



Proximity at a distance: The relationship between foreign subsidiary co-location and MNC headquarters board interlock formation

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ABSTRACT

Corporations seek various relationships, such as board interlocks, with other firms to reduce resource dependencies. The consistent theoretical expectation and empirical finding that physical proximity is an important driver for board interlock formation is seemingly at odds with the emerging and growing literature on transnational board interlock ties. We argue that the effect of proximity on multinational corporation (MNC) board interlock formation can also be attributed to the firms' internationalization strategy, namely, when they have co-located subsidiaries in foreign markets. We call this "proximity at a distance". We test our assumptions on a dataset covering almost 43,000 board interlocks among MNC headquarters and their 12 million subsidiary co-location pairs. We confirm that proximity among headquarters increases the odds of interlocking but also find robust evidence that co-located subsidiaries also increase firms' propensity to interlock, particularly for transnational board interlocks. Our results help provide an explanation for the "paradox of distance" by showing that the interlock between two distant MNCs may be driven by proximity to their foreign subsidiaries. As such, we illustrate how MNCs' resource-dependent strategic responses can occur at the headquarters level to address uncertainties experienced at the subsidiary level.

1. Introduction

Corporations seek various relationships with other firms to increase their access to external resources and capabilities (Cantwell, 2013; Dyer & Singh, 1998; Pfeffer & Salancik, 1978). Firms also tend to value enduring business relationships in networks over discrete transactions with partners to reduce opportunistic behavior and related transaction costs (Coviello & Munro, 1997; Uzzi, 1997). Privileged access to relevant networks enables the firm to develop competitive advantages (Johanson & Vahlne, 2009, 2011). One of the key mechanisms through which firms generate relevant networks is board interlocks, whereby two firms share at least one common board member. Board interlocks

reduce resource dependencies by facilitating access to resources and clients and the dissemination of information and knowledge (Barringer & Harrison, 2000; Santos, Da Silveira, & Barros, 2012). At a more general level, these inter-corporate ties foster trust (Coleman, 1988; Gulati, 1998) and underpin cohesive business communities (Heemskerk, 2007; Kogut, 2012; Mizruchi, 2013).

Board interlocks reflect a strategy for exchanging knowledge and resources and therefore have a pronounced *proximity* element. Studies building on resource dependence theory (RDT) consistently emphasize that companies tend to compete and transact primarily with other firms located near them (e.g., Kono, Palmer, Friedland, & Zafonte, 1998). This makes interlocks with other firms that are nearby more likely. Interlocks

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typically require face-to-face interactions, which reduce the costs of knowledge transfer and increase communication efficiency (Tomlin, 1981; Tyre & Von Hippel, 1997). Firms thus reduce resource uncertainty by interlocking with local transaction partners rather than with firms in distant locales (Boschma, 2005; Harrison, 1994; Kono et al., 1998). Subsequently, research has consistently found that proximity breeds board interlocks (e.g., Allen, 1978; Carroll, 2010; Heemskerk & Takes, 2016).

However, *transnational* board interlocks (i.e., board interlocks among firms that are headquartered in different countries) have markedly increased and consolidated over the last two decades (Carroll & Fenema, 2002; Forsgren et al., 2005; Heemskerk, 2013; Heemskerk & Takes, 2016; Kentor & Jang, 2004). Cross-border interlocking directorates have become “a more general practice in which nearly half of the world’s largest firms participate” (Carroll, 2010: 98). This leads to an intriguing question: how can we reconcile the growing practice of transnational board interlocks with the consistent evidence from existing research that proximity drives board interlock formation? This is similar to the so-called “paradox of distance” raised by Zaheer and Hernandez (2011), who noted past conflicting research showing that distance can be both beneficial and detrimental for MNCs’ access to new knowledge. They suggest that this paradox can be understood by examining the roles of headquarters (HQ) and subsidiaries. Subsidiaries contribute to the MNC’s competitiveness by tapping into the knowledge embedded in their host environment’s networks (Almeida & Phene, 2004; Cantwell, 2013; Zaheer & Hernandez, 2011). The involvement of distant subsidiaries in such local networks serves as a bridge between the foreign- and central-level knowledge of their HQ (Belderbos et al., 2021). By extension, the existing knowledge about MNC board interlock formation highlights the need for further research on the role of distance at the HQ and subsidiary levels to solve the paradox of transnational board interlocks.

González (2019a, 2019b) recently proposed that, to understand transnational board interlock formation, we need to consider the internationalization of firms. While previous research on the antecedents of interlocking directorates have concentrated for the most part on strategic motives, such as resource seeking, monitoring, signaling, and accessing human capital, and on the individual motives that drive directors to join boards, such as career advancement and access to social ties (see Lamb & Roundy, 2016), González cites foreign investment as a key factor driving board interlock formation. Scholars have already recognized that firms respond to the complexity associated with internationalization by installing larger boards (Sanders & Carpenter, 1998) and having foreign board members in their statutory bodies (Oxelheim, Gregorič, Randøy, & Thomsen, 2013). González (2019b, 2019c) takes this a step further and argues that, as their internationalization intensifies, firms seek transnational board interlocks as a non-experiential source of knowledge, much in the way firms did in local contexts before.

While this approach is appealing and promising, it does not “solve” the paradox arising from the role of proximity in transnational interlock formation. In what follows, we reconsider the role of geographic proximity and distance in the context of MNCs seeking network relations to reduce resource dependencies. Although MNCs’ resources and capabilities are significantly shaped by their home base (Cui & He, 2017), it has become apparent that MNCs are best conceptualized as a diversified network in which a set of legal entities is interconnected through ownership, trade, and knowledge ties (Gereffi, Humphrey, & Sturgeon, 2005; Ghoshal & Bartlett, 1990; Reurink & Garcia-Bernardo, 2020). The constituent elements of an MNC (such as its HQ and subsidiaries) are by definition located in different countries and cities across the globe. Consequently, the MNC as a whole must manage multiple resource dependencies embedded in geographically distant contexts. This implies that distance and proximity are multidimensional constructs for MNCs.

We argue that board interlock formation among MNCs may occur not only because of their HQs’ proximity, as RDT suggests, but also because of the proximity of their subsidiaries in foreign locations. We call this

“proximity at a distance”, which occurs when two MNCs have established subsidiaries in the same foreign location. We posit that MNCs are more likely to appoint board members who are affiliated with other MNCs that invest in the same foreign location because they are exposed to similar challenges arising from the same international context. These interlocking directors can offer relevant international experience and may reduce the liability of foreignness and outsidership the companies experience (Johanson and Vahlne, 1977, 2009). We therefore propose that the propensity for board interlocks between two MNCs will be higher not only when two MNCs have their HQs co-located in the same country but also when the two MNCs have subsidiaries co-located in the same foreign location. We also argue that the proximity at a distance effect on board interlock formation will be stronger if the MNCs’ HQs are not co-located. That is, proximity at a distance is a driving mechanism for the formation of transnational board interlocks. In distinguishing between proximity at the subsidiary and HQ levels, we extend Zaheer and Hernandez’s (2011) contribution by unraveling the “paradox of distance” in board interlock formation. In doing so, we also extend RDT by claiming that, for multidimensional entities such as MNCs, the dependence on external resources and the strategic response can stem from different organizational layers (i.e., the subsidiaries and the HQ, respectively).

