. This definition allows us to use the maximum information from our data.[8]

The distribution of export entries by years and regions according to our definition is given in table 3. The intensity of export entry is considerably higher than that of FDI entry. Asia has been the market that attracted the most export entries by Japanese firms in this period. Europe and North America had about the same number of export entries.[9]

Our point is that FDI entry is typically preceded by exports rather than vice versa which, at least partially, help firms reveal foreign market uncertainties. Table 4 presents the total annual numbers of FDI entries with prior export experience in the corresponding region as well as the annual total numbers of export entries with prior FDI experience in the corresponding region.

Table 4 shows that, FDI entry occurred after some export experience for at least 68.5 per cent of cases, which suggests that this is an important feature of Japanese MNEs behaviour.[10] Thus, we note that the mechanism of learning-by-exporting is likely to play an important role for Japanese outward FDI activity. Export entry with previous FDI is observed in only 18.7 per cent of cases in our sample. This pattern, although negligible, may arise for a number of reasons. The parent can enter one country in the region to serve the local market through affiliate sales and then start to export to another country in the region. Alternatively, the parent may start supplying intermediate goods to its affiliate after the FDI entry. The latter behaviour of MNEs was examined by Irarrazabal et al. (2013).

Export experience

We identify export experience as the number of years after the export entry. It accumulates if a firm continues to export. If it does not export for two years consecutively after export entry (in year t), we record export experience as one and two in the years after export entry (t + 1 and t + 2), and as zero after two

[8] Several definitions have been used in the literature. For instance, Eaton et al. (2008) used one year of no exports, Conconi et al. (2016) used five years of no exports before positive exports in year t.

[9] The question about exports to South America, Oceania and Africa was removed from the survey in 2009. Thus, we are not able to identify export entry into these regions since then. Since we have a total of 277 FDI entries reported for these regions for a period of 2009–2018, we can only expect a downward bias in our estimations of FDI entry with previous exports.

[10] This number is lower than the corresponding number for Belgium – 85.9 per cent – reported by Conconi et al. (2016). At the same time it is much higher than the numbers reported in Gumpert et al. (2020) for Norway (49 per cent) and France (15 per cent at the affiliate level).

consecutive years of no export activity (in year $t + 3$). It is plausible to assume that upon export entry a firm adjusts its expectations about local market demand and costs (uncertainty), and this information is not outdated for at least the two next years. Using the data on export experience we identify three cases and define variable Experience0 as zero years of exports experience prior to FDI entry, Experience12 as one to two years of export experience prior to FDI entry, and Experience3plus as three or more years of export experience prior to FDI entry.

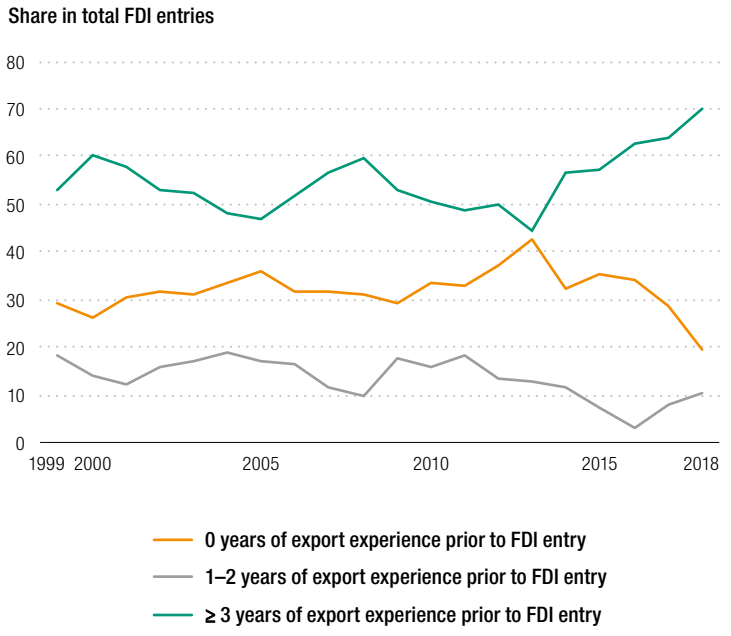
Table 4. Dynamics of FDI and export activity

