

Dissertation

How Connectivity in Foreign Direct Investment Networks Affects MNE Decision-Making and Performance

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The foreign direct investment (FDI) activity of multinational enterprises (MNEs) is inherently a multilateral phenomenon. In the real world, locations rarely receive investments from a single MNE, and MNEs seldom invest in one location. Thus, FDIs create links between locations (e.g., home-host) and connect MNEs with other collocated firms. My dissertation provides insights into how the structural properties of the locations and MNEs, i.e., patterns of relationships and connectivity, influence the decisions and observed behaviors of MNEs. By analyzing MNEs' interactions in different networks, my dissertation assesses the varying influence of different networks on MNEs' strategies.

BIG QUESTION

How do the different relationships of multinational enterprises (MNEs) in different networks influence MNEs' decision-making and performance?

INTRODUCTION

Multinational enterprises (MNEs) are firms that engage in cross-border transactions and integrate their activities across national boundaries to exploit their competitive advantages in global marketplaces (Rugman & Verbeke, 2003). MNEs use foreign direct investments (FDIs) to acquire and control geographically spread assets and resources, and thus, MNEs' FDIs are integral to the multilateral world order (Eden, 2009). The conception of MNEs as a network phenomenon has been prevalent in international business (IB) theorizing¹. However, in an irony of history, IB theories explaining MNEs' FDI behavior have rarely ventured beyond the bilateral perspective, and the use of the multilateral perspective, i.e., "network arguments, measures, or methodology," remains limited (Cuypers, Ertug, Cantwell, Zaheer, & Kilduff, 2020: 715).

Without a multilateral perspective to study MNEs' FDI behavior, we implicitly assume that either the economic actions of MNEs, i.e., their FDI behaviors, are not influ-

enced by their social relationships and interactions, or that the social relationships and interactions (such as FDI linkages) are not unique to the MNEs, and thus their influence on their actions or decisions is homogenous. However, FDI linkages matter because they influence MNEs' actions and decisions, as the IB literature on spillover effects of MNEs' FDI linkages emphatically demonstrates. Here, "spillovers are impacts on third parties not directly involved in an economic transaction, that is, when a transaction between A and B affects C" (Eden, 2009: 1065). Moreover, we know from observation that the global economic system is inherently multilateral, and each firm has a heterogeneous portfolio of social relationships and linkages. For example, the world trade system has a core-periphery structure because firms and countries exhibit differential propensities for some partners. This is because ties to core entities are considered more valuable and preferred over peripheral entities (Zaheer & Bell, 2005). Therefore, understanding how different relationships influence MNEs' FDI decisions and behaviors is theoretically important (Eden, 2009).

Moreover, as some IB scholars have highlighted, the FDI behavior of MNEs is an outcome of a dialectic interaction between MNEs and locations because MNEs make FDI decisions based on expected benefits from *locations* (Beugelsdijk & Mudambi, 2013). MNEs have the potential to connect or disconnect from locations and exhibit preferential at-

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¹ Some examples are "differentiated networks" (Rugman, Verbeke, & Nguyen, 2011: 755), "densely networked firms or enterprises" (Gerffi & Korzeniewicz, 1993), or "geographically dispersed enterprises" (Cantwell, 2009).

Table 1. Data and research method description*

	Sample selection	Network analysis	Regression analysis
Essay 1	United Nations membership and recognition of the countries between 2001 and 2012	Whole network analysis is used to calculate indegree centrality and ineigenvector centrality	Robust regression with robust standard errors, year, and region-fixed effects. Sensitivity analyses: Generalized estimating equations
Essay 2	Input similarities and output overlap – firms from the automotive and automotive component industry between 2003 and 2019	Bipartite decomposition of MNE (plant) – host location (city) network Ego-network analysis for agglomeration and sociometric network analysis for competitive overlap	Dynamic panel data analysis using the Arellano-Bond method with robust standard errors, year and region-fixed effects
Essay 3	Membership of countries in the OFDI network and MNEs from automotive and automotive component industries between 2003 and 2019	Bipartite decomposition of MNE (plant) – country of origin network Sociometric network analysis used to measure COO and MNE connectedness	Semi-parametric hazard rate and log-linear regressions with clustered standard errors, year, and region fixed effects Sensitivity analyses: Linear probability models

