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Brexit and the location of Japanese direct investment in European regions

Andrzej Cieślik
University of Warsaw, Poland

Michael Ryan
Western Michigan University, USA

Abstract

This paper investigates how the Brexit announcement affects Japanese direct investment into Europe at the regional NUTS-2 level. Political and economic uncertainty is an important factor affecting the economic performance of a country and its regions. In this study, Japanese annual firm-level data between the years 2000 and 2018 for 31 European countries is used. Negative binomial estimations indicate a significant negative relationship between uncertainty associated with the Brexit announcement and Japanese foreign direct investment (FDI) in the UK regions. Strong FDI path dependence currently acts to dampen this effect. However, depending upon future European Union Single Market access rules, such path dependence could act to magnify Brexit's effect on inward-UK FDI.

JEL Classification Codes: F23, R12.

Keywords

Brexit, Japanese direct investment, NUTS-2 regions, uncertainty

Introduction

This paper examines the impact of the Brexit announcement and subsequent uncertainty on Japanese foreign direct investment (FDI) into Europe. Beginning with the announcement of the British European Union Referendum Act of 2015, and the subsequent 2016 vote to leave the European Union (EU), UK politicians and policymakers have been concerned over the potential loss of inward FDI. Foreign investment provides the recipient with numerous benefits, ranging from increased employment and technology transfer to it being a catalyst for economic growth (Bitzer et al., 2008; Girma et al., 2008; Görg and Greenaway, 2004; UNCTAD, 2001). For the UK, these inward flows are substantial, as the United Nations Conference on Trade and Development (UNCTAD) has ranked it in the top four largest recipient counties for FDI stocks (accumulated inflows) since 1998. Since the mid-1980s, Japan has been one of the most important sources of UK inward FDI. In 2017, Japanese firms accounted for 29% of all inward-UK FDI inflows (UK Office of National Statistics, ONS).[1] Just as important, the ONS

Corresponding author:
Michael Ryan, Department of Economics, Western Michigan University, Kalamazoo, MI 49008, USA.
Email: michael.ryan@wmich.edu

indicates that in 2017 British firms that received FDI from Japan, as well as from South Korea and India, were "twice as productive as UK firms that received FDI from the US, on average."[2]

Business environment uncertainty is a critical determinant in FDI decision-making (Choi et al., 2020). The Brexit uncertainty that continues to hang over the UK economy affects foreign firms searching for a European location in which to invest. Even after Brexit, the UK remains one of the world's largest economies, an attractive market in which to invest in its own right. However, as EU membership has shown to raise inward FDI by about 28% (Bruno, et al., 2016), the loss of access to the EU Single Market and higher trade costs with the EU would likely decrease a UK-based foreign affiliate's ability to serve Europe in its entirety. While many Japanese firms appear content (for now) to stay in the UK (Faulconbridge and Pitas, 2019), companies like Toyota have recognized the likelihood of increasing trade and other business costs (e.g., coordination costs between a headquarters and manufacturing facilities due to migration controls and regulatory environments) and moved future production to the EU. Warsaw's Gazeta Wyborcza newspaper wrote, for example, that:

> [R]umors have circulated that Toyota will build additional lines in the United Kingdom. We have unofficially found out that Toyota has decided to make these investments in Poland because of the protracted uncertainty about the conditions for the United Kingdom to leave the EU.[3]

Driffield and Karoglou (2018) indicate that little is known about the effects of leaving a free-trade area or customs union since so few countries have done so. Much of the growing Brexit-related economics literature uses pre-Brexit vote data to predict its effect on inward-UK and EU FDI flows, and does so by inferring the negative effects of Brexit through estimating the positive effects of joining the EU (Welfens and Baier, 2018). Simionescu (2018) predicts the number of new FDI projects in the UK may fall by 65–90%, while Dhingra et al. (2016) suggest leaving the EU will reduce inward FDI flows by 22%. Varying Brexit effect predictions typically result from differing assumptions regarding UK-based firms' future access to the EU Single Market.

