SHOULD BIRDS OF A FEATHER FLOCK TOGETHER? AGGLOMERATION BY NATIONALITY AS A CONSTRAINT IN INTERNATIONAL EXPANSION

by

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DEDICATION

To my grandmother,

who will not be able to read a word of this but will, nevertheless, be the most proud

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ABSTRACT

This study examines how national identity affects firm behavior and performance as firms expand internationally. Prior studies show that firms often follow the location decision of other firms from the same home country when moving abroad, which can lead to agglomeration by nationality in foreign markets. While foreign location choices are well understood, we know less about the consequences of agglomeration by nationality, an important question because shared nationality, while facilitating foreign market entry, may also have unintended negative consequences. This study fills this gap by studying the positive and negative consequences of agglomeration by nationality and the behavioral mechanisms that account for the performance consequences. I, first, argue that agglomeration by nationality can lead to a trade-off for firms by enhancing the performance of exploitative innovation but hindering explorative innovation. Second, focusing on the negative consequences on explorative innovation, I explore behavioral mechanisms such as forming homophilic relationships and imitating strategic decisions that mediate the effect of agglomeration by nationality on firm's explorative innovation performance in foreign markets. Finally, I explore firm-level characteristics that make some firms less (or more) likely to be negatively affected by agglomeration by nationality. Using a sample of non-U.S. pharmaceutical firms that conduct R&D in the U.S. from 1980 to 2006, I find empirical support for my theoretical arguments.

CHAPTER ONE. INTRODUCTION

With the IT cluster in Silicon Valley and film production in Hollywood as well-known examples, agglomeration of firms in concentrated geographical areas has been a topic of interest in research in economics, sociology and management (Krugman, 1991; Saxenian, 1994; Porter, 1998). Studies have especially highlighted the important role of clusters or agglomeration of firms as facilitators of innovation (Jaffe, Trajtenberg, and Henderson, 1993; Audretsch and Feldman, 1996). Agglomeration of firms facilitates knowledge transfer across firm boundaries and creates collaborative opportunities, which in turn attracts more entrants with new ideas, creating a virtuous cycle of innovative activities (Saxenian, 1994; Porter, 1998). On the other hand, studies have also shown agglomeration can lead to negative externalities such as increased competition and knowledge leakage (Baum and Mezias, 1992; Shaver and Flyer, 2000) and that certain firms intentionally avoid agglomerated areas (Alcácer and Chung, 2007). In my dissertation, I argue that clusters can, under certain conditions, *hinder* rather than facilitate innovative activities. By focusing on the under-researched but important role of firm identity in clusters, I show that agglomerating with firms that share an identity can create self-reliant communities and routinize innovation activities, making these firms less equipped for explorative innovation.

Firm identity, whether defined as a firm's internal perceptions of its characteristics or

external audiences' expectations to the firm (Albert and Whetten, 1985; Jensen, Kim, and Kim, 2011), guides not only the actions of the internal members, but also the actions at the firm-level and other firms' behavior towards the focal firm. Moreover, when firms have a shared identity, they often have similar behavioral tendencies and also behavioral expectations toward one another, activating the function of identity as a magnetic force that pulls these firms together. By focusing on shared identity among a subset of firms that co-locate geographically, I highlight that agglomeration of firms of similar identities can hinder innovation due to the important role of identity functioning as a magnet which increases the tendencies of homophilic relationships and alignment of strategies among firms that share similar identities. While shared identity can come from many sources, I focus on how nationality as an identity influences firms when they are agglomerated in foreign markets. The nationality of firms can impact agglomeration dynamics in multiple stages starting from the initial choice of locations: Research has shown that firms, in order to reduce the uncertainty in the decision making process, often follow other firms of the same nationality when choosing locations in foreign markets (Henisz and Delios, 2001; Guillén, 2002; Tan and Meyer, 2011). This study moves beyond simply focusing on the *existence* of agglomeration by nationality to examine the *consequences*. More specifically, I focus on how agglomeration by nationality subsequently affects firms' behaviors and strategies, and consequently their innovation performances after entering the foreign market.

When entering foreign markets, co-locating with other firms with the same nationality can initially have obvious benefits such as ease of communication (Miller et al., 2008), and increased collaboration (Tan and Meyer, 2011). While the entry benefits of agglomeration by nationality have been identified, I argue that agglomeration by nationality can, nevertheless, have important trade-offs in terms of innovation performance. Because shared nationality has entry

stage benefits, firms may initially form relationships and make strategic choices that are easily manageable and require less effort. These decisions, however, can become a source of rigidity for firms because they may become overembedded (Uzzi, 1996) in a sub-community of firms of the same nationality. Being constrained in a sub-community of firms sharing a nationality can be especially detrimental when a key objective of the focal firm's foreign market entry is to obtain new knowledge or to strengthen its research and development (R&D). I argue therefore that when firms are agglomerated with others of the same nationality, they will face a trade-off in that their exploitative innovation activities will benefit from the agglomeration while their explorative innovation will suffer.