*The quantitative research design in my dissertation was informed by the qualitative insights gleaned from 19 semi-structured interviews with automotive OEMs (6), tier-1 suppliers (2), machine tool manufacturers (5), and industry association executive members (6).

tachment to core locations; their decisions are also impacted by locations' characteristics (Cuypers et al., 2020)². This means that we cannot understand or explain the outcome or the performance of economic exchanges by studying the presumed autonomous action of MNE without considering the impact of location characteristics or disregarding the influence of social relationships and exchanges (Cuypers et al., 2020).

To posit a general theory of MNEs, I draw upon social network analysis³ to advance a multilateral perspective on MNEs' FDI behaviors. In my dissertation, I show that, among other things, the influence of MNEs' relationships in different networks varies, which leads to differences in MNEs' performance and decisions. Given that MNEs are multi-location enterprises (Beugelsdijk & Mudambi, 2013: 414), they are members of multiple networks, such as inter-organizational and inter-locational networks (Cuypers et al., 2020). A multilateral perspective of MNEs' FDI behavior is more pragmatic than a bilateral perspective. As [Figure 1](#) demonstrates using data from the global automobile industry, any automotive MNEs invest in multiple locations, and various automotive MNEs invest in one location. A detailed description of the sample and research methods used across the three studies of my dissertation is presented in [Table 1](#).

My dissertation has three important implications for practitioners and policymakers. Study 1 shows that host locations should prioritize increasing the quality of inward

FDI (IFDI) rather than solely focusing on quantity, as has often been the *status quo*. This includes increasing diversity of FDI partners and actively seeking investments from 'core' entities. Study 2 shows that in choosing locations for FDI, MNEs should prioritize clusters but must also consider the composition of these clusters. MNEs should seek to mitigate the risks of potential resource competition from industry peers collocated in the same cluster. Study 3 shows that the MNEs' rely on information from their connections in different networks to make decisions, especially under high-risk and uncertainty. Contrary to prior evidence, MNEs are less likely to locate their FDI in high-climate risk locations when we account for the influence of their relationships in different networks on their FDI location decisions. Thus, host locations must be more proactive about reducing their exposure to climate risk to remain attractive IFDI destinations.

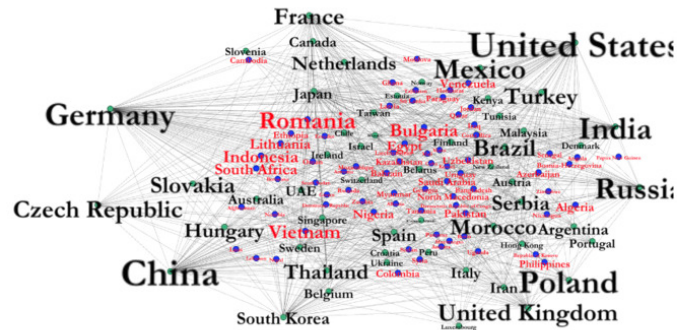
STUDY 1: A MULTILATERAL PERSPECTIVE ON INWARD FOREIGN DIRECT INVESTMENT (IFDI)

In this study, I argue that host locations should care not only about how much IFDI they receive but also about how many investors from different countries of origin they are attracting and who these investors are, e.g., whether they are core or peripheral members of the global FDI network. I

² For example, I find that, despite the automobile sector's wide geographical spread, the manufacturing FDI of MNEs in the automobile industry is more strongly attracted to a few core locations in countries like China, Thailand, or Germany.