To test our assumptions, we developed a unique large-scale dataset covering almost forty-two thousand board interlocks among MNCs and their 12.7 million foreign subsidiary co-location pairs across the globe. We explored the relationship between internationalization and board interlock noted by González (2019a, 2019b), by testing whether *similarity* in foreign direct investment locations relates to HQ interlocks and thus contribute to the IB literature by adding to the role of subsidiaries in triggering the formation of interlocks between MNCs and by revealing how the agglomeration of subsidiaries influences transnational board formation. Our analyses’ outcomes provide strong support for our hypotheses and help to advance both the corporate governance (CG) and the international business (IB) literatures. More specifically, we contribute to the CG literature by explaining one of the main mechanisms responsible for the formation of MNCs’ transnational board interlocks (i.e., proximity at headquarters and subsidiaries). We contribute to both the CG and IB literatures by providing an explanation for the “paradox of distance” (Zaheer and Hernandez, 2011) and by demonstrating how the multidimensional nature underlying the geography of MNCs allows for a “proximity at a distance” mechanism that MNCs can leverage to foster interlocking directorates when their subsidiaries are co-located even when their HQs are not. Finally, we expand the explanatory power of RDT within the IB context by demonstrating that the resource-dependent strategic responses of complex organizations such as MNCs can occur at one organizational level (i.e., HQ) to address uncertainties experienced at another organizational level (i.e., subsidiary).

2. Theory and hypotheses

2.1. Interlocking directorates as a strategic and geographic phenomenon

Interlocking directorates create social ties between firms’ key decision-making bodies and facilitate information exchange in the upper echelons of corporate hierarchies. While interlocking directorates are created by individuals, they constitute relationship-enabling information and resource exchange among organizations (Galaskiewicz & Wasserman, 1989; Valeeva et al., 2020). This is based on the expectation that individuals who create an interlock are willing to share observations and relevant experiences from other companies in which they serve as directors. Early proponents of RDT suggested that “when an organization appoints an individual to a board, it expects the individual will come to support the organization, will concern himself with its problems, will variably present it to others, and will try to aid it” (Pfeffer & Salancik, 1978: 163). When faced with environmental uncertainty,

companies use the mechanism of board interlocking, thus extending the scope of possible advice and counsel by reaching out to practices from other boards, enhancing its chances of increased legitimacy, opening the direct communication channels to new external partners, and getting access to support from stakeholders outside of the firm (Hillman & Dalziel, 2003; Martin, Gözübüyük, & Becerra, 2015). As such, board interlocks have been shown to influence a wide range of corporate practices, including acquisition activity (Haunschild, 1993), environmental scanning (Useem, 1984), and strategic decisions (Geletkanycz & Hambrick, 1997). Board interlocks improve horizontal coordination with competitors and vertical coordination with suppliers (Schoorman, Bazerman, & Atkin, 1981) and increase the tendency to establish business group affiliations (Khanna & Rivkin, 2006).

Board interlocks tend to cluster geographically between firms that are physically close to one another (e.g., Kono et al., 1998; Kogut, 2012). This is consistent with the broader literature on inter-organizational relationships and the importance of geographic proximity in building inter-firm ties (e.g., Boschma, 2005; Green, 1983; Perrucci & Pilisuk, 1970; Scott, 1988). Allen (1978) already found that corporations tend to compete and transact primarily with other firms that are headquartered near them and that corporations reduce resource uncertainty by interlocking with local competitors and transaction partners. This was not the case for other firms headquartered in distant locales. Moreover, geographic proximity favors the knowledge creation and dissemination process, as knowledge incorporates several tacit components that are difficult to transfer across borders (Brown & Duguid, 1991; Polanyi & Sen, 2009). For this reason, knowledge tends to be geographically bound, and embeddedness within the same geographic domain is thus likely to facilitate knowledge transfer across organizations (Jensen & Szulanski, 2004; Zaheer & Hernandez, 2011). The greater the distance between actors, the higher the complexity and costs of transactions (Caiazza & Simoni, 2015; Nachum & Zaheer, 2005), and the more difficult it is to transfer these tacit forms of knowledge. Besides promoting the direct transfer of information and knowledge, geographic proximity plays a complementary role in building other proximity types that are social, organizational, institutional, and cognitive in nature (Howells, 2002). Short distance brings people together and favors trust-building and the birth of both informal and formal networks, leading to the creation of personal and more embedded relationships between firms, which is employed to facilitate the exchange of knowledge and information (Audretsch & Stephan, 1996; Boschma, 2005; Harrison, 1992).

Proximity thus breeds interlocking directorates. While the literature has historically focused on domestic firms, we argue that a similar logic applies to multinational firms. IB scholars have only recently begun to study the importance and impact of board interlocks for MNCs and to link the phenomenon to internationalization strategy (see Lamb & Roundy, 2016; Peng, Mutlu, Sauerwald, Au, & Wang, 2015). However, strategic decisions about international expansion as well as the monitoring of investments relating to internationalization projects are typically board-level issues (Aguilera & Jackson, 2010; Barroso et al., 2011; Filatotchev & Wright, 2011). MNCs therefore create HQ board interlocks with another *compatriot* or *foreign* MNCs. In *both* cases, as we argue below, proximity plays an important role in the creation of corporate board interlocks.

2.2. Proximity at headquarters

When firms internationalize, their resource uncertainty increases, and they seek ways to reduce this uncertainty. Sharing a board member with another MNC provides direct access to its top-level decision making, valuable first-hand information, and access to new resources and networks. This approach is in line with important earlier work in the IB field. When MNCs invest abroad, they are typically confronted with a lack of network embeddedness and knowledge about the local context. Johanson and Vahlne (1977, 2009) suggested that MNCs face a liability

of foreignness due to their psychic distance from the host country as well as liability of ‘outsidership’, meaning that the firm is disadvantaged in a market in which it does not know who the business actors are or how they are related to one another unless it already has relationships to that market. Consequently, the work of MNC boards is more challenging than for domestic firms, as it deals with much more complicated strategies, structures, and environments (Luo, 2005). Firms operating internationally are involved in more complex information exchange and knowledge transfer patterns within their internal and external networks, leading to increased demand for connectivity (Caiazza & Simoni, 2015). RDT suggests that firms can deal with these challenges by seeking relations with the boards of other MNCs facing similar issues.

For MNCs investing abroad, bringing on board directors from other MNCs with similar internationalization processes can assist in dealing with the liabilities they confront. An interlocking director’s own experience also facilitates foreign expansion because direct organizational experience yields substantive information about a location’s culture, its common business practices, preferences of consumers, the process of policymaking, the preferences of key public and private actors, and the likelihood of policy change (Barkema, Bell, & Pennings, 1996; Chang & Rosenzweig, 2001; Caiazza, Cannella, Phan, & Simoni, 2018). A sizable body of literature has established that board interlocks serve as crucial (coordination) mechanisms for the dissemination of corporate practices, strategies, and processes as well as providing a social infrastructure that facilitates learning (Shropshire, 2010). For example, board interlocks serve as an infrastructure for the dissemination of information and practices as well as for learning about market opportunities (Tuschke, Sanders, & Hernandez, 2014). Therefore, interlocks are relevant to knowledge and information transfer among MNCs. They can be used in managing information and knowledge across geographically dispersed establishments, gathering external market intelligence, and providing information in advertising, accounting, and consulting (Zona, Boyd, & Haynes, 2018). These directors thus play an important role in facilitating knowledge transfer and identifying and absorbing knowledge about internationalization. Since it is sometimes difficult to search, process, and exchange critical competitive information, the costs of information exchange can be substantial for MNCs (Bel & Fageda, 2008). Through a board interlock, all these potential benefits can be invoked by an MNC to exchange knowledge and information that can be useful to overcome the liability of foreignness and outsidership in internationalization (Johanson & Vahlne, 2009).

