The Evolving Network of Chinese Multinational Firms

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Abstract

This paper studies the impacts of geographic positions and economic connections on how Chinese multinational firms evolve their global network by conducting outward direct investment (ODI), including both greenfield investment and cross border merger and acquisition. We collect outward direct investment data of 3479 Chinese multinational firms from 2002 to 2013 whose investment destination covers more than 160 countries. We find two dominant geographic driving forces: a direct search effect and an indirect extension effect. That is, a firm tends to invest in the country that is closer to China; and a firm uses its existing ODI network to make further investment, radiating from the existing subsidiaries to their neighbors. Analogously, we also find two economic driving forces: a firm is more likely to invest in the country with more intense Chinese ODI transactions; and a firm takes advantage of its existing host countries ODI linkage to make further investment decisions. These findings are robust when we use other geographic and economic measures, and/or put more control variables.

Keywords: Multinational firms, Network, China

JEL Classifications: F23

1 Introduction

Over the decades, the volume of outward direct investment (ODI) in China has increased at a tremendously fast speed. China started from almost zero outward direct invest before 1980, and until 2015, the scale of investment has ranked at top 10 and the regions covered about 80 percentage of the world. Though China has experienced a rapid expansion of outward direct investment over the world, little is known about how the early geographic and economics expansions affect multinational firms' future destinations of outward direct investment to develop their global network. To fill the gap, this paper tries to identify the impacts of the geographic and economic structures on the dynamic evolution of the global network of Chinese multinational firms.

The geographic expansion of China National Petroleum Corporation in North Africa and Middle East serves as a very good example to illustrate the evolving network of a Chinese multinational firm, which motivates our study. In Figure 1, we find that CNPC began its expansion in Africa by entering Sudan in 1996. Then based on Sudan, CNPC started to enter into the countries closer to Sudan (indicated by the red solid arrows): Algeria (2003), Chad (2003) and Niger (2003).[1] Later, based on these three countries, CNPC conducted its further expansion (indicated by the blue dashed arrows) towards Mauritania and Tunisia (2004), Libya (2005), and Nigeria and Equatorial Guinea (2006).[2] Similarly, in Middle East, radiating from Iraq (1997)[3], CNPC entered Azerbaijan, Oman and Syria in 2002 (indicated by the red solid arrows)[4] Sooner the expansion became deeper in the region (indicated by the blue dashed arrows). From these existing subsidiaries, CNPC entered Cyprus and Iran in 2004.

We collect outward direct investment data of 3479 Chinese multinational firms from 2002 to 2013. There are more than ODI destination countries. This dataset provides

[1] In 2003, CNPC has acquired the exploration license for three blocks in Algeria; In the same year, CNPC also bought the shares of Block H in Chad and acquired the Block Bilma and Tenere in Niger.

[2] In 2004, CNPC acquired from KUFPEC (Kuwait Foreign Petroleum Exploration Company with 50% share-holding in the SLK Oilfield in Tunisia. And in 2005, CNPC signed the contract to explore Block 17-4 from the National Oil Corporation of Libya.

[3] In 1997, CNPC made an agreement with Iraq government to exploit the al-Ahdab oil field.

[4] In 2002, CNPC acquired 50% equity of the Kursangi and Karabagli field of Azerbaijan. Several months later, CNPC obtained 50% of interest in Block 5 of Oman and started to conduct a project in Gbeibe Oilfield of Syria.

detailed ODI records of Chinese firms at the extensive margin—including target countries and transaction date. Using the target countries' location information, we can construct the geographic network on ODI of firms. Combining the target countries' location with the bilateral FDI volume, we could construct the economic connection on ODI of firms. Based on these two types of variables, we could possibly disentangle the impact of geography from the influence of economics when a Chinese multinational firm seeks for global expansion.

To quantify the geographic impact, we consider two standard measures: a geographic distance and a geographic network concentration. The former is an absolute geographic distance between China and its potential ODI destination country; and the latter is the average distance between a Chinese multinational firm's existing ODI destination countries and its potential destination country. The coefficient on the geographic distance represents the direct search effect and the coefficient on the geographic network concentration represents the indirect extension effect. We find that similar to trade (Chaney, 2014), there exist sizable search effect and extension effect, where the search effect refers to the fact that Chinese multinational firms tend to choose closer countries to enter; and the extension effect means that those firms have a higher propensity to enter into the countries closer to their existing ODI destination countries.

To quantify the economic influence, we consider two measures as well: an economic distance defined as the ODI flow between China and its potential ODI destination country, and an economic network concentration calculated as the average of bilateral FDI flows between a firm's existing ODI destination countries and its potential destination country. Similar to the geographic measures, the coefficient on the economic distance represents the economic search effect and the coefficient on the economic network represents the economic extension effect. We find that, there also exists the economic effect, including the economic search effect and economic extension effect. A Chinese multinational firm tends to invest in the country with a higher Chinese ODI intensity and enter into the country with more intense ODI from its existing ODI destination countries.

Our paper build upon four streams of literature: the gravity model, FDI location choice information network and distance measures.

Gravity Model As initially proposed by Tinbergen (1962), the gravity model suggests that the volume of the trade between two countries is proportional to their GDP and the inverse of the distance between them. From then, it has been widely used in the international trade, including FDI, migration and transportation (see more details in Anderson and van Wincoop, 2003; Lewer and Van den Berg, 2008; Stone and Jeon, 1999 and Christie et al., 2003). Recently, Chaney (2014) uses the gravity model to test the direct and remote search effects in trade. That is, a firm tends to export to the country nearby and then uses the exported countries to start remote search to enter into other countries. Our paper is closely related with Chaney (2014), where we try to test whether such search effect and extension effect also exist when a firm conducts ODI. Different from Chaney (2014), in ODI, we also identify the economic impact other than the geographic effect, and find the immediate investment every year is less common, so the extension effect is more prominent on the historical extension path, rather than the immediate extension structure.

FDI Location Choce What are the factors that would attract more FDI? The factors are factor endowment (Eaton and Tamura,1995), corruption and taxation (Wei, 2000), taxation and salary (Mutti and Grubert, 2004), third-country competition (Eichengreen and Tong, 2007), institutional factors (Benassy-Quere et al., 2007) and multinational firms' agglomeration (Alfaro and Chen, 2014). In particular, the list of studies that focus on the ODI from China is Cheng and Ruan (2004), He and Zhang (2009), Jiang and Jiang (2012). Our paper focuses on the evolution of the global network of a multinational firm dynamically; more specifically, how a multinational firm expands through self-learning.

Information Network Model The information network model is first proposed by Rauch (1999), where he argues that the information network is essential to break the information barrier in the trade, and the geographic proximity, through influencing the network structure, can increase the magnitude of trade. Besides international trade, this view has also been demonstrated in FDI studies. Chen and Chen (1998) uses firm-level data at Taiwan to consider the internal and external links of firms. They find that firms tend to use external links to start remote search when making FDI location decision.

He and Zhang (2009) finds that the knowledge and information cost are important to FDI location choices. Multinational firms prefer the region with lower information costs. Javorcik et al. (2011) also studies the impact of the American immigrants ethnicity network on FDI choices. Our paper also builds in information network structure and examines how the existing network structure overcomes the local information barriers of the countries closer to the existing network and leads to future investment in these countries.

Distance Measurement in Trade To understand the network structure on FDI, it is crucial to define a proper measurement for the distance in the network. There is a list of distance measurements used in the literature depending on the context they study. Typically, the distance is defined as a difference of values at two countries. For example, researchers use income difference to measure economic distance, and in addition exploit difference in country size and weather, common border and canal connection to measure culture distance (Ghemawat, 2001; Du et al., 2008; Du et al., 2012; Blanc-Brude et al., 2014 and Davies and Guilin, 2014). As opposed to the difference between two countries, other studies emphasize on the connection between the countries.

Different from the existing literature above, this paper has some distinguished features. This paper is the first paper which simultaneously considers the impacts of both economic network structure and geographic network structure on the firm-level ODI destination decision. We find that the gravity property exists in the geographic location and also in the economic structure.

Moreover, our paper demonstrates a dynamic evolution feature of the global expansion of a multinational firm. We find a firm's past ODI destinations would affect its future ODI destination choice. Specifically, a Chinese firm tends to invest in a country that is both geographically closer and economically more connected to its existing ODI destination countries, which creates a hub-spokes-subhub-spokes network expansion path over the time.

Last but not least, we show that the network expansion of outward direct investment

is different from international trade. The historical network that takes into account all the past experience matters more than the intermediate network from just the last period, especially for the indirect extension search from the economic connections.