Year	FDI entries	FDI entries with previous exports	Share of FDI entries with previous exports	Export entries	Export entry with previous FDI	Share of export entries with previous FDI
	(1)	(2)	(3)	(4)	(5)	(6)
1995	773	525	0.679	2,996	469	0.157
1996	595	420	0.706	1,614	226	0.140
1997	458	356	0.777	1,338	233	0.174
1998	250	199	0.796	1,423	256	0.180
1999	242	172	0.711	1,634	329	0.201
2000	353	261	0.739	1,735	295	0.170
2001	421	293	0.696	1,535	235	0.153
2002	571	391	0.685	1,503	239	0.159
2003	526	364	0.692	1,505	355	0.236
2004	499	333	0.667	1,918	477	0.249
2005	471	302	0.641	1,562	289	0.185
2006	360	246	0.683	1,409	239	0.170
2007	368	251	0.682	1,662	338	0.203
2008	301	208	0.691	1,657	441	0.266
2009	217	153	0.705	2,893	419	0.145
2010	342	228	0.667	1,740	404	0.232
2011	480	323	0.673	1,483	341	0.230
2012	533	336	0.630	1,465	393	0.268
2013	355	203	0.572	1,393	268	0.192
2014	219	149	0.680	1,313	251	0.191
2015	152	98	0.645	1,202	149	0.124
2016	128	84	0.656	1,027	159	0.155
2017	88	63	0.716	1,014	156	0.154
2018	57	46	0.807	953	141	0.148
Total	8,759	6,004	0.685	37,974	7,102	0.187

Source: Based on micro data presented in section 4.

Figure 3 presents the distribution of FDI entries given export experience at the time when foreign affiliates are established. Note that the share of FDI entries with three or more years of experience is high. A relatively small number of FDI entries with one to two years of experience suggests that that length of time may not be enough to reveal foreign market uncertainty. Japanese MNEs prefer to export for a longer period prior to entering into FDI. Given our data availability and definition of export entry, we focus on the period 1999–2018 in our empirical analysis to avoid the left-censoring problem.[11]

Figure 3. Evolution of FDI entries with export experience (Per cent)



Source: FDI survey. For details see table 1.

In our alternative estimation in section 7 we use cumulative exports, $\text{Log(Cumulative exports)}_{f,r,t}$, for 3, 5 and 10 years prior to FDI entry to measure the intensive margin effect on the decision of Japanese firms.

[11] As the basic survey reports export data starting from 1994, we cannot identify export experience for one to four years prior to 1999 without a downward bias.

Gravity variables

Our key gravity variable is physical distance. The main hypothesis and theoretical intuition discussed in section 6.1 imply that distance is the most appropriate proxy for trade costs. Longer distance may impede firms' ability to identify the uncertainty of foreign market demand and costs as it becomes costly to learn through exports. To this end, trade literature suggests that distance can capture various trade barriers and frictions, including not only transportation costs but also costs of communication, cultural distance, historic ties and other geographic factors (see, for example, Head and Mayer, 2013).

We use population-weighted distance from Japan to FDI host country c, $\log(\text{Dist}_c)$, in the country-level analysis. In the region-level analysis, we define the population-weighted distance between Japan and the region r as $\log(\text{Dist}_r) = (\sum_{c \in r} \text{Population}_c \times \text{Dist}_c) / \sum_{c \in r} \text{Population}_c$. In this definition we follow the traditional gravity trade literature (e.g. Head et al,. 2010; Head and Mayer, 2014).[12]

We also use real GDP as a proxy for market size, $\log(\text{RealGDP}_c)$ and $\log(\text{RealGDP}_r)$. To control for the effect of trade and economic partnership agreements we use weighted average tariff, $\text{Tariff}_{c,t}$ ($\text{Tariff}_{r,t}$), applied to imports from Japan by country c (region r) in year t. First, we collect two-digit SITC1 (Standard International Trade Classification section 1) applied tariffs and imports from the UNCTAD TRAINS database. Second, we compute the average import-weighted tariff. This allows us to take into consideration Japan's effort to liberalize trade that started in the 2000s and accelerated in the 2010s.

Firm-level variables

Firm-level controls are total employment, $\log(\text{Emp}_{f,t})$, and labour productivity, $\log(\text{Prod}_{f,t})$. Labour productivity is calculated as the value added divided by total employment. Value added is defined as the difference between sales and intermediate inputs.[13] We also include imports from Japan by firm f's affiliates, $\log(\text{ImportJP}_{f,c,t})$, to control for a channel of intermediate inputs trade emphasized in Irarrazabal et al. (2013). Finally, to control for FDI activity prior to the start of our analysis period, we use a dummy variable, $\text{FDIbefore1995}_{f,c}$.

[12] As this measure contains population data it could reflect market potential as well. We believe that market potential in our case would be proxied by population or GDP of the region. As our analysis goes inside the region the most populated nations obtain a bigger weight in the trade costs measure.

[13] 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).