We expect that the advantages arising from the exploitation of geographic proximity highlighted by RDT—for example, frequent face-to-face interactions, increased communication efficiency, reduced knowledge transfer costs, and lower uncertainty (Boschma, 2005; Kono et al., 1998; Tomlin, 1981; Tyre & Von Hippel, 1997)—will also apply to MNCs. We thus anticipate that MNCs will first seek out board members within their existing HQ network, meaning that board interlocks are likely to be driven by HQ proximity, onboarding directors from compatriot MNCs. Several notable studies have demonstrated how within-country board interlocks relate to internationalization strategy. For instance, interlocking directorates connecting German companies that operate internationally were found to facilitate learning in the process of entering emerging economies (Tuschke, Sanders, & Hernandez, 2014). Similarly, Peng, Au, and Wang (2001) showed that, in Thailand, interlocks are positively and significantly correlated with the internationalization of firms. Chen, Hsu, and Chang (2016) also found that interlocking directorates were positively associated with internationalization for a sample of Taiwanese electronics firms. Studies on family conglomerates and business groups (India), *chaebol* (Korea), *grupos económicos* (Mexico) or *keiretsu* (Japan) also confirm that these board-interlinked firms are sensitive to common internationalization (Aguilera, Crespi-Cladera, Infantes, & Pascual-Fuster, 2020; Belderbos & Carree, 2002). Existing work has also established that firm internationalization impacts board characteristics, such as the inclusion of outside board members or board members with international experience

or multiple directorships (Lai, Chen, & Song, 2019; Lukason & Vissak, 2020; Rivas, 2012). Following this rationale, we propose that MNCs have a higher propensity for sharing board members with other MNCs when their headquarters are located in the same country owing to the effects of HQ geographic proximity. We therefore expect the following baseline hypothesis to hold:

H1. *An interlock between the boards of two MNCs is more likely when their headquarters are co-located in the same country.*

2.3. Proximity at a distance: the role of subsidiary co-location

The growing appreciation in the IB literature of the role of internationalization for board interlock formation has hitherto overlooked the role of co-location of foreign investment. We argue that similarity in foreign investment location is key in the relationship between firm internationalization and board interlock formation. First, we propose that firms will invite board members who are affiliated with other MNCs that invest in the same foreign location because both firms are exposed to similar challenges arising from the new context. After all, when two firms invest in the same foreign location, they face a similar political, economic, and cultural environment that is responsible for the liabilities of foreignness and outsidership (Beugelsdijk et al., 2018; Dellestrand & Kappen, 2012; Johanson & Vahlne, 1977, 2009; Zaheer et al., 2012). In this case, both foreign subsidiaries face the same context that typically confronts them with a lack of local knowledge and network embeddedness. An interlocking directorate is, indeed, an ideal conduit for value creation as MNCs benefit from sharing the information collected by their respective subsidiaries and from accessing their reciprocal non-localized resources, thus performing an entrepreneurial and coordination role (Caiazza et al., 2018). Board interlocks may also influence the individual costs of both HQ and the subsidiaries by reducing communication time and by easing access to information and resources. MNCs can thus decrease their liabilities of foreignness and outsidership and the associated costs by connecting their boards of directors. These factors suggest that two MNCs that both invest in the same distant location have a greater propensity for interlocking.

As such, we propose that subsidiary co-location also provides an opportunity for a HQ board interlock to occur. Given the importance of social networks for firm-level connections, MNC managers must connect. Expatriates have numerous social ties, and they likely connect in MNCs' home countries and host locations (Van Bochove & Engbersen, 2015). Research has demonstrated that expatriates represent a privileged class of high-skilled workers who often cling together (De Vries, 2017). These managers focus on integration into the global and local expatriate community rather than the broader local community. Therefore, foreign subsidiaries' CEOs and other MNC representatives will typically meet within these communities at international events; use similar legal, audit, and market service companies; meet locally with the same government officials; and form a conduit between local and global networks (Beaverstock, 2002; Jones, 2002). The odds of social interaction increase if these activities are geographically centered around the same social foci (Kono et al., 1998), not only at the MNC's HQ but also in a foreign subsidiary location (Chakravarty, Goerzen, Musteen, & Ahsan, 2021; Dahms, 2019; Ma, Zhang, & Liu, 2018).

This notion returns us to the role of proximity in MNC board interlock formation. The board-level tie is put in place because the two firms are in close proximity in the foreign location in which they invest. Geographic proximity of foreign subsidiaries enables MNCs to connect their respective multinational networks. The subsidiaries of an MNC are embedded in both their internal MNC network and their external environments (Andersson, Forsgren, & Holm, 2002; Ciabuschi et al., 2011). Internally, multinationals forge links with their foreign subsidiaries to monitor, coordinate, and control subsidiaries' business activities, to exchange information, or to cooperate with one another to achieve synergies. Externally, the MNC collects and reports information on

markets, business opportunities, and environmental changes, such as those relating to regulations. The flows of assets, knowledge, information, and resources in an MNC's internal and external networks are indispensable in creating value and enhancing the firm's competitive advantage (Almeida & Phene, 2004). In their internal coordination and external information-gathering roles, the multinational and its subsidiaries can benefit from the presence of strategically chosen interlocking directorates. Board interlocks can increase knowledge transfer efficiency and achieve cost reductions in coordination efforts and information exchange.

This is consistent with the shift away from hierarchical conceptualizations of the MNC toward increased recognition of subsidiaries' role in the global MNC network. Conceptually, MNCs are best understood as a diversified network (Gereffi, Humphrey, & Sturgeon, 2005; Ghoshal & Bartlett, 1990). Indeed, for modern MNCs, distance and proximity are multidimensional constructs. From this perspective, MNCs may be proximate at different locations. When both invest in a particular location, they are proximate at a distance. We therefore suggest that this "proximity at a distance" contingency of firms that invest in the same foreign location increases the propensity for these firms to create a board interlock. MNCs' resource-dependent strategic response can occur at one organizational level (HQ) to address uncertainties experienced at another organizational level (subsidiary). Therefore,

H2. *An interlock between the boards of two MNCs is more likely when their foreign subsidiaries are co-located.*

2.4. Proximity at a distance and transnational board interlock formation

Hitherto, we have argued that the proximity effect at the MNC HQ level increases the propensity of within-country board interlocks (H1), while the proximity at a distance effect can increase the propensity of HQ board interlocking, regardless of whether HQs are in the same (national board interlocks) or in different countries (transnational board interlocks) (H2). However, empirical work has consistently demonstrated an increase in and consolidation of transnational board interlocks (i.e., interlocks between the boards of two MNCs headquartered in different countries) (Carroll & Fennema, 2002; Forsgren et al., 2005; Heemskerk, 2013; Kentor & Jang, 2004). While the world "has become smaller" in recent decades, these transnational board interlocks connect firms whose HQ locations are on average 3000 km apart (Heemskerk & Takes, 2016, p. 113). This consistent empirical observation has exerted pressure on the validity of the role that proximity plays in fostering interlocking directorates. However, the concept of proximity at a distance presents an answer to this paradox.