The structure of our paper is organized as follows. Section 2 is the data description and our empirical methodology. Section 3 provides the results for different estimation specifications. Section 4 includes the robustness checks; and Section 5 concludes and outlines the future directions.

2 Data

In this section, we will describe the data, in particular, how Chinese multinational firms conduct outward direct investment at the extensive margin.

2.1 Databases

Our main analysis relies on three different data sources: the firm-level cross-border merger and acquisition from Zephyr, the greenfield data from the Ministry of Commerce of the People's Republic of China and other variables constructed from other databases.

The Zepher Merger & Acquisition database Our analysis abstracts M&A data of domestic firms in China from Zepher database. This database has a long horizon but here we only choose the period from 2002 to 2013 to match the greenfield investment data later. This database includes the detailed M&A information, like the nationality of acquirer and target firms, the announcement date and the closing date of the deal, and the transaction amount of M&A. Using this data, we are able to construct the M&A historical sequence for Chinese multinational firms.

The Greenfield investment information The greenfield investment data is drawn from the FDI administrative database from the website of Ministry of Commerce. This database reports the local information of the domestic firms, the nationality of target countries, and the conducting year of each ODI. Similar to the M&A data, we could

construct the greenfield historical sequential outward investment of Chinese multinational firms.

Other sources Besides the two main databases above, we collect all other variables from other databases. In particular, the geographic distance measures comes from CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) first database, which includes the distance between the capitals and the most populated cities of each country. We use IMF World Economic Outlook database to compile the country-level GDP data. We obtain the bilateral FDI data and the country code conversion table from IMF and WorldAtlas, respectively.

2.2 Chinese ODI Preferred Destinations

The key question in this paper is how Chinese multinationals choose their outward direct investment destinations over the time at the extensive margin. We use two tables to report the most preferred ODI destinations of Chinese firms.

Table 1 gives the summary statistics of top 10 most favored greenfield investment destinations of Chinese multinationals. It shows that 3365 domestic firms have ever completed greenfield investment. Among these firms, there are more than 28000 transaction in 2002-2013, which is the longest horizon we can have. On average, each firm has more than 8 deals. The top two destinations are Hong Kong and USA. And Russia has gained its popularity since 2006 and ranks the third.

Table 2 reports the summary statistics of top 10 most preferred cross-border M&A destinations of Chinese multinationals. The statistics shows that there are 152 Chinese multinational firms who have ever incurred cross-border M&A deals. Among these firms, in total, 410 representative cross-border deals have been successfully completed and on average each firm has 2.7 deals. Regarding where the ODI goes to through cross-border M&A, we find that Hong Kong, USA and Australia are among the top 3 destinations.

Over the time, we can see that both the greenfield ODI and cross-border M&A of Chinese multinationals have kept on increasing. In contrast to the traditional belief that outward direct investment from China mostly goes into less developed economies due to some political reasons, Chinese multinational firms actually prefer more developed markets such as USA, Canada and European countries. Firm-level behaviors in China show a clear profit-seeking sign just like other multinational firms from most advanced economies.

We also realize that Hongkong is an outlier ODI destination for any Chinese multinational firm, so in all our empirical specifications, we exclude Hongkong from our ODI destination list to avoid the potential bias.

3 Estimation Models

3.1 Basic Model Specification

We first consider the basic model specification that takes into account the effect of intermediate network structure on the Chinese multinational firms' ODI decision, similar to Chaney (2014). Specifically, how last period ODI investment decision would affect this period ODI destination choice of a Chinese multinational.

$$\begin{aligned}\Pr(ODI_{f,c,t+1}>0|observables) = F\Bigg(&\alpha_1\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]+\alpha_2\mathbb{I}[ODI_{f,c,t}>0]\\&+\beta_1\frac{\sum_{c'\neq CN}g(d_{c',c})}{N_{c'\neq CN}}+\beta_2 g(d_{CN,c})+\beta_3\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]g(d_{c',c})}{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]}\\&+\gamma_1\frac{\sum_{c'\neq CN}FDI_{c',c,t}}{N_{c'\neq CN}}+\gamma_2 FDI_{CN,c,t}+\gamma_3\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]FDI_{c',c,t}}{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]}\\&+\delta_1 GDP_{c,t}+\delta_2 Population_{c,t}+\delta_3\sum_{c'\neq c}FDI_{c',c,t_0}+\text{ constant}\Bigg)\end{aligned}\tag{1}$$

where in the basic model, $\mathbb{I}[\cdot]$ is an indicator variable whether firm f makes a ODI decision in country c in year t, which is equal to 1 if firm f has outward direct investment to country c at year t; otherwise it is equal to 0. $\sum_{c' \neq c} \mathbb{I}[ODI_{f,c',t} > 0]$ reflects the number of other countries the firm f has made FDI decisions in last year (year t). $g(\cdot)$ is a geographic distance measure from the potential destination country c to China. It takes the form $g(d) = 10000/d$. $F(\cdot)$ is the CDF of the standard normal distribution distribution. $N_{c' \neq CN}$ is the number of countries excluding China.

The conditional probablity that firm f will invest in country c at year $t+1$ depends on a sets of factors shown below.

Geographic Position Char.	Geographic Remoteness	$\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$
	Geographic Search Effect	$g(d_{CN,c})$
	Geographic Extension Effect	$\frac{\sum_{c'} 1[ODI_{f,c',t}>0] g(d_{c,c'})}{\sum_{c'} 1[ODI_{f,c',t}>0]}$
Economic Connection Char.	Economic Remoteness	$\frac{\sum_{c' \neq CN} FDI_{c',c,t}}{N_{c' \neq CN}}$
	Economic Search Effect	$FDIflow_{CN,c}$
	Economic Extension Effect	$\frac{\sum_{c'} 1[ODI_{f,c',t}>0] FDI_{c',c,t}}{\sum_{c'} 1[ODI_{f,c',t}>0]}$
Firm-level Char.	Firm outwardness	$\sum_{c' \neq c} 1[ODI_{f,c',t} > 0]$
	Firm ODI dummy at t	$1[ODI_{f,c,t} > 0]$
Country c′s Char.	GDP per capita	$GDP_{c,t}$
	Population	$Population_{c,t}$
	FDI stock at t_0	$\sum_{c' \neq c} FDI_{c',c,t_0}$

Table 3 shows the summary statistics for this set of intermediate network variables, together with table 5 that lists the potential destination country c's features, we can get a overview of all the above variables.

3.2 Modified Model Specification

However, the basic model may fail, given some features in the ODI data: (i) Outward direct investment is typically less frequent than trade, so it is less likely to find the subsequent investment over two consecutive years. (ii) Each ODI is a big investment decision for multinational firms and the historical network rather than intermediate network plays the significant role in the decision. Like, firms need use the network to obtain the knowledge of the regional politics, economy and culture. To reconcile these possible failures in the basic model, we replace the immediate network structure with the historical FDI network to generate the modified model specification.

$$\begin{aligned}\Pr(ODI_{f,c,t+1}>0|observables) = F\Bigg(&\alpha_1\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]+\alpha_2\mathbb{I}[ODI_{f,c,t}>0]\\&+\beta_1\frac{\sum_{c'\neq CN}g(d_{c',c})}{N_{c'\neq CN}}+\beta_2 g(d_{CN,c})+\beta_3\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]g(d_{c',c})}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]}\\&+\gamma_1\frac{\sum_{c'\neq CN}\sum_{s=t_0}^{t}FDI_{c',c,s}}{tN_{c'\neq CN}}+\gamma_2\frac{\sum_{s=t_0}^{t}FDI_{CN,c,s}}{t}+\gamma_3\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]FDI_{c',c,s}}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]}\\&+\delta_1 GDP_{c,t}+\delta_2 Population_{c,t}+\delta_3\sum_{c'\neq c}FDI_{c',c,t_0}+\text{ constant}\Bigg)\end{aligned}\quad(2)$$

In the modified model, we replace the first regressor (α_1), the fifth regressor (β_2) and the eighth regressor (γ_3) with the historical sequences of FDI transactions. Instead of counting the countries the firm entered in year t, we calculate the transactions from the base year t_o to year t. In addition, we use the average bilateral FDI flows from other countries to country c over the time between year t_o to year t as the sixth and seventh regressors (γ_1 and γ_2) to show the historical FDI flows effects.

Below we list another sets of factors that affect he conditional probablity that firm f

investing in country c at year $t+1$ with a historical network.