5. Effect of distance on FDI activities of Japanese firms

How do trade costs affect outward FDI activities of manufacturing MNEs? To answer this question, we estimate the following model:

$$Y_{f,c,t} = \beta_0 + \beta_1 \, log(Dist_c) + \theta_1 \, log(RealGDP_{c,t}) + \boldsymbol{\mu}\mathbf{X}_{\mathbf{f,t}} + u_f + \eta_t + \varepsilon_{f,c,t}, \quad (1)$$

where $Y_{f,c,t}$ represents FDI activity measured by either $\text{AfSales}_{f,c,t}$, or $\text{FDIStock}_{f,c,t}$, or $\text{FDIFlows}_{f,c,t}$, while $\text{X}_{f,t}$ are firm-level controls. Our main interest is to identify the sign effect of distance on FDI activities. We include firm fixed effects, u_f, to capture firm-level heterogeneity and year fixed effects, η_t, to capture the time trend. We estimate the model by a high-dimensional fixed effects method (Guimaraes and Portugal, 2010).

Table 5. Effect of distance on FDI activity for all MNEs.

	Affiliate sales	FDI stock	FDI flows	Affiliate sales	FDI stock	FDI flows
	(1)	(2)	(3)	(4)	(5)	(6)
log(Dist)	-0.151*** (0.038)	-0.241*** (0.038)	-0.682*** (0.119)	-0.074 (0.046)	-0.162*** (0.044)	-0.481*** (0.138)
log(RealGDP)	0.265*** (0.018)	0.212*** (0.020)	0.723*** (0.058)	0.194*** (0.022)	0.247*** (0.024)	0.813*** (0.070)
log(ImportJP)	0.742*** (0.014)	0.089*** (0.008)	0.240*** (0.019)	0.730*** (0.018)	0.062*** (0.009)	0.176*** (0.024)
log(Emp)	0.033 (0.110)	0.064 (0.046)	-0.059 (0.070)	0.024 (0.139)	0.081 (0.054)	0.160* (0.083)
log(Prod)	-0.032 (0.056)	-0.017 (0.022)	0.013 (0.044)	-0.050 (0.069)	-0.012 (0.028)	0.006 (0.050)
Observations	86,928	85,746	83,884	66,105	64,988	63,766
FDI entry year	>1995	>1995	>1995	>1995	>1995	>1995
FDI type	All	All	All	Horizontal/ Platform	Horizontal/ Platform	Horizontal/ Platform
R-squared	0.587	0.571	0.054	0.577	0.576	0.052
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Source: Based on micro data presented in section 4.
Note: High-dimensional fixed-effect method. Robust standard errors in parenthesis.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.

First, we consider the full sample that includes all MNEs. The results are presented in table 5. Columns 1, 2 and 3 report the results for all types of FDI. Columns 4, 5 and 6 report the results for horizontal and platform-type FDI.

In the results in table 5, we observe a negative and consistent effect of distance on Japanese MNEs' outward FDI activity.[14] The magnitude of this effect is the strongest for FDI flows. Thus, we confirm that distance plays an important role in shaping outward FDI activities of Japanese MNEs. Previous research also emphasized this effect. For instance, Matsuura and Sato (2014) reported a negative effect of distance on total FDI sales and the number of firms at the destination using the same survey data for the period of 1995–2006.

Table 6. Effect of distance on FDI activity for MNEs with export experience

	Affiliate sales	FDI stock	FDI flows	Affiliate sales	FDI stock	FDI flows
	(1)	(2)	(3)	(4)	(5)	(6)
log(Dist)	-0.122**	-0.296***	-0.815***	-0.009	-0.224***	-0.661***
	(0.048)	(0.052)	(0.162)	(0.058)	(0.058)	(0.176)
log(RealGDP)	0.296***	0.229***	0.767***	0.204***	0.271***	0.853***
	(0.023)	(0.027)	(0.077)	(0.028)	(0.031)	(0.087)
log(ImportJP)	0.735***	0.099***	0.280***	0.706***	0.066***	0.179***
	(0.017)	(0.009)	(0.022)	(0.021)	(0.011)	(0.028)
log(Emp)	-0.017	0.099*	0.005	-0.037	0.153**	0.051
	(0.140)	(0.058)	(0.089)	(0.174)	(0.067)	(0.093)
log(Prod)	-0.001	-0.007	0.013	-0.020	-0.011	0.025
	(0.068)	(0.027)	(0.055)	(0.083)	(0.036)	(0.063)
Observations	57,980	57,379	55,993	45,739	45,168	44,136
FDI entry year	>1995	>1995	>1995	>1995	>1995	>1995
FDI type	All	All	All	Horizontal/ Platform	Horizontal/ Platform	Horizontal/ Platform
R-squared	0.595	0.553	0.061	0.582	0.568	0.056
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Source: Based on micro data presented in section 4.
Note: High-dimensional fixed-effect method. Robust standard errors in parenthesis.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.