The subsidiary co-location directs the MNC's attention toward a particular place and enhances the odds of establishing relationships with HQ representatives from another MNC dealing with similar uncertainties. Collaboration with foreign MNCs can enable top management to promptly identify new market and knowledge opportunities and directions for the firm, thus ensuring its long-term competitive advantage (Collings, Morley, & Gunnigle, 2008). In this respect, research has demonstrated that firms are likely to learn more from foreign rather than domestic collaborations, given that collaborations with foreign partners enrich the pool of skills and capabilities available to the firm (Andersson, Dasí, Mudambi, & Pedersen, 2016). Indeed, foreign partners provide MNCs with access to real "state of the art technological knowledge" (Chatterji & Manuel, 1993). Moreover, since knowledge and resources differ across countries, foreign collaborations tend to increase and diversify an MNC's knowledge base (Ebersberger, Feit, & Mengis, 2021). Finally, collaborations between foreign subsidiaries enable MNCs to participate in international innovation networks and to tap into knowledge reservoirs and frontier technologies developed in specialized clusters by more advanced competitors (Hsieh, Ganotakis, Kafourous, & Wang, 2018). Hence, to compete internationally, firms are increasingly resorting to external sources of knowledge by opening their

organizational boundaries (Berchicci, 2013; Garavelli, Petruzzelli, Natalicchio, & Vanhaverbeke, 2013).

Thus, we argue that multinational firms headquartered in different countries that expand into contextually distant countries are more likely to take advantage of subsidiary co-locations to create board interlocks. Indeed, the two co-located foreign subsidiaries will trigger the “proximity at a distance” mechanism and combine their two MNC boards not only to better learn from their peers, overcome information and resource challenges abroad, and more effectively imitate the investment decisions of the other firm with the final aim of reducing the costs, complexity, and liabilities associated with the foreign investment but also to benefit from the opportunity to source more advanced and diversified knowledge and technology from their foreign partners (Klärner, Yoshikawa, & Hitt, 2021). We therefore propose that the effect of the co-location of subsidiaries on board interlocks is stronger for transnational interlocks when headquarters are not co-located within the same country:

H3. *The co-location of foreign subsidiaries is more important for the odds of board interlock formation when the HQs are not co-located (i.e., when they are located in different countries).*

3. Data and methods

3.1. Database

We sourced our data from Bureau van Dijk's ORBIS database. ORBIS provides information on over 200 million firms worldwide, giving extensive coverage of HQs, subsidiaries, and boards across the globe. Over 160 providers collect data from official registers, annual reports, and company websites to create the database, facilitating unprecedented insight into the scale and scope of interlocking directorates. ORBIS' data quality differs across regions, and yet it is frequently identified as one of the best data sources on corporations today (Compston, 2013; Heemskerk & Takes, 2016; Vitali et al., 2011). For instance, firm coverage is better for high-income than for low-income countries (Garcia-Bernardo & Takes, 2018). For each available company, we extracted its directors, operating revenue, country, HQs and subsidiary locations, and sectors for both HQs and subsidiaries. We use all current appointments as of September 2015.

To determine whether two subsidiaries are co-located, we followed an existing approach that merges nearby towns that are part of the same agglomeration into city clusters, thereby limiting missing or incorrect observations (Heemskerk, Takes, Garcia-Bernardo, & Huijzer, 2016). In total, we collected data on 8,839,464 subsidiary dyads co-located within the same city. Among these, 37,234 co-locations are associated with interlocking directorates at the HQ level. Moreover, we collected control data on 3,210,081 firm dyads with subsidiaries in different cities. Among these, 5763 dyads are associated with interlocking directorates at the HQ level.

3.2. Dependent and explanatory variables

Our dependent variable is a dyadic binary variable named *board interlock* that measures the occurrence of a board interlock between MNCs at the HQ level. That is, their boards of directors share at least one member. Our main independent variables are *co-located headquarters* and *co-located subsidiaries*. These are both dummy variables indicating whether these firms either have co-located headquarters or foreign subsidiaries. The dummy variable *co-located headquarters* disentangles whether the HQs are in the same home country. As far as the subsidiary co-location is concerned, it has been argued that MNCs target specific locations within countries rather than countries as a whole (Belderbos, Du, & Slangen, 2020; Beugelsdijk & Mudambi, 2013; Crescenzi et al., 2014), as they take into account the markets' subnational characteristics rather than national features in their location decision process.¹ We therefore identify subsidiary co-location at the level of city agglomerations. Our third independent variable is the interaction between *co-located headquarters* and *co-located subsidiaries*. This allows us to test whether the proximity at a distance effect is strengthened if the headquarters are not co-located in the same country and hence form a transnational board interlock.

3.3. Control variables

We include a set of various control variables in our model. First, we expect that the effect of co-location of HQs on board interlock formation will remain in place if we control for the physical *distance of the headquarters*. We also include two controls for the distance between the headquarters and their co-located subsidiaries (i.e., *distance sum* and *distance difference*). The former is the sum of the distance between the two HQs and the locations of their subsidiaries, while the latter considers the difference between these distances—that is, the extent to which one of the HQs is more distant to the subsidiary co-location than the other. Next, it is well documented that interlock activity is correlated with firm size, so we need to control for the *firm size* of HQs on interlock formation. To measure this variable, we include the logarithm of the sum of the total revenue for both firms. Furthermore, preferential attachment is a well-known property in network dynamics, whereby high-degree nodes have higher odds of attracting additional ties. Board interlock networks are no exception to this rule, and therefore we control for the degree centrality of the MNCs through the variable *interlock degree centrality*—that is, the number of other board interlocks with other firms. Furthermore, the odds of forming interlocks are likely dependent on the size of the cities in which the firms are based. Therefore, the *city size of HQs* is included, in line with research on the importance of global cities in creating networks (Santangelo, 2018). City size is calculated as the product of the number of companies in HQ locations. In addition, organizations operating in many geographically dispersed locales require more information to manage their environments (Dill, 1958; Mizruchi & Schwartz, 1992). As firms internationalize, they require the ability to both connect different parts of the world and operate successfully in a wide variety of political and economic

¹ This is consistent with the notion that competition between locations to attract FDI is stronger across countries than within countries (Basile, Castellani, & Zanfei, 2008; Villaverde & Maza, 2015). This implies that it is essential to analyze investment decisions at a more fine-grained subnational level. Hence, the question is at what level co-location is significantly effective for relevant networks to be organized. Cities are arguably the most important foci for international business (Sassen, 1991). The rising prominence of cities as centers of economic activity helps to explain why global economic organization is centered around “sticky spaces in slippery space” (Markusen, 1996). We therefore suggest that the city level represents the more valid and relevant geographic area for our measurement of proximity at a distance. We use a dyadic dependent variable to explain the occurrence of interlocking directorates as a function of their headquarters and subsidiary co-locations.

Table 1
Overview of dependent, independent, and control variables.

	Description	Label	Mean	STD
Dependent variable				
Board interlock	Common HQ board member: binary (true/false)	Interlock	0.0027	0.0520
Independent variables				
Co-located headquarters	HQ in same home country: binary (true/false)	Co-located HQ	0.0920	0.2890
Co-located subsidiaries	Subsidiary in same city: binary (true/false)	Co-located sub	0.7215	0.4483
Co-located headquarters * Co-located subsidiaries		Co-located HQ * Co-located sub	0.0787	0.2693
Control variables				
Distance between HQs	log 10 (distance between HQs)	Distance HQs	3.3330	0.8214
Sum of distances of HQs to co-located subsidiaries	log10 (distance (HQ1 to Sub1) + distance (HQ2 to Sub2))	Distance Sum	3.6009	0.5523
Difference of distances of HQs to co-located subsidiaries	log10 distance (HQ1 to Sub1) – distance (HQ2 to Sub2)	Distance Diff	3.1077	0.9045
Firm size	log10 (revenue HQ1) + log10 (revenue HQ2)	Firm Size	11.9224	2.4485
Interlock degree centrality	log10 (# interlocks HQ1) + log10 (# interlocks HQ2)	Degree centrality	7.4908	1.1746
City size of HQs	log10 (# companies in city HQ1) + log10 (# companies in city HQ2)	City Size HQ	6.9202	1.5658
International exposure	log10 (# countries active HQ1) + log10 (# countries active HQ2)	Int Exposure	2.321212	0.809164
No. of subsidiaries	log10 (# subsidiaries HQ1) + log10 (# subsidiaries HQ2)	N. Subsidiaries	3.968378	1.10363
Sector diversification	log10 (# sectors HQ1) + log10 (# sectors HQ2)	Sector Div	2.999838	0.76287
Firms HQ1 and HQ2 in the same sector	binary (true/false)	Same Sector	0.2036	0.4026