Geographic Position Char.	Geographic Remoteness	$\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$
	Geographic Search Effect	$g(d_{CN,c})$
	Geographic Extension Effect	$\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[ODI_{f,c',s}>0] g(d_{c',c})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[ODI_{f,c',s}>0]}$
Economic Connection Char.	Economic Remoteness	$\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{t N_{c' \neq CN}}$
	Economic Search Effect	$\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$
	Economic Extension Effect	$\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[ODI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[ODI_{f,c',s}>0]}$
Firm-level Char.	Firm outwardness	$\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[ODI_{f,c',s} > 0]$
	Firm ODI dummy at t	$1[ODI_{f,c,t} > 0]$
Country c′s Char.	GDP per capita	$GDP_{c,t}$
	Population	$Population_{c,t}$
	FDI stock at t_0	$\sum_{c' \neq c} FDI_{c',c,t_0}$

Table 4 shows the summary statistics for the set of historical network variables, together with table 5, we can get a overview of all the above variables.

3.3 Coefficients Interpretation

In the following, we will discuss the meanings of all the coefficients in equation (1) and (2) in detail.

The coefficients $\alpha = (\alpha_1, \alpha_2)$ collect the impacts of a multinational firm's own characteristics. The coefficient α_1 controls for the impact of the number of countries a firm entered in year t or has entered prior to year t on the likelihood it enters a new country

in the year $t+1$. $\alpha_1 > 0$ means that the more markets a firm entered in year t or has entered before, the more likely it will enter a new country in year $t+1$. The coefficient α_2 represents the impact of a firm's past ODI activity. We expect $\alpha_2 > 0$ since we believe the existing past experience helps. If a firm has already have outward FDI in country c, the more likely it will enter that country.

The coefficients $\beta = (\beta_1, \beta_2, \beta_3)$ represent the impacts of the geographiąttributes. The coefficient β_1 measures the impact of remoteness of country c away from all countries other than China. Since our $g(d)$ is an inverse measure of geographic distance, $\beta_1 < 0$ means if country c is closer to countries other than China, it is the less likely for China to conduct direct investment in it. The coefficient β_2 represents the direct impact of proximity on ODI. $\beta_2 > 0$ suggests the geographic proximity plays a positive role for a Chinese multinational on the ODI entry, which means a firm has a higher propensity to enter a nearby country than a remote one. This is called "geographic search effect" in our paper. The coefficient β_3 controls for the indirect impact of geographic proximity on ODI, where the regressors in the intermediate network specification and the historical network specification are the weighted average proximity measures between a multinational's potential destination country c and its existing ODI destination countries c's. $\beta_3 > 0$ suggests that if a firm has ever invested in countries close to country c in year t, the more likely the firm will sequentially enter country c in year $t+1$. This is defined as "geographic extension effect".

Analogously to β, the coefficients $\gamma = (\gamma_1, \gamma_2, \gamma_3)$ control for the influence of the economic attributes. Similar to proximity measures, we construct some economic connection measures analogous to geographic proximity measures. The coefficient γ_1 is the impact of economic remoteness. $\gamma_1 < 0$ suggests that the more economic isolated country, the less likely a Chinese multinational firm will invest in that country. The coefficient γ_2 represents the direct impact of economic connection on ODI. $\gamma_2 > 0$ suggests that a firm is more likely to invest the country having more FDI transactions with China, which we call it "economic search effect". The coefficient γ_3 controls for the indirect impact of economic connection on ODI, where the regressors in the intermediate network specification

and the historical network specification are the weighted average economic connection measures between a multinational's potential destination country c and its existing ODI destination countries c''s.. The sign of the coefficient γ_3 is ambiguous. There are two opposite driving forces to determine the sign of γ_3: if a firm has ever invest countries that have close FDI connection with country c in year t, the more likely the firm will sequentially enter country c due to the similarity of investment; alternatively, if a firm has ever invest countries that have close economic connection with country c in year t, the less likely the firm will enter country c due to the competition of investment. The sign of the coefficient is dependent on which driving force is dominant.

Finally, the coefficients $\delta = (\delta_1, \delta_2, \delta_3)$ control for the effects of the country attributes on ODI. Here, we consider the country's attributes as GDP, population and FDI stock at $t = 0$. We expect that these three coefficients are all positive.

Our identifications are mainly based on three key assumptions: sequential exogeneity, independent investors and independent markets. First, the sequential exogeneity means that the past observables are not correlated with the error terms. Second, we assume firms independently make their own investment decisions. In other words, a firms decision is not dependent on other firms decisions. Last, we assume that the potential destination markets are independent. That is, each year when a firm makes decision, it only considers the past investment feature, is not forward-looking and thus will not make strategic joint investment decision over a particular region.

Note that the concern may arise for the last assumption. It is possible that a firm may sequentially enter a particular set of countries which have similar features, for instance, locating in a common or sharing a common language. To further teasing out these effects, we extend our analysis by introducing common region and common language indices into our network definitions as we will show the specifications in the extended models.

3.4 Extended Model Specifications

We further ask whether the extension effect, regardless of geographic or economic, is largely driven by some common features among the existing destination countries c' and the potential destination country c, such as common region, common language and so on. Here, we consider common region and common language effects as proxies for any multinational possible regional and/or cultural expansion strategies. We add additional network variables indexed by common region and common language, which are represented as geographic common region network and geographic common language network, with coefficients β_4 and β_5. Similarly, we introduce additional economic network variables as economic common region network and economic common language network, with coefficients γ_4 and γ_5.

Extended Basic Model Specification

$$\begin{aligned}\Pr(ODI_{f,c,t+1}>0|observables) = F\Bigg(&\alpha_1\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]+\alpha_2\mathbb{I}[ODI_{f,c,t}>0]\\&+\beta_1\frac{\sum_{c'\neq CN}g(d_{c',c})}{N_{c'\neq CN}}+\beta_2 g(d_{CN,c})+\beta_3\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]g(d_{c',c})}{\sum_{c'\neq c}\mathbb{I}[FDI_{f,c',t}>0]}\\&+\beta_4\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(R_{c'}=R_c\right)g(d_{c',c})}{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(R_{c'}=R_c\right)}+\beta_5\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(L_{c'}=L_c\right)g(d_{c',c})}{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(L_{c'}=L_c\right)}\\&+\gamma_1\frac{\sum_{c'\neq CN}FDI_{c',c,t}}{N_{c'\neq CN}}+\gamma_2 FDI_{CN,c,t}+\gamma_3\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]FDI_{c',c,t}}{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]}\\&+\gamma_4\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(R_{c'}=R_c\right)FDI_{c',c,t}}{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(R_{c'}=R_c\right)}+\gamma_5\frac{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(L_{c'}=L_c\right)FDI_{c',c,t}}{\sum_{c'\neq c}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(L_{c'}=L_c\right)}\\&+\delta_1 GDP_{c,t}+\delta_2 Population_{c,t}+\delta_3\sum_{c'\neq c}FDI_{c',c,t_0}+\text{ constant}\Bigg)\end{aligned}\quad(3)$$

Extended Modified Model Specification

$$\Pr(ODI_{f,c,t+1}>0|observables)=F\Bigg(\alpha_1\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]+\alpha_2\mathbb{I}[ODI_{f,c,t}>0]$$
$$+\beta_1\frac{\sum_{c'\neq CN}g(d_{c',c})}{N_{c'\neq CN}}+\beta_2 g(d_{CN,c})+\beta_3\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]g(d_{c',c})}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',t}>0]}$$
$$+\beta_4\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]\mathbb{I}\left(R_{c'}=R_c\right)g(d_{c',c})}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',t}>0]\mathbb{I}\left(R_{c'}=R_c\right)}+\beta_5\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]\mathbb{I}\left(L_{c'}=L_c\right)g(d_{c',c})}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]\mathbb{I}\left(L_{c'}=L_c\right)}$$
$$+\gamma_1\frac{\sum_{c'\neq CN}\sum_{s=t_0}^{t}FDI_{c',c,t}}{N_{c'\neq CN}}+\gamma_2\frac{\sum_{s=t_0}^{t}FDI_{CN,c,s}}{t}+\gamma_3\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]FDI_{c',c,t}}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',t}>0]}$$
$$+\gamma_4\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]\mathbb{I}\left(R_{c'}=R_c\right)FDI_{c',c,t}}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]\mathbb{I}\left(R_{c'}=R_c\right)}+\gamma_5\frac{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]\mathbb{I}\left(L_{c'}=L_c\right)FDI_{c',c,t}}{\sum_{c'\neq c}\sum_{s=t_0}^{t}\mathbb{I}[ODI_{f,c',s}>0]\mathbb{I}\left(L_{c'}=L_c\right)}$$
$$+\delta_1 GDP_{c,t}+\delta_2 Population_{c,t}+\delta_3\sum_{c'\neq c}FDI_{c',c,t_0}+\text{ constant}\Bigg) \quad (4)$$

Equation (3) and (4) show the extended model specifications for both the intermediate and historical network structures. If it is the multinational firm's regional and cultural strategies that play the most important roles in its global network expansion, we shall lose the statistic and economic significance of the coefficients β_3 and γ_3 by controlling these two effects. Otherwise, the geographic and economic extension effects on the sequential evolution of a global network do exist for a Chinese multinational firm.