In contrast, we include post-announcement and post-vote data on Japanese firm-level FDI activity into Europe. Employing a dataset that extends to 2019, we can identify Brexit-related FDI decisions dating after the UK's decision to leave the EU. Our analysis controls for a variety of EU-host region and year-specific effects, and while our results confirm an already-felt negative impact of Brexit on inward FDI, we can identify how Brexit's impact will depend on future access to the EU Single Market.

Data and methodology

This paper examines the annual count of new Japanese FDI into Europe for the period 2000–2018 located in Toyo Keizai's *Overseas Japanese Companies* (OJC) database. For our study, we focus on the 5179 investments into 31 European countries (28 EU countries including the UK, plus Iceland, Norway, and Switzerland) that have occurred since 1970, 1691 of which were in 2000 or later. The OJC database provides detailed location information for each established affiliate from which we can determine its EU Nomenclature of Territorial Units for Statistics (NUTS) location. We focus on the NUTS-2 level, which Eurostat describes as the basic region for the application of regional policies. There are 281 NUTS-2 regions in the NUTS 2016 classification system, including those in non-EU members, with the OJC listing investments in 227 of these regions by 2019. To avoid selection bias, our analysis does include NUTS-2 regions for which no Japanese investment is recorded in the OJC database. Figure 1 identifies the location of Japanese FDI in Europe in our sample period.

Our dependent variable is the count of new investments, and is skewed toward several regions in the most developed European countries. Count model estimation is the appropriate econometric framework here, given the data's discrete non-negative integer values and preponderance of zeros. We base our modeling strategy on the negative binomial model, a generalization of the Poisson model, as it best enables us to address the common problem of over-dispersion present in the data. Moreover, the negative binomial model is a preferred choice to logit models when the number of alternatives is high

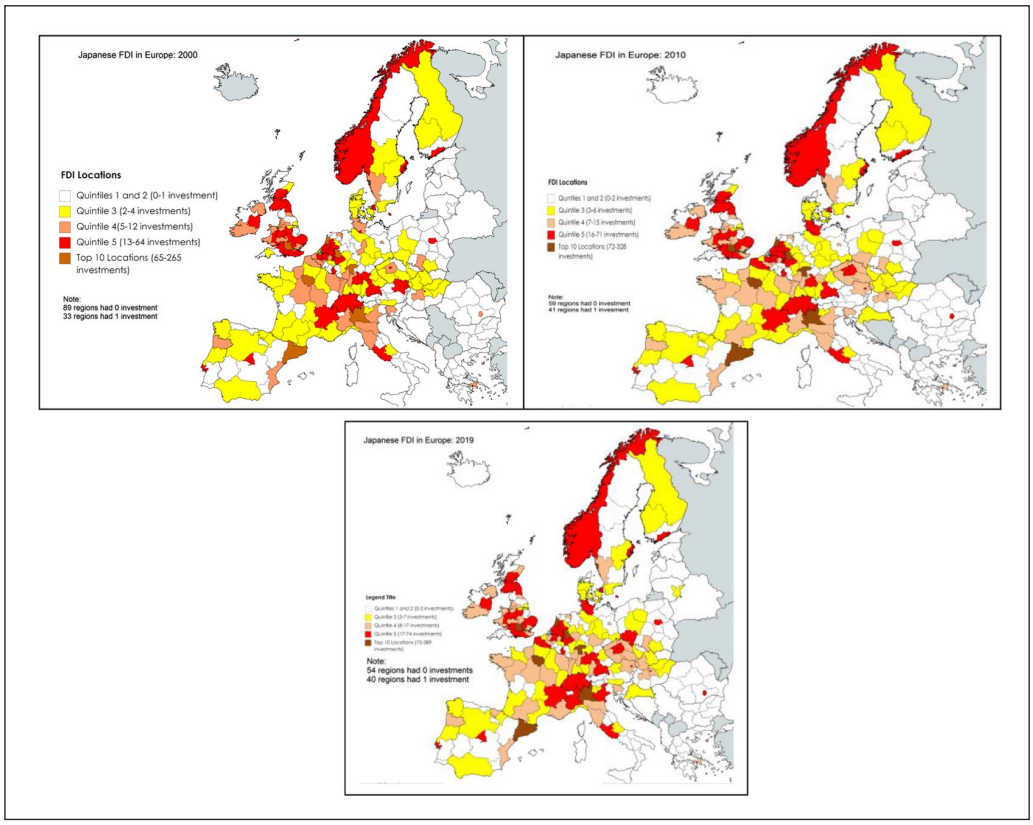

Figure 1. Japanese foreign direct investment (FDI) location choice in Europe: 2000, 2010, 2019.