Source: Authors' own work based on ORBIS data (Bureau Van Dijk).

conditions. As such, we introduce the variables *international exposure* (measured by the number of countries in which an MNC is active) and *number of subsidiaries* (measured by the number of subsidiaries it has) to control for the effect of the firm's higher degree of internationalization on the likelihood of interlocking. Finally, a corporation's industrial similarity or diversity may also influence its odds of interlocking. Sectoral similarity may increase the likelihood of strategic cooperation. However, sectoral diversification may stimulate the use of interlocks as a strategy for obtaining the benefits of cross-industry cooperation. [Nicholson et al. \(2004\)](#) found interlocking to be particularly advantageous for companies facing high organizational complexity. We therefore include how the sectoral similarity influences the probability for interlocks through the dummy variable *same sector* if firms HQ1 and HQ2 operate in the same sector and control for the effect of industrial

diversification of firms through the variable *sector diversification* accounting for the number of different industries in which the two HQs operate. [Table 1](#) provides an overview of the key descriptors of the variables used in our model, and [Table A1](#) in the [Appendix](#) demonstrates the correlation between the variables. All continuous variables were scaled to have a mean of zero and a standard deviation equal to one.

3.4. Methodology

Our main goal is to assess the relationship between the existence of an interlock between two MNC HQs and the fact that they are co-located or have a co-located subsidiary (the proximity at a distance effect). It may be tempting to treat this as a problem of explaining (board interlock) link formation in a network. However, the size of our dataset makes it impossible to employ the statistical models that are typically employed for such tasks ([Block et al., 2019](#)), such as exponential random graph models (ERGMs) or stochastic actor-oriented models (SAOMs). Instead, we argue that our problem is one of estimating the probability of interlocks between pairs of HQs, which can be done using a logistic regression model. This makes our approach similar to that of link prediction, a well-studied problem in network analysis wherein the goal is to explain which links are likely to exist, given the structural position of a pair of nodes in a network ([Martínez, Berzal, Cubero, 2016](#)).

However, standard maximum likelihood estimates fail for such problems, as the data is highly sparse or imbalanced (see [Altman et al., 2004](#)). We addressed the two main issues in the data as follows. First, to eliminate the impact of multicollinearity, we used L2-regularized logistic regression ([Fan, Chang, Hsieh, Wang, & Lin, 2008](#)). L2-regularized regression adds an extra constraint to the regression: the sum of the square of all coefficients must be below a parameter *C*. This reduces the coefficients of the less important variables, preserving those that are more predictive and eliminating issues of multicollinearity ([Park and Hastie, 2008](#)).² The issue gets reduced to finding the optimal value for parameter *C*, preventing overfitting. We use a standard stratified 10-fold cross-validation ([Kohavi, 1995](#)). This technique, for the purpose of finding the optimal parameters, separates the data into separate train and test sets, where the model is fit on 50% of the data (the train split) and the fit of the model is calculated on the other 50% (the test split). This maximizes the out-of-sample predictive power of the logistic regression and limits concerns of multicollinearity. The model's fit was measured using the ROC AUC score, which weighs the true positive and false positive rates similarly. Second, recall that our data consist of dyads of two co-located subsidiaries (and HQs), meaning that for each city, the number of co-located subsidiary pairs is quadratic in the total number of subsidiaries (HQs). However, only a relatively small number of dyads (4.2 in 1000) was associated with an interlock, meaning that we are indeed dealing with highly sparse data. Therefore, we increased the weight of the positive observations (observing interlock) relative to the negative observations to a value. The weight is given by the parameter *class_weight*. This method is commonly applied in a machine learning context, in which to train the model, false negatives (not predicting an interlock when there is an interlock) are penalized more than true positives (correctly predicting the interlock). We find the optimal value of *class_weight* using the cross-validation approach explained above. Using grid search, the optimal parameters were found to be *class_weight* = 0.001438 and *C* = 100, with an AUC score of 0.90. To calculate confidence intervals, we used 100 bootstrapping samples. Subsequent regressions were performed using the logistic regression package of *sklearn* ([Pedregosa et al., 2011](#)).

² This statistical approach is commonly applied in the area of biogenetics where the number of potential genetic predictors that are related with the occurrence of a disease far exceeds the number of observations in the samples examined and is now gaining traction in other fields (see [Chalamandaris & Vlachogiannakis, 2018](#)).

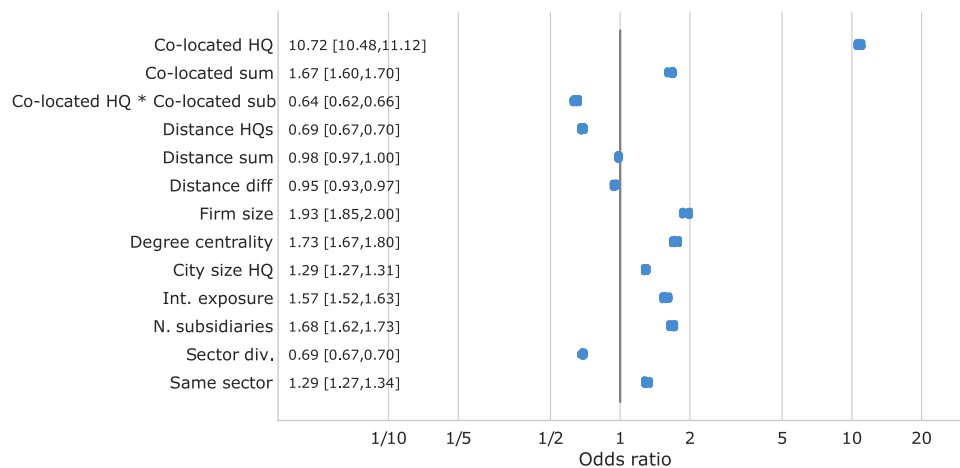


Fig. 1. Regression results: effects on board interlock odds ratios, full model. Note: Based on 100 bootstrap samples, each point represents a sample. Means and confidence intervals are shown between brackets for each variable. For reference, the results of a non-penalized (i.e., standard) logistic regression are included in Appendix Table A2.

Source: Authors' own work based on data retrieved from Bureau van Dijk's ORBIS database.

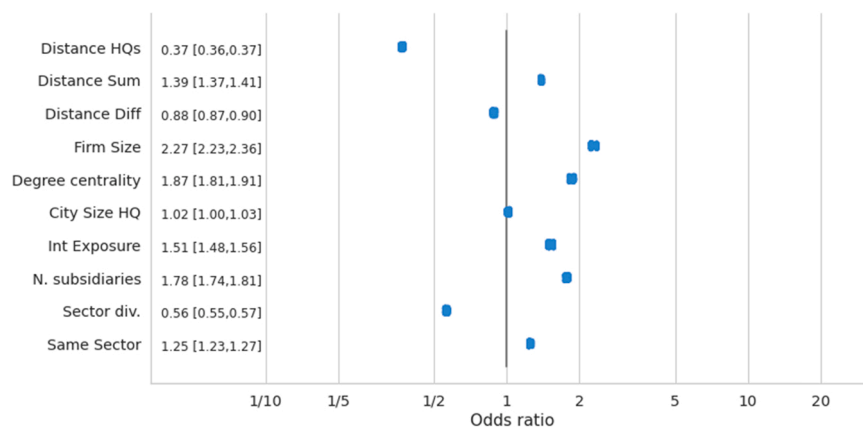


Fig. A1. Regression results: effects on board interlock odds ratios, control variables only.