4 Results

4.1 Main Specifications

Table 6 reports the regression results with FDI flows for the basic model, i.e. the immediate network structure. First, we find that there indeed exist geographic proximity effects on ODI. More specifically, the coefficient β_2 on the geographic distance reflects

the geographic search effect. It is positive and significantly different from zero in the 1% level, meaning that the closer to China, the more likely a Chinese multinational to invest in that country, as shown in column (1) and (3). In addition, the coefficient β_3 on the geographic network concentration reflects the geographic extension effect. It is positive, suggesting that if a firm has invested in the countries that are close to country c, it is more likely to enter country c sequentially. Finally, the estimates do not change too much in column (4) and (6) after we introduce a couple of controls, like GDP, population as well as the initial year FDI stock.

Analogically, we find that there also exist economic connection effects on ODI in Table 6. In column (2)-(3), the coefficient γ_2 represents the economic search effect. It is positive and significantly different from zero in the 1% level, meaning that the more intensive economic connection with China, the more likely that the firm will invest in that country. Moreover, the coefficient γ_3 on the economic network represents the economic extension effect. The estimates in column (2)-(3) are not statistically significant. It suggests that the immediate network intensity does not show a strong influence on ODI location decision choice. Finally, the estimates do not alter the pattern in column (5)-(6).

Table 7 reports the estimates with historical network. We redefine some regressors as historical averages, like geographic network, economic network as well as firm outwardness, and keep other unchanged. We find that the estimates on the historical variables have been changed but the estimates on other variables remain almost the same as those in the immediate network. Specifically, the estimates on geographic network are more or less the same as that of the immediate network in terms of magnitude in all specifications. However, we do find strong evidence of the economic historical network. In column (2)-(3), we find that the estimates on economic network are positive and significantly different from zero in the 1% level, which is different from that in the immediate network. Finally, similar as above, the estimates almost remain the same in terms of magnitude as we introduce a set of control variables in column (5)-(6). Note that all the results suggest that the geographic network has no strong cumulative impact while the economic network has a strong cumulative effect on a firm's ODI destination decision. It is consistent with the

economics intuition that the geographic network does not have additional proximity value that adds to an investor's knowledge; however, the economic network do has additional proximity value for an investor: the more transactions over the time horizons, the more institution knowledge and market preference an investor can gain. This is one of our key findings.

4.2 Extended Specifications

Table 8 summarizes the estimates when we include the common region and the common language. In particular, column (1)-(3) examines the geographic impacts and column (4)-(6) examines the economic impacts and column (7) reflects both the geographic and economic effects. The estimates on the geographic common region are positive and significantly different from zero at the 1% level in column (1), (3) and (7). It suggests that a Chinese multinational firm does have some regional strategy at the geographic level when it starts to develop its global network. In addition, the estimates on geographic language are also positive and significantly different from zero at the 1% in column (2). However, after we consider both common region and common language, the effect associated with common language goes away. It is possible that the common region and common language sometimes overlap and the most impact of common feature is captured by the common region rather than the common language.

In comparison, the estimates on economic common region are either insignificant or only slightly significant at 10% level in column (4), (6) and (7). In addition, the estimates on economic network with common language are negative but not statistically significant, which we think is largely due to the lumpy feature of ODI and cannot be reflected by the immediate network.

Table 9 further summarizes our analysis with historical network. We find that the estimates on the geographic network with common features remain more or less the same. But the estimates on the economic network with common features are negative and significantly different from zero at the 1% level. In particular, the estimates on the economic network with common region are negative and significantly different from zero at the 1%

level in column (4) and (7). The estimates on the economic network with common language are also negative and significantly different from zero at the 1% level in column (5) to (7). The results suggest that the economic network with common features between the potential destination country c and the existing destination country c' will reduce the incentive for a firm to invest in that country. Though common region and common language can help a firm better adjust in the destination country, a firm may face more severe competition from his rivals in its existing destination countries and thus reduce the likelihood to enter that country.

Under the extended specifications, the original geographic and economic extension effects (β_3 and γ_3) do not change much in both statistical significance or economic magnitude. This means there does exist a sequential evolution effect of the global network expansion for a Chinese multinational firm.

5 Robustness Checks

Beyond the main and extended specifications, we also conduct a sequence of robustness checks. First, we replace bilateral FDI flows with FDI stock. Second, we separate the sample into greenfield and cross-border M&A subsamples to run the all the specifications again. Third, we merge our data with annual survey of scale-above manufacturing firms and do all the regression with sector controls. Basically, the patterns are more or less the same as those in the main specifications. Below, we will briefly discuss each one by one.

5.1 Different Measure for FDI: FDI stock

In the results section above, we use the bilateral FDI flows to define the economic connection and network. Here we use a different measure for FDI, FDI stock, to redefine the economic connection and network. We expect that the results from our main specifications will still hold by using FDI stocks. Table 10 and 11 report the estimates with the immediate network and historical network, respectively. We find that the basic pattern is the same in all the specifications. In terms of magnitude, only the estimates on economic distance are smaller than those with FDI flow. All other estimates are almost the same as

those with FDI flows in Table 10. Similarly, we find that there is no significant difference by using FDI stocks in Table 11.

5.2 Different FDI Types: Greenfield and Cross-border M&A

In addition, we separate the sample into greenfield and cross-border M&A subsamples. From the summary statistics, we find that cross-border M&A is less frequent than Greenfield each year. In this set of robustness check, we want to see whether the results in the main specifications remain in both greenfield and cross-border M&A subsamples. Table 12-13 summarizes the estimates with the immediate network, respectively; Table 14-15 reports the estimates with the historical network. We find that the key results maintain in both greenfield and cross-border M&A with the immediate network. However, the economic extension effect for cross-border M&A under the historical network specification is positive but not statistically significant, suggesting that for cross-border M&A, the economic network is less crucial. To some extent, this finding is consistent with the intuition: since cross-border M&A is less frequent to happen and determined by both the acquiring firm and target firm, so compared to other factors, the economic network itself is less important in the process of cross-border M&A.

5.3 Sector Fixed Effect

As a final check, we merge our ODI data with annual survey of scale-above manufacturing firms (annual sales are above 5 million RMB) to abstract the sector indices. We try to examine whether the key results hold after controlling additional sector fixed effect. Using the exact match on a firm's name, our sample size drops from 3479 to 1035. We lose two third of observations partly due to our exact name matching method, and because now we only focus on i) the scale-above firms, and ii) the manufacturing firms. Interestingly, in Table 16-17, we notice that the basic pattern holds across different specifications with the immediate network and historical network, except the impact of the economic network. For example, in column (6) of Table 17, the estimate of the economic extension effect is positive but no longer statistically significant. We argue that this exception is largely due to the firm size. Possibly, the larger a firm is, the less dependent on the overall FDI

trend. In other words, as a firm is large enough to overcome potential uncertainty in the outward direct investment, it does not need to rely on the macro-level investment trend to determine where to invest. Other estimates are also consistent with economics intuitions.

6 Conclusion

We examine the impacts of geographical positions and economic connections on how Chinese multinational firms evolve their global network by conducting outward direct investment (ODI), including both greenfield investment and cross border merger and acquisition. We find two dominant geographic driving forces: a direct search effect and an indirect extension effect. That is, a firm tends to invest in the country that is closer to China; and a firm uses its existing ODI network to make further investment, radiating from the existing subsidiaries to their neighbors. Analogously, we also find two economic driving forces: a direct search effect and an indirect extension effect. A firm is more likely to invest in the country with more intense Chinese ODI transactions; and a firm takes advantage of its existing host countries ODI linkage to make further investment decisions. These findings are robust when we use other geographic and economic measures, and/or put more control variables.