(Arauzo et al., 2010; Guimarães et al., 2003; Schmidheiny and Brülhart, 2011).

We employ numerous NUTS-2 regional characteristics as our independent variables.[4] These variables, common in FDI location studies, include the region's geographic size, gross domestic product (GDP), population, infrastructure development, unemployment rate, and skilled labor force. We also include whether the region is in the EU-15 and has adopted the euro. Our relatively long time period means we can include agglomeration effects of previous FDI in a region to account for inertia in location choices of FDI. Moreover, we also take into account country-level characteristics, including its distance from Japan and its market potential (Harris, 1954), which measures the ability of firms in that country to serve the entire European market. Japanese firms have been shown to locate in countries with high economic potential, suggesting that the economic potential framework is more general, and thus preferred, to a standard gravity model specification (Cieślik and Ryan, 2004). In all estimated specifications we control for time-specific effects by including indicator variables for individual years. This is important, as we wish to isolate changes in locational-specific FDI inflows from the overall global decline in FDI flows identified during much of the latter half of our sample period.

Empirical results

Our empirical results are reported in Table 1. Column (1) reports our baseline results obtained from the specification in which we include only regional characteristics without controlling for agglomeration effects.

Column (1) indicates *Brexit* displays the expected negative sign and is significant at the 5% level. All

Table 1. Empirical results on Brexit and location choice of Japanese foreign direct investment.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Brexit	−0.579**	−0.511**	−0.449*	−0.496*	−0.478*	−0.634**	−0.520*
	(0.258)	(0.240)	(0.255)	(0.263)	(0.263)	(0.274)	(0.281)
Agglomeration		0.009***	0.008***	0.008***	0.008***	0.007***	0.007***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Land area	−0.002***	−0.002***	−0.003***	−0.003***	−0.003***	−0.002***	−0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.007***	−0.002**	0.002	0.002	0.002	0.003**	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population	0.027***	0.034***	0.023***	0.023***	0.022***	0.020***	0.020***
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)
Motorways	−0.050**	−0.026	0.039**	0.037*	0.045**	0.049**	0.055**
	(0.020)	(0.017)	(0.019)	(0.020)	(0.021)	(0.023)	(0.023)
Unemployment	−0.034**	−0.029***	−0.024**	−0.022**	−0.019*	−0.012	−0.010
	(0.011)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)
% Tertiary education	0.073***	0.058***	0.060***	0.059***	0.058***	0.062***	0.059***
	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
EU-15 member			−0.912***	−0.87***	−0.844***	−1.025***	−0.869***
			(0.127)	(0.139)	(0.141)	(0.154)	(0.175)
Euro				−0.072	−0.077	−0.093	−0.124
				(0.095)	(0.096)	(0.099)	(0.100)
Distance from Japan					−0.014	−0.003	−0.010
					(0.013)	(0.014)	(0.015)
Market potential						0.027***	
						(0.007)	
External market potential							0.033***
							(0.008)
Internal market potential							0.007
							(0.013)
Constant	−24.237	−22.531	−20.669	−21.139	−21.424	−5.031***	−4.679***
	(602.74)	(1108.196)	(401.15)	(502.295)	(845.882)	(.964)	(.973)
/lnalpha	−0.063***	−1.297***	−0.998***	−0.981***	−0.974***	−0.89***	−0.871***
	(0.114)	(0.260)	(0.201)	(0.199)	(0.197)	(0.183)	(0.177)
Observations	3718	3718	3718	3718	3718	3368	3368
Pseudo R^2	0.194	0.234	0.245	0.245	0.245	0.232	0.233
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors are in parentheses.
***$p < .01$, ** $p < .05$, * $p < .1$.
GDP: gross domestic product.

our control variables are significant. *Land area* is unsurprisingly negative and significant at the 1% level, as many Japanese investments concentrate in geographically small capital city regions. Regional *GDP* and *Population* display their expected positive signs and are significant at the 1% level. The estimated coefficient on *Motorways* is significant at the 5% level but surprisingly displays a negative sign. *Unemployment* is negative and significant at the 5% level, signaling that Japanese investors avoid regions with high unemployment. By contrast, *% Tertiary education* is positive and statistically

significant at the 1%, level indicating Japanese investors prefer to invest in regions with a well-educated workforce.