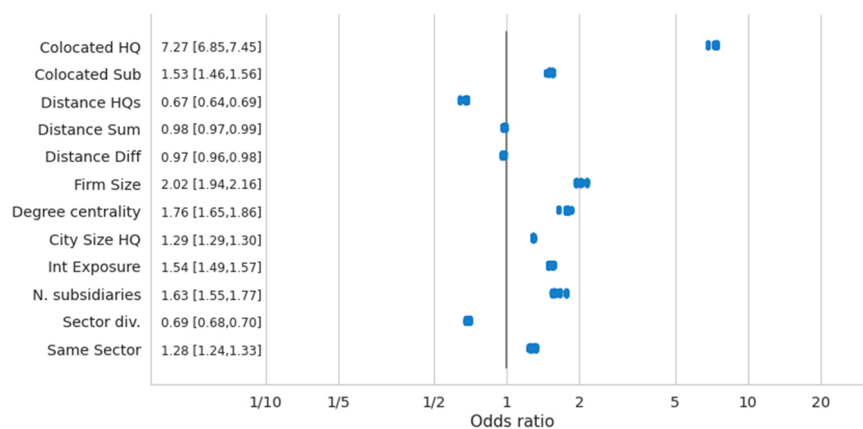


Fig. A2. Regression results: effects on board interlock odds ratios, explanatory variables without interaction.

4. Results

Fig. 1 illustrates the outcomes of our analysis and indicates which factors affect the propensity to interlock for MNCs. The figure shows the odds ratios and coefficients (between brackets). The points are independent bootstrapping samples, showing the results' sensitivity to

changes in the data (see Section 3.4). For this reason, we use a figure to represent the results. The figure presents our final model, with three independent variables and all control variables. In the Appendix, we also included the results for the model with only controls and with the controls and the first two independent variables but not the interaction effect (Appendix Figs. A1 and A2). While we are confident that our

Table A1

Correlation between different variables in our experimental setup.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1: Interlock													
2: Co-located HQ	0.10												
3: Co-located sub	0.02	0.10											
4: Co-located HQ * Co-located sub	0.09	0.92	0.20										
5: Distance HQs	-0.08	-0.56	-0.07	-0.53									
6: Distance sum	0.00	0.08	0.19	0.08	0.46								
7: Distance diff	-0.06	-0.43	-0.02	-0.45	0.83	0.61							
8: Firm size	0.06	0.14	0.17	0.14	0.07	0.36	0.13						
9: Degree centrality	0.07	0.13	0.28	0.14	-0.06	0.26	0.03	0.67					
10: City size HQ	0.01	-0.17	0.00	-0.16	-0.23	-0.32	-0.22	-0.07	0.10				
11: Int exposure	0.06	0.14	0.26	0.14	0.00	0.36	0.10	0.71	0.83	-0.01			
12: N. subsidiaries	0.07	0.14	0.19	0.14	-0.02	0.28	0.06	0.75	0.92	0.05	0.85		
13: Sector div.	0.06	0.09	0.17	0.09	-0.04	0.23	0.04	0.70	0.84	0.05	0.86	0.90	
14: Same sector	0.00	0.10	0.03	0.10	-0.16	-0.07	-0.15	-0.15	-0.04	0.04	-0.09	-0.07	-0.09

Note: Because we use penalized logistic regression rather than a stepwise regression technique, multicollinearity was not an issue in our analysis (see Section 3.4). The correlation matrix is thus included for the purpose of illustrating the relationships between the variables.

Table A2

Regression results: effect on board interlocks using non-penalized (i.e., standard) logistic regression as robustness test.

Dependent variable	(1)	(2)	(3)	(4)	(5)
HQ board interlock	Logit	Logit	Probit	2SLS	Logit
Co-located HQ		2.236*** (135.21)	0.821*** (129.70)	0.0136*** (167.93)	2.655*** (79.88)
Co-located sub		0.237*** (13.69)	0.0895*** (14.52)	0.00344*** (18.77)	0.443*** (19.02)
Co-located HQ * Co-located sub					-0.491*** (- 14.54)
Distance HQs	-0.785*** (- 103.77)	-0.181*** (- 17.75)	-0.0871*** (- 21.17)	-0.00312*** (- 71.31)	-0.116*** (- 10.70)
Distance sum	-0.0311*** (- 2.68)	-0.275*** (- 22.21)	-0.108*** (- 22.43)	-0.000914*** (- 15.09)	-0.258*** (- 20.78)
Distance diff	0.119*** (14.96)	0.171*** (17.70)	0.0647*** (16.49)	0.000595*** (14.66)	0.0930*** (8.56)
Firm size HQs	0.413*** (67.33)	0.352*** (58.89)	0.113*** (53.63)	0.000424*** (37.91)	0.352*** (58.95)
Interlock degree centrality	0.432*** (28.71)	0.433*** (28.47)	0.163*** (29.40)	-0.000334*** (- 6.09)	0.430*** (28.33)
City size HQs	-0.0552*** (- 16.38)	0.144*** (36.97)	0.0592*** (40.79)	0.000594*** (48.08)	0.145*** (37.31)
International exposure	0.554*** (31.38)	0.389*** (21.85)	0.148*** (22.93)	-0.000322*** (- 5.89)	0.384*** (21.56)
N. subsidiaries	0.357*** (18.95)	0.188*** (10.09)	0.0858*** (12.41)	0.00251*** (41.46)	0.195*** (10.41)
Sector diversification	-0.545*** (- 25.29)	-0.00457 (- 0.21)	-0.0312*** (- 3.78)	0.000498*** (7.42)	-0.00783 (- 0.36)
Same sector	-0.795*** (- 55.66)	-0.694*** (- 50.51)	-0.180*** (- 35.03)	-0.00141*** (- 32.16)	-0.687*** (- 50.02)
Constant	-13.45*** (- 134.40)	-16.65*** (- 157.09)	-6.489*** (- 169.96)	-0.00572*** (- 21.80)	-16.85*** (- 157.36)
N	12,049,545	12,049,545	12,049,545	12,049,545	12,049,545
LR χ^2	113,858.81	131,157.20	130,799.82	18,079.41 ¹	131,568.34
Pseudo R ²	0.1996	0.2303	0.2293		0.2306

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ¹ 2SLS reports Wald χ^2 ² 2SLS does not report Pseudo R².

choice of estimation method is appropriate given the imbalanced dataset at hand, as explained in the Methodology section, we provide robustness checks with non-penalized (i.e., standard) logistic and probit models in Table A2 in the Appendix, demonstrating that our findings are robust. In Table A2, we begin with the control logit Model 1 before adding the two direct explanatory variables of the co-location of HQ and the co-location of subsidiaries in Model 2. The same model specification is run using probit in Model 3.