We simultaneously consider the impacts of both economic network structure and geographic network structure on the firm-level ODI destination decision. We find that the gravity property exists in the geographic location and also in the economic structure.

Moreover, our paper demonstrates a dynamic evolution feature of the global expansion of a multinational firm. We find a firm's past ODI destinations would affect its future ODI destination choice. Specifically, a Chinese firm tends to invest in a country that is both geographically closer and economically more connected to its existing ODI destination countries, which creates a hub-spokes-subhub-spokes network expansion path over the time.

Last but not least, we show that the network expansion of outward direct investment is different from international trade. The historical network that takes into account all the past experience matters more than the intermediate network from just the last period, especially for the indirect extension search from the economic connections.

Figure 1: Geographic Expansion of China National Petroleum Corporation

Table 1: Top 10 Greenfield ODI Destinations

Country	2002-2005	2006-2010	2011-2013
Hong Kong	228	2511	5036
USA	132	1048	1842
Russia	107	567	462
Japan	46	413	363
Viet Nam	76	455	274
Australia	29	262	388
Germany	53	279	339
United Arab Emirates	52	374	241
Singapore	23	191	397
South Korea	37	317	251
Other	647	4614	6003

Note: 1. This table shows the frequency of greenfield direct investments by Chinese Multinational firms.
2. There are 3365 Chinese multinationals conducting greenfield ODI.

Table 2: Top 10 Cross-border M&A ODI Destinations

Country	2002-2005	2006-2010	2011-2013
Hong Kong	14	70	11
Australia	1	25	16
USA	6	10	26
Singapore	4	16	8
Canada	2	15	7
UK	1	9	14
Germany	3	3	10
France	3	3	6
Italy	1	6	1
Malaysia	0	6	2
Other	19	44	48

Note: 1. This table shows the frequency of cross-border M&A activities by Chinese Multinational firms.
2. Cayman islands (CYM), Bermuda(BMU) and British Virgin Islands (VGB) are excluded.
3. There are 152 Chinese multinationals conducting cross-border M&A.

Table 3: Summary Statistics (Immediate Network)

	Max	Min	Median	Mean	SD
Firm Outwardness	38	0	0	0.23	0.763
ODI Dummy at t	1	0	0	0.001	0.037
Geo.Remoteness	6.293	0.93	2.22	2.333	0.845
Geo.Distance	12.353	0.518	1.237	1.655	1.606
Geo.Network	167.737	0	0	0.361	2.262
Econ.Remoteness	423.26	-444.543	0.363	8.261	27.026
Econ.Distance	51.238	-0.814	0.002	0.223	2.332
Econ.Network	109.097	-51.212	0	0.058	1.209

Table 4: Summary Statistics (Historical Network)

	Max	Min	Median	Mean	SD
Firm Outwardness	12	0	0	0.079	0.215
ODI Dummy at t	1	0	0	0.001	0.037
Geo.Remoteness	6.293	0.93	2.22	2.333	0.845
Geo.Distance	12.353	0.518	1.237	1.655	1.606
Geo.Network	167.737	0	0	0.849	2.602
Econ.Remoteness	60.466	-3.712	0.06	1.292	4.24
Econ.Distance	18.958	-0.008	0.002	0.074	0.816
Econ.Network	18.621	-5.827	0	0.005	0.122

Table 5: Summary Statistics: Control Variables

	Max	Min	Median	Mean	SD
GDP	16.16	0	0.02	0.34	1.277
Population	1354.04	0.02	8.81	39.64	140.83
FDI stock at $t = 0$	0.036	0.122	0	0.001	0.125

Table 6: Immediate Network of FDI Flows (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\sum_{c' \neq c} 1[ODI_{f,c',t} > 0]$	0.058*** (0.002)	0.056*** (0.002)	0.053*** (0.002)	0.057*** (0.002)	0.056*** (0.002)	0.053*** (0.002)
ODI dummy at t $1[ODI_{f,c,t} > 0]$	1.167*** (0.024)	1.086*** (0.027)	1.065*** (0.026)	1.064*** (0.025)	1.005*** (0.027)	0.985*** (0.027)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.163*** (0.005)	−0.168*** (0.005)	−0.149*** (0.005)	−0.117*** (0.005)	−0.104*** (0.005)	−0.085*** (0.005)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.032*** (0.002)		0.052*** (0.002)	0.032*** (0.002)		0.050*** (0.002)
Geographic Network $\frac{\sum_{c' \neq c} 1[ODI_{f,c',t}>0] g(d_{c,c'})}{\sum_{c' \neq c} 1[ODI_{f,c',t}>0]}$	0.006*** (0.0005)		0.016*** (0.001)	0.022*** (0.001)		0.021*** (0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} FDI_{c',c,t}}{N_{c' \neq CN}}$	0.004*** (0.0001)	0.003*** (0.0001)	0.004*** (0.0001)	0.002*** (0.0001)	0.003*** (0.0001)	0.003*** (0.0001)
Economic Distance $FDI_{CN,c,t}$		0.211*** (0.005)	0.216*** (0.005)		0.180*** (0.005)	0.183*** (0.005)
Economic Network $\frac{\sum_{c' \neq c} \mathbb{I}[ODI_{f,c',t}>0] FDI_{c',c,t}}{\sum_{c' \neq c} \mathbb{I}[ODI_{f,c',t}>0]}$		0.002 (0.001)	−0.001 (0.001)		0.007*** (0.001)	0.002 (0.002)
GDP				0.092*** (0.003)	0.100*** (0.004)	0.087*** (0.004)
Population				−0.0002*** (0.00002)	0.0004*** (0.00002)	0.0004*** (0.00002)
FDI stock at t_0				−0.444*** (0.046)	−0.928*** (0.056)	−0.694*** (0.054)
Constant	−2.769*** (0.012)	−2.710*** (0.012)	−2.857*** (0.013)	−2.880*** (0.013)	−2.876*** (0.012)	−3.019*** (0.014)
Observations	5,702,081	4,912,596	4,912,596	5,573,358	4,866,422	4,866,422
Firms	— 3479 —					
Countries	— 166 —					
Years	— 11 —					
Pseudo R^2	0.095	0.210	0.216	0.120	0.229	0.235
Log Likelihood	−59,770.380	−52,129.750	−51,736.440	−58,111.790	−50,866.420	−50,512.320
Akaike Inf. Crit.	119,554.800	104,273.500	103,490.900	116,243.600	101,752.800	101,048.600

Note: *p<0.1; **p<0.05; ***p<0.01

Table 7: Historical Network of FDI Flows (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}{t}$	0.188***	0.188***	0.187***	0.184***	0.190***	0.184***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
ODI dummy at t $1[ODI_{f,c,t} > 0]$	1.253***	1.099***	1.083***	1.098***	1.005***	0.981***
	(0.024)	(0.024)	(0.024)	(0.025)	(0.025)	(0.025)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.166***	−0.132***	−0.111***	−0.112***	−0.075***	−0.060***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.030***		0.048***	0.031***		0.046***
	(0.002)		(0.002)	(0.002)		(0.002)
Geographic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0] g(d_{c,c'})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}$	0.006***		0.004***	0.021***		0.019***
	(0.0004)		(0.0004)	(0.001)		(0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{tN_{c' \neq CN}}$	0.023***	0.019***	0.020***	0.005***	0.014***	0.013***
	(0.0004)	(0.0004)	(0.0004)	(0.001)	(0.001)	(0.001)
Economic Distance $\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$		1.201***	1.227***		1.071***	1.066***
		(0.018)	(0.018)		(0.020)	(0.020)
Economic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0]}$		0.039***	0.034***		0.063***	0.037***
		(0.012)	(0.012)		(0.013)	(0.014)
GDP				0.093***	0.101***	0.088***
				(0.004)	(0.004)	(0.004)
Population				−0.0002***	0.0004***	0.0004***
				(0.00002)	(0.00002)	(0.00002)
FDI stock at t_0				−0.221***	−0.854***	−0.626***
				(0.050)	(0.056)	(0.055)
Constant	−2.749***	−2.804***	−2.946***	−2.895***	−2.961***	−3.099***
	(0.012)	(0.011)	(0.013)	(0.013)	(0.012)	(0.014)
Observations	5,702,081	5,395,929	5,395,929	5,573,358	5,343,744	5,343,744
Firms	— 3479 —					
Countries	— 166 —					
Years	— 11 —					
Pseudo R^2	0.083	0.117	0.122	0.118	0.141	0.147
Log Likelihood	−60,500.260	−58,300.230	−57,959.290	−58,222.510	−56,693.730	−56,277.610
Akaike Inf. Crit.	121,014.500	116,614.500	115,936.600	116,465.000	113,407.500	112,579.200