[14] Other control variables have the expected signs. GDP and imports from Japan are positive and significant. The size and productivity of the parent are not statistically significant.

Second, we examine the sample of firms with FDI activities that were preceded by exports to the region where country c belongs. This is a focus of our attention as it estimates the effect of distance on outward FDI activities of Japanese MNEs that established an affiliate after serving the market by exports. The estimation results are presented in table 6.

As we can see, the effect of $\log(Dist_c)$ is negative in all estimations. We also control for MNE productivity, which is one of the channels for explaining MNEs' outward FDI activity, as emphasized in Helpman et al. (2004), as well as for intermediate inputs trade from parent to affiliates (Irarrazabal et al., 2013). The effect of distance remains significant. In sum, we confirm that trade costs have a negative effect on FDI activity of MNEs, subject to previous export experience. The next section examines the effect of trade costs on the decision to enter a foreign market.

6. Trade costs and probability of FDI entry by Japanese firms: empirical evidence

In this section we test our main hypothesis that trade costs negatively affect FDI entry decisions subject to previous export experience.

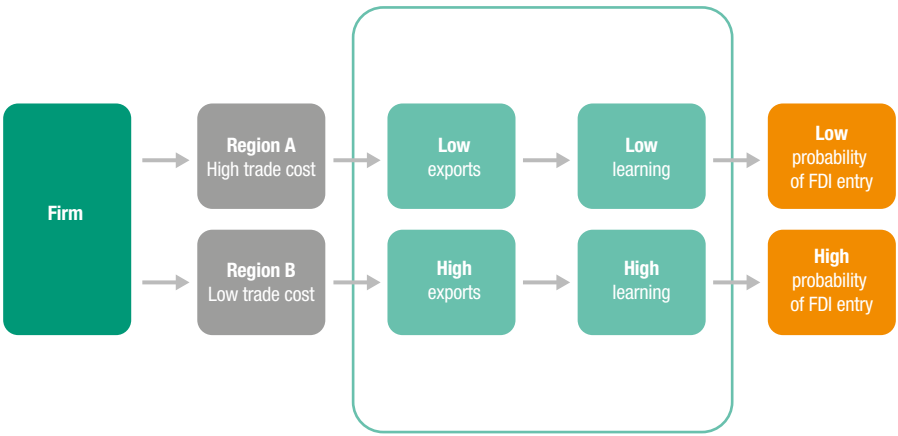
6.1. Trade costs and probability of FDI entry

We suggest the following intuition to explain the negative effect of trade costs on FDI entry. Consider a domestic firm producing one good that seeks to serve foreign markets. The decision to expand internationally has already been made. The firm starts by exporting to foreign country A, or foreign country B, or both countries. Before trading, the firm has prior beliefs about local conditions (demand and costs) in the foreign countries. After observing actual sales, the firm updates its prior beliefs about the foreign conditions. Given its beliefs, the firm can calculate the expected sales in each country. If the expected sales are high enough, the firm establishes an affiliate in the corresponding country to produce there and to serve the local market. Assume that the sales distributions in A and B are such that if the firm knows them, it establishes an affiliate in both countries.

Now, suppose that in the beginning, the firm starts trading with both countries, and for several time periods it gets the same sequence of low sales in both countries. Assume that this sequence is such that the firm decides to stop serving B (because of high iceberg costs), but it continues serving A. Suppose that after that the firm gets a sequence of high sales in country A and based on these observations it decides to establish an affiliate in A. So, we end up in a situation where the firm enters country A through FDI and never learns that FDI in country B is also profitable.

Given the discussion above, we conjecture that subject to export experience, the probability of FDI is lower when trade costs are higher. Figure 4 summarizes the core relationships in our investigation. The following empirical analysis tests this hypothesis.

Figure 4. Core relationship in the investigation



Sources: Authors' design.

6.2. Probability of FDI entry and export experience

We estimate the proportional hazard model (Cox, 1972). This is a semiparametric model that assumes a common baseline hazard for all subjects. Thus, the likelihood of FDI entry depends on our variables of interest and it is not affected by the timing of FDI entry. We estimate two models:

$$h(t) = h_0(t)\exp\{\beta_1 Experience12_{f,r,t} + \beta_2 Experience3plus_{f,r,t} + v_r\}, \quad (2)$$

and

$$h(t) = h_0(t)\exp\{\beta_1 Experience12_{f,r,t} + \beta_2 Experience3plus_{f,r,t} + \beta_3 \log(\text{Dist}_r) + \delta_1 \log(\text{RealGDP}_{r,t}) + \delta_2 \text{tariff}_{r,t} + \boldsymbol{\mu}\mathbf{X}_{f,t} + v_r\} \quad (3)$$

The model given by (2) aims to reveal regional export experience effect on the probability of FDI entry in the host country. We estimate this model for the first FDI entry in country c of region r. As explained earlier, we may have multiple FDI entries in a region.