We add *Agglomeration* – which controls for the presence of previous Japanese FDI into the region – to our model in column (2). *Agglomeration* is positive and significant at the 1% level, confirming our results regarding the strong path dependence regarding Japanese FDI location choice in Europe at the regional level. This supports Cieślik and Ryan's (2004) results at the country level. Importantly, the inclusion of *Agglomeration* does not affect the sign and statistical significance of the Brexit variable. Other than *GDP* and *Motorways*, the statistical significance and signs of other variables remain unaffected.

Columns (3) and (4) display the estimation results obtained from specifications in which we control for a specific region being located in the core EU-15 and in a euro adopting country. Column (3) identifies the *EU-15* variable to be negative and significant at the 1% level, confirming the well-recognized shift in investment toward the newer EU member states, especially those in Central and Eastern Europe. Including EU-15 and the euro has no significant effect on the other explanatory variables; in both cases, *Brexit* maintains its significantly negative impact, while *Agglomeration* remains strongly positive. Adding *Distance from Japan* to our estimation in column (5) does not alter our qualitative results.

In column (6) we report the results obtained from the specification in which we add the country-level variable *Market potential*, indicating a firm's ability in that country to serve the entire European marketplace. Our estimation results indicate the expected positive and significant coefficient, signaling that that for Japanese investors access to markets in other countries in Europe is very important. The inclusion of *Market potential* slightly affects the statistical significance of other variables. In particular, the Brexit and GDP variables become statistically significant at the 5% level.

Finally, in column (7) we split *Market potential* into its two components, namely *Internal market potential* and *External market potential.* The coefficient on *Internal market potential* is insignificant, perhaps because European countries are geographically somewhat small and relatively easy to serve from within. In contrast, *External market potential* is highly positively significant. This indicates that access to the EU Single Market remains an important consideration for Japanese investors. This specification only slightly affects *Brexit's* statistical impact, while it has no effect on *Agglomeration.*

Conclusions

This paper studies the effects of the Brexit announcement on the flows of Japanese direct investment into Europe. Two major conclusions emerge. Firstly, in contrast to earlier work that can only posit Brexit's effect on inward-UK investment, we identify the significant negative impact Brexit has already had on Japanese direct investment flows even prior to the January 2020 British exit from the EU. That is, the consequences of Brexit are visible already and in future they might be magnified depending on the Brexit scenario. Secondly, we identify strong evidence of path dependence at the regional level with respect to the current Japanese FDI flows. This means that, despite the significance of the Brexit announcement, Japanese FDI will continue to flow into the UK due to the significant presence of previous Japanese investors, mitigating to an extent Brexit's negative impact on UK urban and regional development. We show this in the maps indicating Japanese FDI location choices in 2000, 2010, and 2019. High concentrations of Japanese FDI continue to exist in South and East England, including London and its suburbs; Berkshire, Hampshire, and Surrey in South East England; as well as Bedfordshire and East Anglia in the East of England. These locations, given their proximity to London, may not be severely affected. However, the long-run consequences of Brexit will depend on the exact Brexit scenario. In particular, two scenarios are possible: (i) the UK leaves the EU but remains a part of the Single Market, like Switzerland or Norway, or (ii) the UK leaves both the EU and the Single Market.

The statistical significance of the external market potential variable measuring access to other foreign markets indicates that Brexit should not have a major impact on the location of Japanese FDI location choice within Europe if the post-Brexit agreement guarantees free access to the Single European

Market. However, if Single Market access is not guaranteed, Japanese investors will likely accelerate investment into continental Europe. In this case, the recognized path dependence of Japanese investment patterns through the agglomeration variable would serve in the future to amplify, not mitigate, Brexit's future effect on inward-UK investment. It appears that winners and losers from the Brexit decision regarding FDI inflows will depend on the EU Single Market arrangement that the UK and EU establish.