³ One of the primary challenges previous researchers faced in conceptualizing and examining FDI as a multilateral and multilevel phenomenon was the right datasets and the need for cross-level research methods and statistical analysis tools. Recent advances in social network research and the greater availability of multilateral FDI statistics at multiple levels, e.g., firms and locations, have made it possible to visualize FDI as a network-based phenomenon and allow us to dissect it into its constituent layers.

Two-mode country of origin (COO)-host country network and host country-MNE network in the automobile industry for 2019



Note: Here, the home countries (COOs) are denoted with black labels, and host countries are labeled in red.



Note: Here, the host countries are denoted with red labels, and MNEs are labeled in black.

One-mode COO network and MNE network in the global automobile industry for 2019

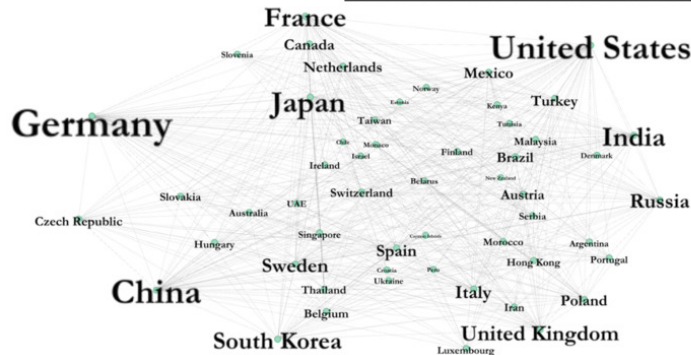


Figure 1. Visualization of multilevel network analysis.

use social network analysis to distinguish between the impact of quantitative aspects (how much) of IFDI versus the qualitative elements, such as *diversity of ties* (how many) and *quality of ties* (who). Modeling the multilateral global IFDI network also helps me better assess the spillover effects of IFDI and offer some reconciliatory evidence for the debate on the impact of IFDI on the economic growth of the host location (Iršová & Havránek, 2013; Meyer & Sinani, 2009). I find that greater diversity of IFDI ties is associated with positive spillovers, such as increased knowledge generation potential and resource utilization efficiency of the host location. This, in turn, is positively related to host locations' economic growth. Further, the magnitude of positive spillovers generated by higher-quality IFDI ties, i.e., when core locations with more diverse ties become investors in another host location, is higher and associated with further increases in host locations' economic growth. This study helps explain why and how more extensive interactions and connectivity increase the economic growth rates in host locations.

STUDY 2: DISAMBIGUATING THE EFFECTS OF DIFFERENT NETWORK AFFILIATIONS ON MNE PERFORMANCE

In this study, I demonstrate that MNEs should consider where they should locate their FDI *and* who their neighbors will be, i.e., the composition of the clusters, especially with regard to industry peers. Prior literature posits that, despite the positive effect of geographic connectivity due to agglomeration economies (Ellison & Glaeser, 1997), MNEs collocating their FDI risk adverse selection, knowledge dissipation, and loss of competitive advantage to competitors (Shaver & Flyer, 2000). However, this does not adequately explain why even leading MNEs continue collocating their FDI with competitors or why geographic networks persist without devolving into “concentrations of mediocrity” (McCann & Mudambi, 2004: 509). I consider a potential alternative explanation: MNEs are simultaneously embedded in geographic and industry networks⁴, and commingling these disparate networks' effects may lead to idiosyncratic findings in the studies examining the impact of FDI collocation on MNEs' performance.

I disaggregate the location-bound geographic network and a non-location-bound industry network (Figure 1) to differentiate between the effects of the geography vs. industry-mediated spillovers on MNEs. Increasing connectivity of locations and associated geography-mediated spillovers positively affect MNEs' performance by increasing their knowledge recombination and resource utilization potential⁵. However, a higher level of connectivity of MNEs in industry networks, or increasing overlap with industry competitors due to multiple collocations, is associated with negative spillovers. Multiple collocations with industry competitors may lead to resource congestion, depletion, and adverse selection⁶ that attenuate the positive influence of agglomeration economies on MNE performance.