Model 4 is an instrumental variable regression using two-stage least squares because we wish to ensure that our results hold when we control for the reverse causality that board interlock can lead to foreign subsidiary co-location. Following the seminal works by Ellison and Glaeser (1997) and Chang and Park (2005), we have employed foreign firm agglomeration as an exogenous variable that can explain foreign

subsidiary co-location but not HQ board interlock. Chang and Park (2005) demonstrated that firms tended to co-locate with others to benefit from network externalities. They specifically focused on regions and cities rather than on countries, which strengthens our use of foreign subsidiary agglomeration at the city level as an exogenous variable in the first-stage regression. A post-hoc test of endogeneity confirms that we can reject the null hypothesis that the variables are exogenous. Analysis of the first-stage regression reveals that foreign firm agglomeration (which has been measured by the sum of all foreign subsidiaries in that city) significantly explains foreign subsidiary co-location. The F-statistic of this first-stage regression output also indicates that we can reject the null hypothesis that our instruments are weak. Hence, this model confirms our results. Finally, Model 5 is the final logit model including the interaction variable between HQ and subsidiary

co-location to check whether our results hold for transnational board interlocks, meaning that we want to check whether foreign subsidiary co-location is more important for board interlocks between multinationals that are headquartered in different home countries. The results of Model 5 for our hypotheses are all in line with our original analysis, which we report below.

The results of our main approach provide strong support for our hypotheses. First, as Fig. 1 illustrates, we find that if the MNCs' HQs are in the same country, the odds of an interlock increase 10.7-fold. This robustly supports our first hypothesis and confirms that MNCs whose HQs are geographically proximate have a higher propensity for interlocking. Although we argued that co-location is the best way to measure proximity in our case, we also included distance as a control variable. Consistent with our theory, greater distances between HQ locations pose a significant barrier to board interlock formation.

Moving to our second hypothesis, Fig. 1 demonstrates that proximity at a distance as measured by the presence of co-located subsidiaries increases the likelihood of interlock between two MNCs 1.7-fold, thus supporting Hypothesis 2. This means that the characteristics of a firm's network of subsidiaries have a major influence on MNC board interlock formation.

Finally, Fig. 1 presents the results of the analysis that included the interaction between the first two independent variables. Again, we find strong support for our theoretical claims and for our third hypothesis in particular. The negative effect of the interaction means that when the HQs are not based in the same home country, the proximity of the co-located subsidiaries (proximity at a distance) is more important for the odds of board interlock formation. This means that proximity at a distance is an important driver for transnational board interlock formation. In sum, our results support all three hypotheses. Distance has a dual nature, and the proximity at a distance effect has a hitherto unnoticed but strong effect on the likelihood of board interlock formation, in particular that of transnational board interlocks.

Regarding the control variables, the expected effects are evident across all three models. As mentioned above, the distance between the headquarters negatively impacts the odds of board interlock formation. Furthermore, the likelihood of interlocking increases with firm size. When the size increases by ten, the odds increase by 93% (calculated from the figure by $(1.93 - 1) \times 100$). The results also confirm that a firm's internationalization increases board interlock odds, consistent with González's (2019b, 2019c) findings. Degree centrality in the board interlock network also impacts interlock formation, as expected. When two companies have ten times more interlocks with other firms outside the dyad, the odds of interlocking increase by 73%. Being in the same sector also increases the odds of interlocking by 29%, similar to the effect of HQ city size.

5. Discussion and conclusion

Our study provides novel, large-scale empirical evidence that the likelihood of MNCs' boards to interlock increases not only if their HQs are co-located but also if those MNCs co-locate investment in the same foreign locations. We call this "proximity at a distance" and find it particularly important to explain the formation of transnational board interlocks. Our results provide support for our hypotheses as well as several theoretically relevant nuances. This thereby advances our understanding of the relationship of connectivity between boards, firms, places, and spaces. Consequently, this study contributes to a recent call to increase knowledge explaining the co-evolution of these closely related phenomena that remain underexplored in the IB field (Can-o-Kollmann, Cantwell, Hannigan, Mudambi, & Song, 2016).

On the one hand, we show that, even in a global economy, proximity continues to play a role in board interlock formation, just as RDT expects. But, on the other hand, given the complexity and fragmentation of the MNC into many different entities across many different locations, proximity has become a multidimensional construct. Indeed, MNCs can

be either proximate in their home country, when their HQs are co-located, or proximate at a distance, when they invest in the same foreign location. Just as proximate HQs positively influence board interlock formation, we find that proximity at a distance through co-located subsidiaries also has a positive effect. Our results thus demonstrate how MNCs respond strategically to uncertainties experienced at the subsidiary level by forming interlocking ties at the board level. In fact, the proximity at a distance effect is particularly pronounced for transnational board interlocks. This means that the observed rise in transnational board interlocks is in fact consistent with the long-established importance of proximity for board interlock formation.

These results enable us to contribute to the CG and IB literatures both separately and jointly in response to the call for greater synergy between these two disciplines (Strange, Filatotchev, Buck, & Wright, 2009). Regarding the CG literature, we shed new light on the dynamics underlying transnational board interlock formation. Recent research (e.g., González, 2019c) has demonstrated that firms increasingly engage in transnational interlocks as internationalization intensifies and that expansion into physically distant countries may result in further engagement in these connections. Previous scholars, however, have not examined the mechanism via which these transnational interlocks occur and the specific role that foreign subsidiaries play in this regard. Our results uncovered a hitherto unknown mechanism of board interlock formation as a result of foreign investment co-location. Proximity at a distance offers a new way of explaining how (transnational) board interlocks form.

Concerning the IB literature, scholars have already established that foreign subsidiaries can play a role in improving MNCs' global governance, for instance, through their local boards as structural intermediaries between HQs and subsidiary management (Aguilera, Marano, & Haxhi, 2019). However, this work has not really touched upon mechanisms through which subsidiaries have an impact on the corporate governance of the MNC, such as the one we uncovered. Our results confirm that foreign subsidiary co-location can bring two MNCs together by establishing a board interlock—not at the subsidiary level but at the apex of its corporate control, the MNC's HQ board. We therefore show that board interlocks are not necessarily HQ driven, but may also be subsidiary-driven. While the dominant perspective on the MNC has assumed that HQ makes decisions (Foss, 2019; Foss, Foss, & Nell, 2012,,), our results lend support to an increasingly nuanced body of literature on the subsidiary perspective (Ambos, Kunisch, Leicht-Deobald, & Steinberg, 2019; Lunnan, Tomassen, Andersson, & Benito, 2019; Perri, Andersson, Nell, & Santangelo, 2013), which highlights how subsidiaries play an important role in the governance mechanisms of the MNC. We contribute to this by establishing the relationship between subsidiary co-location and board interlock at the HQ level. We call this phenomenon "proximity at a distance".

In addition, although our study does not specifically investigate the antecedents of (transnational) board interlock formation, our findings contribute to the IB literature by lending support to the view that board interlocks offer a means of reducing the liability of foreignness and outsidership and channels for cost reduction and value creation. The availability of an interlock allows lower information costs and transaction costs and thereby reduces the risks that may otherwise complicate or restrict ventures into foreign markets. Institutional theory suggests that other firms' networks may have an important impact on foreign direct investment decisions by providing the focal firm with key information and resources (Caiazza et al., 2018). An interlocking director can therefore be a source of information that can help reduce risk and increase legitimacy (Caiazza & Simoni, 2015). An interlocking director's firm's own experience yields substantive information about a location's culture, its common business practices, consumers' preferences, policymaking processes, the preferences of key public and private actors, and the likelihood of policy change (Barkema, Bell, & Pennings, 1996; Chang & Rosenzweig, 2001).