Note: *p<0.1; **p<0.05; ***p<0.01

Table 8: Immediate Network of FDI Flows, Other Channels (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Outwardness $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}{t}$	0.054***	0.053***	0.054***	0.053***	0.053***	0.053***	0.054***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
FDI dummy at t	0.986***	0.985***	0.986***	0.985***	0.985***	0.985***	0.985***
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.086***	−0.083***	−0.085***	−0.085***	−0.085***	−0.085***	−0.086***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.048***	0.050***	0.048***	0.050***	0.050***	0.050***	0.048***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Geographic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0] g(d_{c,c'})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}$	0.016***	0.020***	0.016***	0.021***	0.021***	0.020***	0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{tN_{c' \neq CN}}$	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Economic Distance $\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$	0.183***	0.183***	0.183***	0.183***	0.183***	0.183***	0.183***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Economic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0]}$	0.003*	0.002	0.003*	0.002	0.002	0.002	0.003**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GDP	0.088***	0.087***	0.088***	0.087***	0.087***	0.087***	0.088***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Population	0.0004***	0.0004***	0.0004***	0.0004***	0.0004***	0.0004***	0.0004***
	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
FDI stock at t_0	−0.716***	−0.707***	−0.718***	−0.696***	−0.694***	−0.695***	−0.716***
	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)
Geographic Common Region	0.009***		0.008***				0.009***
	(0.001)		(0.001)				(0.001)
Geographic Common Lang.		0.009***	0.002				0.003
		(0.001)	(0.002)				(0.002)
Economic Common Region				0.003		0.004*	−0.004*
				(0.002)		(0.002)	(0.002)
Economic Common Language					0.0001	−0.001	−0.001
					(0.002)	(0.002)	(0.002)
Constant	−3.018***	−3.025***	−3.020***	−3.019***	−3.019***	−3.019***	−3.019***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Observations	4,866,422	4,866,422	4,866,422	4,866,422	4,866,422	4,866,422	4,866,422
Pseudo R^2	0.2355	0.2350	0.2355	0.2348	0.2348	0.2348	0.2355
Firms				— 3479 —			
Countries				— 166 —			
Years				— 11 —			
Log Likelihood	−50,464.640	−50,496.830	−50,463.910	−50,511.130	−50,512.310	−50,510.930	−50,461.430
Akaike Inf. Crit.	100,955.300	101,019.700	100,955.800	101,048.300	101,050.600	101,049.900	100,954.900

Note: *p<0.1; **p<0.05; ***p<0.01

Table 9: Historical Network of FDI Flows, Other Channels (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Outwardness $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}{t}$	0.185***	0.183***	0.185***	0.184***	0.184***	0.184***	0.184***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	0.983***	0.982***	0.983***	0.981***	0.981***	0.981***	0.982***
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.060***	−0.059***	−0.059***	−0.060***	−0.060***	−0.060***	−0.059***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.045***	0.046***	0.045***	0.046***	0.046***	0.046***	0.045***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Geographic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0] g(d_{c,c'})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}$	0.015***	0.018***	0.015***	0.019***	0.019***	0.019***	0.015***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{tN_{c' \neq CN}}$	0.012***	0.013***	0.012***	0.012***	0.012***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Economic Distance $\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$	1.070***	1.067***	1.071***	1.067***	1.074***	1.073***	1.078***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.021)
Economic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0]}$	0.039***	0.036***	0.038***	0.044***	0.047***	0.049***	0.054***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)
GDP	0.089***	0.089***	0.089***	0.088***	0.088***	0.088***	0.089***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Population	0.0004***	0.0004***	0.0004***	0.0004***	0.0004***	0.0004***	0.0004***
	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
FDI stock at t_0	−0.638***	−0.634***	−0.639***	−0.621***	−0.620***	−0.618***	−0.630***
	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)
Geographic Region	0.006***		0.006***				0.006***
	(0.001)		(0.001)				(0.001)
Geographic Lang.		0.006***	0.002				0.002
		(0.001)	(0.002)				(0.002)
Economic Region				−0.010***		−0.006	−0.010***
				(0.004)		(0.004)	(0.004)
Economic Lang.					−0.008***	−0.007**	−0.007**
					(0.003)	(0.003)	(0.003)
Constant	−3.098***	−3.104***	−3.100***	−3.099***	−3.098***	−3.098***	−3.100***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Observations	5,343,744	5,343,744	5,343,744	5,343,744	5,343,744	5,343,744	5,343,744
Pseudo R^2	0.1478	0.1476	0.1478	0.1474	0.1475	0.1475	0.1480
Firms				— 3479 —			
Countries				— 166 —			
Years				— 11 —			
Log Likelihood	−56,252.850	−56,269.840	−56,252.360	−56,273.500	−56,271.170	−56,269.970	−56,240.280
Akaike Inf. Crit.	112,531.700	112,565.700	112,532.700	112,573.000	112,568.300	112,567.900	112,512.600

Note: *p<0.1; **p<0.05; ***p<0.01

Table 10: Immediate Network of FDI Stocks (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\sum_{c' \neq c} 1[ODI_{f,c',t} > 0]$	0.059*** (0.002)	0.056*** (0.002)	0.053*** (0.002)	0.056*** (0.002)	0.055*** (0.002)	0.052*** (0.002)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	1.083*** (0.025)	1.021*** (0.027)	1.001*** (0.027)	1.031*** (0.025)	0.980*** (0.027)	0.964*** (0.027)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.145*** (0.005)	−0.151*** (0.005)	−0.129*** (0.005)	−0.137*** (0.005)	−0.129*** (0.006)	−0.107*** (0.006)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.037*** (0.002)		0.056*** (0.002)	0.030*** (0.002)		0.048*** (0.002)
Geographic Network $\frac{\sum_{c' \neq c} 1[ODI_{f,c',t}>0] g(d_{c,c'})}{\sum_{c' \neq c} 1[ODI_{f,c',t}>0]}$	0.006*** (0.0005)		0.015*** (0.001)	0.020*** (0.001)		0.019*** (0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} FDI_{c',c,t}}{N_{c' \neq CN}}$	0.005*** (0.0001)	0.004*** (0.0001)	0.004*** (0.0001)	0.007*** (0.0002)	0.008*** (0.0003)	0.008*** (0.0003)
Economic Distance $FDI_{CN,c,t}$		0.048*** (0.002)	0.047*** (0.002)		0.025*** (0.002)	0.029*** (0.002)
Economic Network $\frac{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0] FDI_{c',c,t}}{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0]}$		0.0003** (0.0001)	0.00002 (0.0001)		0.0004*** (0.0001)	0.00005 (0.0002)
GDP				0.087*** (0.003)	0.099*** (0.004)	0.085*** (0.004)
Population				−0.0003*** (0.00002)	0.0003*** (0.00002)	0.0003*** (0.00002)
FDI stock at t_0				−1.300*** (0.060)	−1.960*** (0.084)	−1.602*** (0.082)
Constant	−2.840*** (0.012)	−2.753*** (0.012)	−2.914*** (0.014)	−2.839*** (0.013)	−2.828*** (0.013)	−2.970*** (0.015)
Observations	5,702,081	4,912,596	4,912,596	5,573,358	4,866,422	4,866,422
Firm			— 3479 —			
Country			— 166 —			
Year			— 11 —			
Pseudo R^2	0.107	0.216	0.223	0.124	0.233	0.237
Log Likelihood	−58,969.070	−51,728.230	−51,302.520	−57,788.170	−50,656.930	−50,340.020
Akaike Inf. Crit.	117,952.100	103,470.500	102,623.000	115,596.300	101,333.900	100,704.000