Therefore, we allow for multiple "failures" in our survival analysis estimation. Our data set comprises all exporters that were active in the period 1998–2018. We include regional fixed effects (v_r) where possible.[15]

In the model given by (3), we would like to focus on the effect of distance on the probability of FDI entry by firm f in country c of region r given export experience of firm f in region r. Variables $\mathbf{X}_{f,t}$ include firm-level controls such as productivity and employment. The main results of our estimation are reported in table 7.

Columns 1 and 2 report the results of the estimation of model (2), while columns 3 and 4 report the results for model (3). Column 5 provides the results of the estimation of the model similar to (3), but with the interaction terms of distance and exports experience instead of $log(Dist_r)$ and with region fixed effects.

The results suggest that export experience has a positive effect on the likelihood of FDI entry. Moreover, longer experimentation increases the probability of FDI entry ($\beta_2 > \beta_1$ in all columns). As expected, distance has a negative and significant effect on the probability of FDI entry. These results confirm that export experience positively affects the probability of FDI entry due to the learning-by-exporting mechanism. The uncertainties in a foreign market are likely to play an important role in Japanese MNEs' outward FDI activity. Conconi et al. (2016) findings for Belgian firms showed the same pattern – export experience decreases uncertainty and increases the probability of FDI. In this regard our work also complements Chen et al. (2021), which emphasized the learning-by-exporting mechanism using the same data as we use. Trade costs, however, decrease the probability of FDI entry. Our hypothesis suggests that it becomes costly to experiment in foreign markets by exporting. Thus, Japanese firms may exit a market before they discover that it is profitable to establish a foreign affiliate there.[16] As a robustness check, we estimated this model with an alternative definition of FDI entry and export experience (i.e., for one to four years and five or more years) as well as with an alternative survival analysis method. The results are qualitatively the same. They are reported in Appendix A in appendix tables A1–A4.

[15] Ideally, we would like to estimate our model at the firm-country-year level. However, the data are not available. We can potentially deal with this situation by assigning the same export experience to all countries in the region. Assume a firm exports to one country, and it learns about all countries in the region from exports to one country. In such a case, exports to the region are identical to exports to all counties of that region. When we estimate the model at the firm-country-year level, we look whether it increases the probability of FDI in each country. For the country where the firm exports, export experience increases the probability of FDI, however for those countries of the same region where the firm does not export the effect is potentially negative. The overall effect is insignificant or negative. Therefore, we cannot disaggregate to the firm-country-year level if we do not know where the firm exported. Indeed, when we did the estimation, that is what we found.

[16] Control variable coefficients are of the expected signs. Market size, tariffs, firm productivity and firm size have positive and significant effects on the probability of FDI entry.

Table 7. Cox regression model, country level FDI entry

	Model				
	(1)	(2)	(3)	(4)	(5)
Experience12	0.648*** (0.076)	0.400*** (0.075)	0.458*** (0.075)	0.329*** (0.081)	3.598*** (0.914)
Experience3plus	1.122*** (0.046)	0.735*** (0.046)	0.833*** (0.046)	0.410*** (0.048)	1.836** (0.823)
log(Dist)			-1.577*** (0.046)	-1.555*** (0.045)	
log(Dist) x Exp12					-0.377*** (0.105)
log(Dist) x Exp3plus					-0.163* (0.094)
log(Prod)				0.202*** (0.033)	0.201*** (0.033)
log(Emp)				0.509*** (0.013)	0.507*** (0.012)
log(RealGDP)				0.634*** (0.026)	
Tariff				0.078*** (0.003)	
Observations	446,355	446,355	427,562	385,588	389,811
Region fixed effects	No	Yes	No	No	Yes
FDI entries	5,811	5,811	5,811	5,349	5,362
Log likelihood	-57,313	-55,173	-55,693	-48,934	-48,815

Source: Based on micro data presented in section 4.
Note: Cox regression models. Robust standard errors in parenthesis.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.