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Notes

1. https://commonslibrary.parliament.uk/economy-business/where-does-the-uk-rank-in-foreign-direct-investment-statistics/ (accessed 17 July 2020).
2. https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/articles/ukforeigndirectinvestmenttrendsandanalysis/july2019 (accessed 17 July 2020).
3. https://next.gazeta.pl/next/7,151003,25354316,toyota-zainwestuje-600-mln-zl-w-polska-fabryke-wszystko-przez.html (accessed 17 July 2020).
4. Data descriptive statistics are available in Appendix Table A1.
5. This accounts for the average distance between a country's producers and its consumers. (see Head and Mayer, 2010). Intra-national distance is measured as distance $= 0.67*(\text{Area}/\pi)^{1/2}$.

ORCID iD

Michael Ryan https://orcid.org/0000-0001-9381-3112

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Appendix 1

Table A1. Descriptive statistics.

Variable	Description	Obs	Mean	Std. dev.	Min	Max
Count of annual investments	Annual count of new investment into each NUTS-2 region.	5840	0.287	0.942	0	15
Brexit	Indicator variable taking value 1 for UK NUTS-2 regions. Coding of 1 for the UK NUTS-2 regions begins in 2015, in accordance with the British European Union Referendum Act of 2015 which signaled the beginning of the move toward Brexit.	5840	0.034	0.182	0	1
Agglomeration	Cumulative number of previous Japanese investments into the region, dating back to 1970 when Japanese outward FDI laws were liberalized.	5840	14.616	39.662	0	389
EU-15	Indicator variable that takes value 1 if the region is located in one of the old EU-15 member states, 0 otherwise.	5820	0.739	0.439	0	1
Euro	Indicator variable that takes the value 1 for years the region has adopted the euro as its official currency, 0 otherwise.	5820	0.555	0.497	0	1
Land area (100s of $km^{2)}$	Region's geographic size	5840	18.817	16.839	0.647	150.677
GDP (billions €)	Region's GDP	4961	45.825	48.872	0.922	733.875
Population (100,000s)	Region's population	5524	18.817	16.839	0.647	150.677
Motorways (100s of km)	Proxy for the region's physical infrastructure.	4475	2.977	3.131	0	26.26
Unemployment (%)	Region's unemployment rate	5444	8.321	5.276	1.2	37
% Tertiary education	Proxy for region's level of skilled employment.	5458	27.758	9.34	6.7	69.8
Distance from Japan (100s of miles)	Distance between Tokyo and the region's national capital.	5840	57.956	4.071	48.6	69.26
Market potential (billions €)	Proxy for the firm's ability to serve the entire European market from an individual location, calculated as the sum of each country's GDP divided by the distance between capitals.	5058	25.159	8.517	6.247	47.597
External market potential (billions €)	Portion of market potential representing inter-national trade.	5058	18.077	6.179	5.734	39.828
Internal market potential (billions €)	Portion of market potential representing intra-national trade.[5]	5058	7.082	4.887	0.208	17.947

(Continued)

Table A1. (Continued)

NUTS-2-level data – pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(10)
(1) Agglomeration	1.000								
(2) EU-15 member	0.138	1.000							
(3) Euro	0.051	0.567	1.000						
(4) Land area	−0.133	−0.137	−0.051	1.000					
(5) GDP	0.632	0.289	0.194	−0.036	1.000				
(6) Population	0.372	−0.015	0.117	0.133	0.705	1.000			
(7) Motorways	0.086	0.337	0.265	0.237	0.375	0.527	1.000		
(8) Unemployment	−0.116	−0.026	0.188	0.111	−0.082	0.115	0.181	1.000	
(10) % Tertiary education	0.348	0.287	0.000	−0.102	0.374	−0.011	0.074	−0.346	1.000

Country-level data – pairwise correlations.

Variables	(1)	(2)	(3)	(4)
(1) Market potential	1.000			
(2) External market potential	0.825	1.000		
(3) Internal market potential	0.700	0.174	1.000	
(4) Distance from Japan	−0.010	−0.136	0.155	1.000