Note: *p<0.1; **p<0.05; ***p<0.01

Table 11: Historical Network of FDI Stocks (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}{t}$	0.189***	0.188***	0.188***	0.184***	0.189***	0.183***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	1.234***	1.045***	1.034***	1.091***	0.994***	0.975***
	(0.024)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.140***	−0.109***	−0.088***	−0.110***	−0.073***	−0.061***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.036***		0.046***	0.033***		0.042***
	(0.002)		(0.002)	(0.002)		(0.002)
Geographic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0] g(d_{c,c'})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}$	0.006***		0.003***	0.021***		0.019***
	(0.0004)		(0.0004)	(0.001)		(0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{t N_{c' \neq CN}}$	0.024***	0.017***	0.019***	−0.006***	0.017***	0.014***
	(0.0004)	(0.0004)	(0.0004)	(0.001)	(0.001)	(0.001)
Economic Distance $\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$		0.349***	0.347***		0.311***	0.301***
		(0.005)	(0.005)		(0.006)	(0.006)
Economic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0]}$		0.008***	0.008***		0.010***	0.007***
		(0.001)	(0.001)		(0.001)	(0.001)
GDP				0.081***	0.088***	0.075***
				(0.004)	(0.004)	(0.004)
Population				−0.0001***	0.0004***	0.0004***
				(0.00002)	(0.00002)	(0.00002)
FDI stock at t_0				0.127*	−0.947***	−0.675***
				(0.066)	(0.069)	(0.068)
Constant	−2.818***	−2.858***	−2.995***	−2.901***	−2.959***	−3.083***
	(0.012)	(0.011)	(0.013)	(0.013)	(0.012)	(0.014)
Observations	5,702,081	5,395,929	5,395,929	5,573,358	5,343,744	5,343,744
Firm	— 3479 —					
Country	— 166 —					
Year	— 11 —					
Pseudo R^2	0.087	0.122	0.127	0.118	0.140	0.146
Log Likelihood	−60,241.370	−57,945.490	−57,647.490	−58,225.620	−56,762.000	−56,388.970
Akaike Inf. Crit.	120,496.700	115,905.000	115,313.000	116,471.200	113,544.000	112,801.900

Note: *p<0.1; **p<0.05; ***p<0.01

Table 12: Immediate Network of FDI Flows (Greenfield)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\sum_{c' \neq c} 1[ODI_{f,c',t} > 0]$	0.056***	0.056***	0.053***	0.056***	0.056***	0.053***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	1.136***	1.074***	1.050***	1.047***	0.989***	0.968***
	(0.025)	(0.027)	(0.027)	(0.025)	(0.028)	(0.027)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.179***	−0.171***	−0.151***	−0.117***	−0.105***	−0.085***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.030***		0.053***	0.032***		0.050***
	(0.002)		(0.002)	(0.002)		(0.002)
Geographic Network $\frac{\sum_{c' \neq c} 1[ODI_{f,c',t}>0] g(d_{c,c'})}{\sum_{c' \neq c} 1[ODI_{f,c',t}>0]}$	0.021***		0.019***	0.022***		0.021***
	(0.001)		(0.001)	(0.001)		(0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} FDI_{c',c,t}}{N_{c' \neq CN}}$	0.041***	0.034***	0.035***	0.023***	0.028***	0.027***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Economic Distance $FDI_{CN,c,t}$		0.208***	0.213***		0.176***	0.180***
		(0.005)	(0.005)		(0.005)	(0.006)
Economic Network $\frac{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0] FDI_{c',c,t}}{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0]}$		0.002	−0.002*		0.007***	0.002
		(0.001)	(0.002)		(0.001)	(0.002)
GDP				0.096***	0.107***	0.092***
				(0.004)	(0.004)	(0.004)
Population				−0.0002***	0.0004***	0.0004***
				(0.00002)	(0.00002)	(0.00002)
FDI stock at t_0				−0.497***	−1.014***	−0.769***
				(0.047)	(0.057)	(0.055)
Constant	−2.728***	−2.703***	−2.853***	−2.877***	−2.873***	−3.017***
	(0.012)	(0.012)	(0.014)	(0.013)	(0.013)	(0.015)
Observations	5,404,190	4,719,309	4,719,309	5,390,730	4,707,318	4,707,318
Firms	— 3365 —					
Countries	— 161 —					
Years	— 11 —					
Pseudo R^2	0.091	0.203	0.210	0.104	0.217	0.222
Log Likelihood	−57,230.060	−50,122.390	−49,722.990	−56,402.110	−49,296.550	−48,950.830
Akaike Inf. Crit.	114,474.100	100,258.800	99,463.970	112,824.200	98,613.100	97,925.660

Note: *p<0.1; **p<0.05; ***p<0.01

Table 13: Immediate Network of FDI Flows (M&A)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\sum_{c' \neq c} 1[ODI_{f,c',t} > 0]$	0.033	0.089*	0.038	0.045	0.094*	0.045
	(0.049)	(0.051)	(0.056)	(0.049)	(0.052)	(0.056)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	1.337***	1.240***	1.227***	1.277***	1.194***	1.187***
	(0.158)	(0.164)	(0.165)	(0.160)	(0.165)	(0.166)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.173***	−0.090***	−0.113***	−0.162***	−0.104***	−0.122***
	(0.026)	(0.027)	(0.028)	(0.029)	(0.030)	(0.030)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	−0.062***		−0.041**	−0.036**		−0.031**
	(0.014)		(0.017)	(0.014)		(0.016)
Geographic Network $\frac{\sum_{c' \neq c} 1[ODI_{f,c',t}>0] g(d_{c,c'})}{\sum_{c' \neq c} 1[ODI_{f,c',t}>0]}$	0.020***		0.019***	0.019***		0.018***
	(0.005)		(0.006)	(0.005)		(0.006)
Economic Remoteness $\frac{\sum_{c' \neq CN} FDI_{c',c,t}}{N_{c' \neq CN}}$	0.039***	0.034***	0.032***	0.019***	0.012*	0.012*
	(0.003)	(0.004)	(0.004)	(0.006)	(0.007)	(0.007)
Economic Distance $FDI_{CN,c,t}$		0.223***	0.215***		0.209***	0.204***
		(0.023)	(0.023)		(0.024)	(0.024)
Economic Network $\frac{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0] FDI_{c',c,t}}{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0]}$		0.006	0.002		0.006	0.003
		(0.005)	(0.005)		(0.005)	(0.005)
GDP				0.0001	−0.018	−0.013
				(0.016)	(0.017)	(0.018)
Population				−0.0004**	−0.001*	−0.001*
				(0.0002)	(0.0003)	(0.0003)
FDI stock at t_0				0.543***	0.740***	0.655***
				(0.201)	(0.210)	(0.215)
Constant	−2.386***	−2.740***	−2.608***	−2.457***	−2.696***	−2.593***
	(0.069)	(0.067)	(0.079)	(0.076)	(0.074)	(0.085)
Observations	86,944	79,658	79,658	86,640	79,404	79,404
Firms	— 152 —					
Countries	— 188 —					
Years	— 11 —					
Pseudo R^2	0.227	0.286	0.290	0.235	0.292	0.295
Log Likelihood	−1,594.030	−1,472.473	−1,464.594	−1,578.556	−1,459.964	−1,454.004
Akaike Inf. Crit.	3,202.060	2,958.946	2,947.188	3,177.112	2,939.927	2,932.007

Note: *p<0.1; **p<0.05; ***p<0.01

Table 14: Historical Network of FDI Flows (Greenfield)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}{t}$	0.181***	0.186***	0.181***	0.182***	0.188***	0.182***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	1.214***	1.090***	1.064***	1.081***	0.991***	0.966***
	(0.024)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.186***	−0.134***	−0.119***	−0.113***	−0.076***	−0.061***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.027***		0.048***	0.031***		0.046***
	(0.002)		(0.002)	(0.002)		(0.002)
Geographic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0] g(d_{c,c'})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}$	0.021***		0.018***	0.021***		0.020***
	(0.001)		(0.001)	(0.001)		(0.001)
Economic Remoteness $\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{t N_{c' \neq CN}}$	0.230***	0.189***	0.199***	0.045***	0.138***	0.125***
	(0.004)	(0.005)	(0.004)	(0.010)	(0.010)	(0.010)
Economic Distance $\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$		1.189***	1.193***		1.059***	1.054***
		(0.018)	(0.018)		(0.020)	(0.021)
Economic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0]}$		0.041***	0.018		0.065***	0.039***
		(0.012)	(0.013)		(0.014)	(0.014)
GDP				0.097***	0.107***	0.093***
				(0.004)	(0.004)	(0.004)
Population				−0.0002***	0.0004***	0.0004***
				(0.00002)	(0.00002)	(0.00002)
FDI stock at t_0				−0.268***	−0.925***	−0.687***
				(0.051)	(0.057)	(0.056)
Constant	−2.708***	−2.796***	−2.937***	−2.892***	−2.956***	−3.094***
	(0.012)	(0.011)	(0.013)	(0.013)	(0.012)	(0.014)
Observations	5,404,190	5,182,100	5,182,100	5,390,730	5,168,640	5,168,640
Firms	— 3365 —					
Countries	— 161 —					
Years	— 11 —					
Pseudo R^2	0.080 0.108	0.115	0.102	0.125	0.132	
Log Likelihood	−57,864.530	−56,117.640	−55,678.480	−56,508.670	−55,054.820	−54,644.020
Akaike Inf. Crit.	115,743.100	112,249.300	111,375.000	113,037.300	110,129.600	109,312.000