Regarding joint theoretical contributions, first, we provide an

explanation of the ‘paradox of distance’ that has been highlighted by both the IB and CG disciplines. IB scholars have demonstrated that geography can be both detrimental and beneficial for knowledge transfer across firms and for their innovation performance. On the one hand, geography is a source of costs (control, coordination, monitoring and travel) and differences (cultural and institutional) that increase complexity and uncertainty. On the other hand, distance also offers opportunities to foster creativity and innovation, as it allows for reaching diverse, novel, unique and non-redundant knowledge (Zaheer & Hernandez, 2011). In a similar vein, the CG literature points out that the extent to which firms are able to share and transfer knowledge (and resources in general) through board interlocking depends on geography, but perspectives on how this is accomplished are in contrast with one another. While proximity offers the opportunity to exploit face-to-face interactions, higher communication efficiency, and lower knowledge transfer costs (Boschma, 2005; Harrison, 1994; Kono et al., 1998; Tomlin, 1981; Tyre & Von Hippel, 1997), firms derive greater benefit from sharing knowledge and resources when they are located far away from one another (Martin et al., 2015). Both IB and CG thus have their own “paradox of distance”.

In line with Zaheer and Hernandez (2011), we provide a solution for this (IB and CG) puzzle by unpacking the multidimensional nature of the geography of MNCs as networks of physically dispersed organizational entities. The proximity at a distance mechanism offers an explanation of this paradox: while we observe that MNCs interlock when they are located in the same country, we also find that MNCs leverage their subsidiaries to foster interlocking directorates even when their HQs are located far away. The complexity of MNCs and their networks allows them to exploit the proximity at a distance mechanism for knowledge transfer.

As such, this study also further expands the explanatory power of RDT both within the IB and CG disciplines. Resource dependencies of co-located subsidiaries (potentially shared markets, customers, suppliers, etc.) enhance multi-level organizational adaptations. As uncertainty and dependencies increase, the need for links to other organizations also increases, including the possibility of HQ board interlocks. For example, declining profits and external shocks may lead to expanded business activity through diversification and strategic alliances with other companies. We demonstrate that the resource-dependent strategic response of complex organizations such as MNCs can occur at one organizational level (i.e., HQ) to address uncertainties experienced at another organizational level (i.e., subsidiary).

Organizational adaptations to dependencies entail the alignment of internal organizational elements with environmental pressures as well as attempts to alter their environments. Contrary to the classic conception of organizations, which treat firms as closed systems, contemporary MNCs are better understood as open systems with a keen eye on the environment’s impact. According to the open systems perspective, an organization will be effective to the extent that it recognizes changes in its environment and adjusts itself to those dependencies. MNCs increasingly engage in transnational board interlocks as a result of internationalization, and the joint expansion into foreign locations may result in further engagement in these connections. RDT suggests that subsidiary-driven interlocks evolve in response to the organizational challenges that MNCs face across their global operations. Subsidiaries can contribute to MNCs’ competitiveness by tapping into their external networks in their host locales (Almeida & Phene, 2004; Nohria & Ghoshal, 1997). Subsequently, the proximity of foreign subsidiaries allows MNCs to connect their respective multinational networks. Subsidiaries’ external networks can thus constitute a key strategic resource for MNCs.

5.1. Empirical contributions

We provide a further empirical contribution to the IB and CG literatures by introducing an innovative level of analysis and sample scale, thus extending previous findings on several fronts. While it is

acknowledged that there are within-country variations and possible regional effects that transcend the national borders that one should consider in searching for determinants of the phenomenon of interest (Beugelsdijk & Mudambi, 2013), earlier studies relating interlocking directorates to IB strategy have typically implemented country-level analysis. We see no theoretical necessity for this and consider subsidiary co-location effects at the city level. We thereby expand on recent research on the role of subnational levels and, in particular, cities in IB research (Nielsen, Asmussen, & Goerzen, 2018; Santangelo, 2018) and demonstrate how a focus on micro-locations such as cities advances our knowledge of the different organizational levels of corporate units within the MNC network. In doing so, we take a step toward overcoming methodological nationalism. Finally, while earlier studies in IB and related fields typically considered small national or regional samples, we employ a large-scale approach and test our dyadic network model on the available data on board interlock activity worldwide. This also demands methodological innovation through the application of machine learning techniques that enable us to deal with problems of data sparsity through regularization and cross-validation of samples.

5.2. Managerial implications

Our findings can guide international strategy and inform board member selection. Our work suggests that firms can strategically choose to expand to locations in which they have privileged access to relevant local networks through their boards’ personal social capital to avoid the liabilities of outsidership. Furthermore, firms may consider using board interlocking as an alternative mechanism to building more enduring relationships. We suggest this is a particularly attractive option for the company if access to the local network is a pressing need and if a firm wishes to have greater flexibility in reconstructing its access to geographically dispersed networks. Large emerging markets with dynamic market competition (fostering organizational and market disequilibrium) may stimulate the use of the proximity at a distance mechanism. Ensuring privileged access to relevant, local networks may also guide the board selection process ahead of investment. We propose that considering the locational imprints of existing candidate affiliations and social networks can help ensure the board’s optimal composition.

5.3. Limitations and future developments

We should also consider the results above in the context of the study’s limitations. We argued and found empirical support for the notion that the propensity of interlocking directorate formation increases when firms’ subsidiaries are located within the same city. However, it is not immediately clear which definition of location is most relevant for the mechanism we aimed to test. Is the uncertainty relating to a foreign investment driven by the country in which the subsidiaries are based? Or is it more finely grained and driven by the city’s location? Alternatively, is it driven by the subnational regions in which the subsidiaries are located? Our reading of the literature offers no clear guidance on this matter. We therefore consider this an important empirical question for future work that should test whether our results are also robust for regional and national co-locations.

Since we used cross-sectional data, we cannot claim unidirectional causality. Since board interlocks may drive as well as be determined by firm internationalization into particular locations, future research should examine the timing of investments compared to the timing of interlocks and consequent organizational change. In fact, in our robustness checks, we ran a 2SLS instrumental variable regression to control for this reverse causality, whereby a post-estimation test of endogeneity confirmed a significant relationship between board interlock and subsidiary co-location. Relatedly, the directionality of board interlocks is another important avenue for future research, which could focus on which companies send and receive board members. These limitations of our study may serve as motivation and direction for

further analyses.

Future research on the interlock formation in IB may also include several micro-level managerial questions, such as (a) how the ‘proximity at a distance’ phenomenon can influence knowledge transfer, learning, problem solving, organizational costs, and performance (in subsidiaries and HQs); (b) whether it stimulates centralization in MNCs’ decision making at the HQ level or decentralization at the subsidiary level; and (c) their role in MNC networks. CG research may benefit further from investigating the mechanisms that govern the creation of more diverse and international boards and the transnational ties that such actions develop. Recently developed knowledge on subsidiary roles and initiatives inside MNCs (Ambos, Andersson, & Birkinshaw, 2010; Schmid, Dzedek, & Lehrer, 2014) and increasing empirical evidence on foreign direct investment agglomeration can additionally contribute to CG knowledge. The process of transnational board interlock formation, its antecedents, and its effects, such as the impact on performance and questions, have yet to be explored with respect to whether transnational board interlocks mitigate environmental risks better than national board interlocks.

More generally, the newly identified link between subsidiary collocation and transnational board interlock formation may reflect changes in MNCs’ organizational structures and agility and, hence, is a topic that certainly merits further investigation. Our work suggests that, for MNCs, the first law of geography —“Everything is related to everything else, but near things are more related than distant things” (Tobler, 1970: 7)—still holds if we accept that being proximate can also be experienced at remote peripheries. Proximity at a distance helps to explain the emerging phenomenon of transnational board interlocks, and we hope that our contribution offers a fruitful foundation for future work concerning the relationship between subsidiary agglomeration and HQ interlocks as well as greater synergy between CG and IB research.

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Appendix

See Appendix Figs. A1 and A2 and Tables A1 and A2.

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