7. Alternative estimation strategy

The proportional hazard model estimated in the previous section has a problem: we assume that hazard functions for different firms are proportional over time. Therefore, in this section we examine our estimates of the trade costs effect on FDI entry decisions using an alternative model, a probit model with random effects, given by the specification

$$\begin{aligned} &Prob[FDIEntry_{f,c,t}] \\ &= \beta_1 log(Cumulative\ exports)_{f,r,t} + \beta_2 \log(Dist_c) + \delta_1 \log(RealGDP_{c,t}), \\ &+ \delta_2 \text{tariff}_{c,t} + \boldsymbol{\mu}\mathbf{X}_{f,t} + \varepsilon_{f,c,t}, \end{aligned} \tag{4}$$

where $FDIEntry_{f,c,t}$ is a dummy equal to 1 if firm f established a foreign affiliate in country c for the first time. To control for export experience, we use cumulative exports for 3, 5, and 10 years prior to export entry, $\log(\text{Cumulative exports})_{f,r,t}$. At the country level, we control for the real GDP of country c, $\log(RealGDP_{c,t})$, and tariffs applied to imports from Japan by country c, $\text{tariff}_{c,t}$. $\mathbf{X}_{f,t}$ is a list of controls that includes firm-level characteristics, i.e., employment of parent firm f, $log(Emp_{f,t})$, and labour productivity of parent firm f, $\log(Prod_{f,t})$. We also control for firm f's FDI in a country before 1995, $\text{FDIbefore1995}_{f,c}$. Finally, our key variable of interest is the distance between Japan and country c, $\log(Dist_c)$.

Each firm has an option to establish a foreign affiliate in 138 countries in year t.[17] We include all pairs of firm-countries even if we observe zero FDI and zero exports. Thus, we interpret zero FDI and exports as information about Japanese MNEs' behaviour.[18] We use a probit model with random effects to estimate specification (4).

The results are presented in table 8. Column 1 reports our benchmark regression. GDP, which is a measure of market potential, as well as firm size and firm labour productivity have positive impacts on the probability of FDI entry. Applied tariffs positively affect the probability of FDI entry. We conjecture that this effect is driven by the tariff-jumping mechanism. An increase in tariffs, ceteris paribus, makes exports relatively more expensive, and Japanese firms are more likely to establish FDI to serve the foreign market. As expected, FDI in a country before 1995 is negatively and significantly associated with FDI entry.

[17] We also experimented with an alternative approach by observing firms at the moment of FDI entry or the final year a firm appeared in the survey. We included an observation for a firm for the first year when it engaged in FDI. If the firm never did so, we included an observation for this firm in the year when this firm appeared in the survey for the last time. The firm also has an option to establish a foreign affiliate in 138 countries. Thus, the firm decides about FDI entry in country c once in its life cycle. We estimated model 4 using logit and probit with random effects models. They are identical to the ones presented in the main text and are available upon request.

[18] We end up with 27,137,315 observations. The smaller number of observations in the reported results is due to missing observations for some of the explanatory variables.

Our key variable of interest, i.e., distance, negatively affects the probability of FDI entry. Trade costs decrease the likelihood of FDI entry by Japanese MNEs. Moreover, as reported in columns 2, 3 and 4 in table 8, the coefficients of previous export experience measured by cumulative exports for 3, 5, and 10 years are positive and significant. Thus, we document that, despite controlling for export experience, distance continues to have a significant and negative impact on the probability of FDI entry. The magnitude of the coefficient decreases only slightly changes if we compare column 1 and columns 2, 3 and 4. By and large, we conclude that an increase in trade costs decreases the probability of FDI entry subject to previous export experience, which confirms our hypothesis and can be rationalized by the logic provided in section 6.1.

Table 8. Probit with random effects model, country-level FDI entry

	Model			
	(1)	(2)	(3)	(4)
log(Dist)	-0.394*** (0.005)	-0.357*** (0.005)	-0.357*** (0.005)	-0.357*** (0.005)
log(RealGDP)	0.195*** (0.003)	0.194*** (0.003)	0.194*** (0.003)	0.194*** (0.003)
Tariff	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
log(Emp)	0.214*** (0.003)	0.167*** (0.004)	0.167*** (0.004)	0.168*** (0.004)
log(Prod)	0.064*** (0.009)	0.035*** (0.009)	0.035*** (0.009)	0.035*** (0.009)
FDIbefore1995	-1.637*** (0.138)	-1.695*** (0.137)	-1.692*** (0.137)	-1.687*** (0.137)
log(CumulativeExports)		0.032*** (0.001)	0.031*** (0.001)	0.029*** (0.001)
Constant	-6.490*** (0.099)	-6.580*** (0.099)	-6.582*** (0.099)	-6.575*** (0.099)
Observations	15,921,417	15,921,417	15,921,417	15,921,417
Cumulative exports		3 years before FDI entry	5 years before FDI entry	10 years before FDI entry
Log likelihood	-40,853	-40,446	-40,455	-40,494

Source: Based on micro data presented in section 4.
Note: Probit regression models. Robust standard errors in parenthesis.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.