Note: *p<0.1; **p<0.05; ***p<0.01

Table 15: Historical Network of FDI Flows (M&A)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	y					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}{t}$	0.467***	0.437**	0.349*	0.477***	0.438**	0.366*
	(0.177)	(0.182)	(0.190)	(0.179)	(0.183)	(0.192)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	1.341***	1.198***	1.203***	1.232***	1.122***	1.131***
	(0.159)	(0.163)	(0.164)	(0.161)	(0.165)	(0.165)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.178***	−0.058**	−0.081***	−0.157***	−0.069**	−0.087***
	(0.026)	(0.028)	(0.029)	(0.028)	(0.030)	(0.030)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	−0.066***		−0.039**	−0.036**		−0.028*
	(0.014)		(0.016)	(0.015)		(0.016)
Geographic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0] g(d_{c,c'})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}$	0.013***		0.010*	0.011**		0.008
	(0.005)		(0.005)	(0.005)		(0.005)
Economic Remoteness $\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{t N_{c' \neq CN}}$	0.231***	0.233***	0.221***	0.022	0.046	0.051
	(0.025)	(0.026)	(0.026)	(0.049)	(0.049)	(0.049)
Economic Distance $\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$		1.130***	1.070***		1.011***	0.970***
		(0.098)	(0.099)		(0.104)	(0.105)
Economic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0]}$		0.002	−0.010		0.014	0.003
		(0.051)	(0.056)		(0.054)	(0.058)
GDP				−0.007	−0.021	−0.017
				(0.017)	(0.018)	(0.018)
Population				−0.0004**	−0.0005	−0.0005
				(0.0002)	(0.0003)	(0.0003)
FDI stock at t_0				0.797***	0.847***	0.764***
				(0.230)	(0.230)	(0.235)
Constant	−2.398***	−2.874***	−2.746***	−2.496***	−2.831***	−2.736***
	(0.070)	(0.073)	(0.085)	(0.078)	(0.079)	(0.090)
						Observations
Observations	86,944	85,272	85,272	86,640	84,968	84,968
Firms	— 152 —					
Countries	— 188 —					
Years	— 11 —					
Pseudo R^2	0.221	0.250	0.252	0.232	0.257	0.258
Log Likelihood	−1,606.968	−1,547.855	−1,542.969	−1,583.052	−1,532.424	−1,529.560
Akaike Inf. Crit.	3,227.935	3,109.711	3,103.938	3,186.104	3,084.847	3,083.120

Note: *p<0.1; **p<0.05; ***p<0.01

Table 16: Immediate Network of FDI Flows, Sector (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\sum_{c' \neq c} 1[ODI_{f,c',t} > 0]$	0.064***	0.071***	0.068***	0.063***	0.072***	0.068***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	0.977***	0.877***	0.866***	0.812***	0.734***	0.722***
	(0.049)	(0.052)	(0.052)	(0.051)	(0.054)	(0.053)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.145***	−0.158***	−0.135***	−0.072***	−0.070***	−0.044***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.036***		0.056***	0.037***		0.058***
	(0.003)		(0.003)	(0.004)		(0.004)
Geographic Network $\frac{\sum_{c' \neq c} 1[ODI_{f,c',t}>0] g(d_{c,c'})}{\sum_{c' \neq c} 1[ODI_{f,c',t}>0]}$	0.005***		0.011***	0.017***		0.016***
	(0.001)		(0.002)	(0.002)		(0.002)
Economic Remoteness $\frac{\sum_{c' \neq CN} FDI_{c',c,t}}{N_{c' \neq CN}}$	0.005***	0.004***	0.004***	0.002***	0.003***	0.003***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0002)
Economic Distance $FDI_{CN,c,t}$		0.174***	0.180***		0.116***	0.121***
		(0.009)	(0.009)		(0.011)	(0.011)
Economic Network $\frac{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0] FDI_{c',c,t}}{\sum_{c' \neq c} \mathbb{I}[FDI_{f,c',t}>0]}$		−0.0004	−0.003		0.006**	0.002
		(0.002)	(0.002)		(0.002)	(0.003)
GDP				0.099***	0.114***	0.098***
				(0.006)	(0.007)	(0.007)
Population				−0.0001***	0.0004***	0.0004***
				(0.00004)	(0.00004)	(0.00004)
FDI stock at t_0				−0.349***	−0.870***	−0.609***
				(0.078)	(0.093)	(0.090)
Sector	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−2.905***	−2.792***	−2.958***	−3.087***	−3.016***	−3.193***
	(0.044)	(0.045)	(0.047)	(0.046)	(0.046)	(0.048)
Observations	1,696,365	1,476,280	1,476,280	1,658,070	1,462,301	1,462,301
Firm	— 1035 —					
Country	— 167 —					
Year	— 11 —					
Pseudo R^2	0.090	0.163	0.169	0.122	0.191	0.197
Log Likelihood	−17,452.150	−16,062.760	−15,940.050	−16,842.200	−15,516.050	−15,398.450
Akaike Inf. Crit.	34,976.300	32,197.520	31,956.100	33,762.400	31,110.090	30,878.900

Note: *p<0.1; **p<0.05; ***p<0.01

Table 17: Historical Network of FDI Flows, Sector (Whole Sample)

	Dependent variable: $y = 1[ODI_{f,c,t+1} > 0]$					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Outwardness $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}{t}$	0.135***	0.138***	0.138***	0.136***	0.141***	0.139***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
FDI dummy at t $1[ODI_{f,c,t} > 0]$	1.051***	0.915***	0.905***	0.823***	0.750***	0.734***
	(0.048)	(0.049)	(0.049)	(0.050)	(0.051)	(0.051)
Geographic Remoteness $\frac{\sum_{c' \neq CN} g(d_{c,c'})}{N_{c' \neq CN}}$	−0.152***	−0.128***	−0.104***	−0.071***	−0.048***	−0.026***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Geographic Distance $g(d_{CN,c}) = 1/d_{CN,c}$	0.033***		0.053***	0.036***		0.055***
	(0.003)		(0.003)	(0.004)		(0.004)
Geographic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0] g(d_{c,c'})}{\sum_{c' \neq c} \sum_{s=t_0}^{t} 1[ODI_{f,c',s}>0]}$	0.005***		0.002**	0.017***		0.013***
	(0.001)		(0.001)	(0.002)		(0.002)
Economic Remoteness $\frac{\sum_{c' \neq CN} \sum_{s=t_0}^{t} FDI_{c',c,s}}{t N_{c' \neq CN}}$	0.027***	0.024***	0.025***	0.009***	0.019***	0.017***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Economic Distance $\frac{\sum_{s=t_0}^{t} FDI_{CN,c,s}}{t}$		1.132***	1.164***		0.915***	0.916***
		(0.033)	(0.034)		(0.040)	(0.041)
Economic Network $\frac{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0] FDI_{c',c,s}}{\sum_{c' \neq c} \sum_{s=t_0}^{t} \mathbb{I}[FDI_{f,c',s}>0]}$		0.026	0.023		0.051**	0.032
		(0.019)	(0.019)		(0.021)	(0.021)
GDP				0.107***	0.122***	0.106***
				(0.006)	(0.007)	(0.007)
Population				−0.0001***	0.0005***	0.0005***
				(0.00004)	(0.00003)	(0.00003)
FDI stock at t_0				−0.311***	−1.006***	−0.718***
				(0.088)	(0.098)	(0.096)
Sector	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−2.874***	−2.895***	−3.058***	−3.096***	−3.114***	−3.287***
	(0.044)	(0.044)	(0.046)	(0.046)	(0.045)	(0.048)
Observations	1,696,365	1,605,285	1,605,285	1,658,070	1,589,760	1,589,760
Firm	— 1035 —					
Country	— 166 —					
Year	— 11 —					
Pseudo R^2	0.079	0.109	0.115	0.122	0.144	0.150
Log Likelihood	−17,666.600	−17,085.950	−16,974.390	−16,843.010	−16,421.600	−16,302.470
Akaike Inf. Crit.	35,405.210	34,243.900	34,024.780	33,764.020	32,921.210	32,686.940

Note: *p<0.1; **p<0.05; ***p<0.01

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