STUDY 3: IMPACT OF CLIMATE RISK ON OUTWARD FDI DECISIONS OF MNEs AND THE MODERATING ROLE OF NETWORK CONTINGENCIES

In this study, I argue that MNEs' FDI location decisions under risk are influenced by their relationships in different networks; MNEs are not atomistic entities that base their strategic decisions solely on private information. Instead, MNEs also rely on information gleaned through social relations in these different networks to make decisions under high risk and uncertainty (Cuypers et al., 2020), such as foreign investment decisions in markets where they lack local knowledge. Based on these insights, I examine how climate risk affects MNEs' FDI location choices and how this relationship is moderated by MNEs' membership across different FDI networks – their country-of-origin's (COO) outward FDI network and industry-wide FDI collocation network (industry network). I assume that, within the auto industry, information exchange is more likely to occur among MNEs from the same home country than competitors from different home countries⁷. Contrary to previous studies examining the impact of climate change on MNEs' FDI location decisions (Gu & Hale, 2023), the adverse effects of increasing climate risk in the host location decrease the likelihood (and also magnitude) of MNEs' locating their FDI in these locations after I control for the influence of the information MNEs gain from being members in different networks. Further, MNEs' memberships in different networks have differ-

4 What is also less understood is the distinction between the implications of membership of MNEs in physical networks, e.g., geographic networks, versus construal networks, e.g., industry networks, for MNEs' performance. My dissertation work is a rare attempt to consider the implication of this distinction for literature on MNEs' FDI behavior.

5 The increasing returns to agglomeration benefits such as input sharing, labor market pooling, and knowledge spillovers (Ellison & Glaeser, 1997) is only possible if these resources are characterized by increasing returns to specialization which means increasing use of these resources increases their quality and efficacy. A nuance often overlooked in the literature.

6 Given that the resources exchanged in industry networks are private goods, they often do not satisfy the 'increasing returns' property (Levinthal & Wu, 2010). This is because these resources cannot be acquired by multiple firms, and increasing use of these resources through sharing agreements decreases their efficacy and utility because of resource congestion and depletion.

7 Communication among MNEs from the same countries is encouraged, and communication among MNEs from the same industry is actively discouraged (Tan & Meyer, 2011).

ent moderating effects. MNEs from more connected home countries have better access to information, which helps them reduce information asymmetry when making FDI location decisions under uncertainty. Thus, these MNEs are less likely to locate their FDI in high-climate risk locations. In contrast, MNEs more embedded in the industry networks face isomorphic pressures and often resort to imitative behaviors when making FDI decisions under uncertainty. This means such MNEs are more likely to locate their FDI in high-climate risk locations.

CONCLUSION

The main contribution of my dissertation research is to show how a multilateral perspective can address theoretical debates by resolving empirical inconsistencies, leading to a better theory-based understanding of the consequences of FDI location decisions of MNEs while delineating the network-based contingencies that MNEs face in their strategic decision-making processes. My dissertation highlights that FDI must be understood as a multilevel phenomenon with an interconnected multilayered network structure. The limited use of network-focused arguments, measures, and methodology in studying MNEs' behaviors and FDI activities (Cuyppers et al., 2020) alludes to an undersocialized account of MNEs' activities, which leads us to partial truth. It is important to acknowledge that MNEs' structural properties, e.g., connectedness across different layers of FDI networks, affect their decision-making and behaviors.

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Soni Jha (jha57@pfw.edu) is an Assistant Professor of Strategic Management at Purdue University—Fort Wayne. Her research focuses on the influence of network memberships and externalities on MNEs' corporate strategies and market outcomes. Her prior research has been published in the *Journal of International Business Studies* and the *Global Strategy Journal*. Before her academic career, Soni worked in commodities trading and social impact investing. She also consulted for auto-component manufacturers in India regarding the impact of India's industrial policy on the electrification of the automotive industry.

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