8. Conclusions and policy recommendations

In this paper, we address the question of why FDI falls with distance, conditional on export activity in the foreign country. We suggest that the learning-by-exporting mechanism plays an important role in Japanese MNEs' behaviour, and we attempt to detach it from other effects. MNEs reveal uncertainty about the foreign market through exports and update their beliefs about the expected profitability. However, distance increases trade costs and may increase the cost of experimentation through exporting. This can lead to a decrease in FDI.

We uncover the dynamics of FDI and exports from Japan's micro data for the period of 1995–2018 and show that FDI entry occurs after experimentation with exports in a considerable number of cases (about 68.5 per cent). We also confirm the negative effect of distance on Japanese firms' outward FDI activity, including for a subset of firms that were engaged in exports prior to FDI entry. Finally, we show that export experience increases the probability of FDI entry. Distance negatively affects the likelihood of Japanese MNEs' FDI entry subject to previous export experience.

The results of our analysis show that trade costs play an important role in the decision to serve foreign markets. Given these findings, policymakers should consider a number of important issues when they design policies in regard to trade and FDI.

First, a policy that aims at facilitating trade through regional trade agreements or another type of partnership creates an environment in which firms can experiment in the foreign market for a longer period of time. Thus, there is a higher probability that they will realize the high potential of demand and will decide to serve the market through FDI. This is an outcome that is beneficial for both countries that participate in the trade agreement.

Second, a policy that creates a better environment for foreign firms or an FDI agreement between countries creates a higher option value of exports and indirectly induces more trade between countries. Firms may attempt to serve the market through exports and if the revealed demand potential is high, they will have less difficulty in establishing an affiliate there.

Thus, we can talk about the magnifying effect of trade or FDI agreements between countries as they will promote both trade and FDI. Nevertheless, as our results suggest, trade promotion does not fully translate to increased FDI because of remaining trade barriers – proxied by physical distance – even after we control for export experience. Therefore, trade and FDI promotion policies should complement each other.

Third, services have become an important driver of economic growth. Given our results we can conjecture that facilitating trade in services may lead to an increase in FDI in services, and consequently higher potential for economic growth.

We acknowledge that our study has some limitations. For instance, from the empirical point of view, due to data limitations, we observe exports to regions although FDI entry happens at the country level. Thus, we assume that a firm reveals market uncertainty in a country by exporting to a region. Unfortunately, given our data, we cannot make a weaker assumption. We rationalize this assumption by suggesting that a firm intending to establish an affiliate in a country prefers to experiment by exporting to this country rather than to any other country in the same region.

Despite these limitations we believe that our study provides strong support for the hypothesis of the importance of trade costs in shaping the probability of FDI entry in the presence of the learning-by-exporting mechanism. It remains on our agenda to deal with the limitations of our study in order to further our understanding of MNEs' behaviour.

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Appendix. Robustness checks

As a robustness check, we experimented with alternative survival models and definitions. One problem with the Cox regression model is that it is computationally challenging to include firm-level fixed effects. Therefore, we run a piecewise exponential survival model with mixed effects. The results are presented in appendix table 1.

In addition, we estimate the model using an alternative definition of FDI entry. We consider only the first FDI entry to a region rather than multiple FDI entries. After an FDI entry to a region happened, we stop tracking the firm in survival analysis. The results are presented in appendix tables 2 and 3. They are identical to the estimation in which we consider multiple FDI entries to a region.

Finally, we estimate equations (2) and (3) using an alternative split of export experience, i.e., export experience for one to four years ($experience14$) and experience for five and more years ($experience5plus$). The results are reported in appendix table 4, and are identical to the ones reported in the main text. In particular, distance has a negative effect on the probability of FDI entry. These results provide additional evidence that trade costs play a key role in shaping outward FDI activity even when we control for the learning-by-exporting effect.

Appendix table 1. Piecewise exponential survival model with mixed effects, country-level FDI entry

	Model				
	(1)	(2)	(3)	(4)	(5)
Experience12	0.895*** (0.078)	0.529*** (0.079)	0.606*** (0.078)	0.519*** (0.079)	2.980** (1.347)
Experience3plus	0.870*** (0.074)	0.320*** (0.078)	0.435*** (0.075)	0.309*** (0.078)	1.469 (1.268)
log(Dist)			-1.824*** (0.070)	-1.514*** (0.072)	
log(RealGDP)				0.430*** (0.037)	
Tariff				0.104*** (0.009)	
log(Dist) x Exp12					-0.284* (0.155)
log(Dist) x Exp3plus					-0.131 (0.145)
Constant	-6.029*** (0.073)	-6.779*** (0.107)	10.113*** (0.616)	-5.979*** (1.543)	-6.695*** (0.119)
Observations	191,923	191,923	191,923	191,923	191,923
Number of groups	8,090	8,090	8,090	8,090	8,090
Region fixed effects	No	Yes	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Log likelihood	-9,570	-8,941	-9,108	-9,056	-8,939

Source: Based on micro data presented in section 4.
Note: Piecewise exponential survival regression models. Robust standard errors in parenthesis. Constant omitted.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.

Appendix table 2. Cox regression model, region-level FDI entry

	Model				
	(1)	(2)	(3)	(4)	(5)
Experience12	0.601*** (0.109)	0.455*** (0.108)	0.505*** (0.109)	0.420*** (0.114)	2.411* (1.243)
Experience3plus	0.640*** (0.060)	0.380*** (0.061)	0.479*** (0.061)	0.244*** (0.066)	0.446 (1.140)
log(Dist)			-1.078*** (0.056)	-0.996*** (0.057)	
log(Dist) x Exp12					-0.226 (0.140)
log(Dist) x Exp3plus					-0.023 (0.129)
log(Prod)				0.146*** (0.046)	0.155*** (0.046)
log(Emp)				0.176*** (0.017)	0.183*** (0.017)
log(RealGDP)				0.385*** (0.030)	
Tariff				0.037*** (0.007)	
Observations	405,645	405,645	386,852	349,030	353,241
Region fixed effects	No	Yes	No	No	Yes
FDI entries	1,977	1,977	1,977	1,813	1,825
Log likelihood	-19,578	-19,088	-19,232	-17,317	-17,365

Source: Based on micro data presented in section 4.
Note: Cox regression models. Robust standard errors in parenthesis.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.

Appendix table 3. Piecewice exponential survival model with mixed effects, region-level FDI entry

	Model				
	(1)	(2)	(3)	(4)	(5)
Experience12	0.895*** (0.078)	0.529*** (0.079)	0.606*** (0.078)	0.519*** (0.079)	2.980** (1.347)
Experience3plus	0.870*** (0.074)	0.320*** (0.078)	0.435*** (0.075)	0.309*** (0.078)	1.469 (1.268)
log(Dist)			-1.824*** (0.070)	-1.514*** (0.072)	
log(RealGDP)				0.430*** (0.037)	
Tariff				0.104*** (0.009)	
log(Dist) x Exp12					-0.284* (0.155)
log(Dist) x Exp3plus					-0.131 (0.145)
Constant	-6.029*** (0.073)	-6.779*** (0.107)	10.113*** (0.616)	-5.979*** (1.543)	-6.695*** (0.119)
Observations	191,923	191,923	191,923	191,923	191,923
Number of groups	8,090	8,090	8,090	8,090	8,090
Region fixed effects	No	Yes	No	No	Yes
Log likelihood	-9,570	-8,941	-9,108	-9,056	-8,939

Source: Based on micro data presented in section 4.
Note: Piecewice exponential survival regression models. Robust standard errors in parenthesis. Constant omitted.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.

Appendix table 4. Cox regression model, country-level FDI entry

	Model				
	(1)	(2)	(3)	(4)	(5)
Experience14	0.054 (0.064)	-0.049 (0.063)	-0.022 (0.063)	-0.079 (0.068)	2.303*** (0.747)
Experience5plus	0.957*** (0.041)	0.608*** (0.041)	0.699*** (0.042)	0.281*** (0.044)	0.895 (0.689)
log(Dist)			-1.605*** (0.046)	-1.564*** (0.045)	
log(Dist) x Exp14					-0.274*** (0.086)
log(Dist) x Exp5plus					-0.070 (0.080)
log(Prod)				0.201*** (0.033)	0.200*** (0.033)
log(Emp)				0.511*** (0.013)	0.509*** (0.012)
log(GDP)				0.647*** (0.026)	
Tariff				0.078*** (0.003)	
Observations	446,355	446,355	427,562	385,588	389,811
Region fixed effects	No	Yes	No	No	Yes
FDI entries	5,811	5,811	5,811	5,349	5,362
Log likelihood	-57,416	-55,209	-55,742	-48,952	-48,836

Source: Based on micro data presented in section 4.
Note: Cox regression models. Robust standard errors in parenthesis.
*, **, *** indicate significance at the 10, 5, and 1% level, respectively.