Moreover, to further elaborate my theoretical arguments regarding the negative impact of agglomeration by nationality on explorative innovation, I focus on the important role of nationality as a shared identity that drives firm behavior and unpack specific behavioral mechanisms that may lead to such negative outcomes. I focus on relationship building and strategy formation in foreign markets as these are key operations of firms in building up operations in a new location. I argue that nationality as an identity functions as a magnet that not only pulls the firms together to form relationships but also aligns the behavior such as strategy formation of the firms that share the identity. First, I propose that agglomeration by nationality will promote the homophilic tendencies of individuals and organizations in a foreign market which will result in more relationships formed based on nationality. Focusing on the nationality composition of employees and the nationality of alliance partners, I argue that nationality based relationship building is one mechanism by which agglomeration by nationality leads to lower explorative innovation performance. Second, co-locating with more firms from the same home country will lead to more imitative strategies among the co-national subset of firms. Based on

more information firms have regarding the strategies that co-national firms are pursuing, firms are more likely to pay more attention to and, in turn, imitate the trajectories of these firms in the focal foreign market. Myopic strategy formation through a limited focus centered around co-national firms, I argue, is another mechanism by which agglomeration by nationality leads to a decrease in explorative innovation performance.

Finally, I explore the boundary conditions of my argument by examining firm characteristics that make certain firms more (or less) resistant to the magnetic pull by shared identity. In other words, I examine firm characteristics that moderate the negative relationship between agglomeration by nationality and explorative innovation. I argue that certain firm characteristics will attenuate the behavioral tendencies such as forming homophilous relationships or imitating strategic decisions and thus, make the firms less vulnerable to the impact of co-locating with other firms of the same nationality. I, first, examine the order in which firms enter the focal foreign location and argue that the firms that are early movers from their home country will be less negatively impacted by agglomeration by nationality compared to the firms that enter later when a co-national community has already been established. Second, I argue that the firms that have experience in other locations of the host country will be less affected by the co-national community and thus, experience less negative effects on explorative innovation when agglomerated with other firms of the same nationality. Third, I examine the culture of the home country of the firms and argue that firms from individualistic cultures as opposed to those from collectivistic cultures will exhibit less homophilic tendencies. I, therefore, argue that the individualism of the home country culture will moderate the negative impact of agglomeration by nationality on explorative innovation in a foreign market.

I study the consequences of agglomeration by nationality in an international setting in

which firms expand to a foreign market to obtain new knowledge and enhance their innovation capabilities. I use a sample of non-U.S. pharmaceutical firms that locate their R&D facilities in various U.S. locations and examine how these firms may face a trade-off in terms of different types of innovations such as patent generation and drug developments by agglomerating (or not agglomerating) with other pharmaceutical firms from the same home country. To further explore the mechanisms by which agglomeration by nationality leads to negative explorative innovation outcomes in terms of new drug developments, I examine the nationality of the employees, the nationality of the alliance partners and the imitation of technological trajectories by nationality in the foreign market. In sum, through the theoretical framework and empirical analysis, I develop a nuanced and rigorous account of how national identity, a neglected aspect of agglomeration literature, affects the behavior of firms and their subsequent performance in foreign markets. By integrating firm identity into agglomeration research, I identify another important negative externality of agglomeration above and beyond excessive competition. I also move beyond the influence of nationality on the location choice of firms when moving to foreign markets, and highlight the consequences by illustrating the behavior and strategic choices made in foreign markets.

By studying the negative consequences of agglomeration by nationality in foreign markets, my dissertation offers important new theoretical contributions. First, this study contributes to research on agglomeration. Prior research has emphasized the importance of clusters of facilitating innovation of the member firms (Marshall, 1920; Saxenian, 1994). By focusing on subsets of firms that share a nationality within a cluster, I show that tightly-knit clusters can come to resemble large firms (Almeida and Kogut, 1997) and become self-reliant communities. As a consequence, I show that agglomeration by nationality can lead to innovation

becoming routinized and incremental while hindering explorative innovation. Prior research on agglomeration has also pointed to the negative externalities of agglomeration (Marshall, 1920; McCann and Folta, 2008), especially emphasizing the negative externality that arises from excessive competition among firms that locate in geographically proximate locations (Baum and Mezias, 1992; Baum and Haveman, 1997). This study, by focusing on organizational identity, identifies another important source of negative externality of agglomeration. While prior research has mostly focused on the competitive dynamics within agglomerated clusters, I argue that when a subset of actors that share an identity agglomerate, homophilous tendencies may outweigh the competitive tendencies, but nevertheless lead to negative performance outcomes. Using nationality as a salient indicator of shared identity of firms in a foreign market, I theorize that firms of the same nationality are more likely to interact in a cooperative manner, rather than intensely compete with each other, in a foreign market and consequently become embedded in a social structure based on nationality, restricting them from a diverse set of connections. Specifically, I propose that when firms that share the same nationality agglomerate, they will initially imitate one another's strategies and form more relationships with actors of the same nationality which can consequently lead to negative innovation outcomes.

Second, my study contributes to the research on foreign market entry by theorizing the stages after entry. Prior research on foreign market entry has highlighted the imitative behavior of firms of others from the same home country when choosing locations in foreign markets (Henisz and Delios, 2001; Guillén, 2002). I shift the attention from the entry stage and focus on firm behavior and performance after the initial entry to show the consequences of agglomerating by nationality. Following the firms throughout multiple stages of their foreign expansion is important given that the factors that lead to location choice may not always lead to positive

outcomes in terms of performance in the market. Finally, this study contributes to research on the agglomeration of actors by ethnicity/nationality. Most research on agglomeration by nationality have focused on individuals and ethnic enclaves (Portes, 2010) and highlighted the benefits of agglomeration by nationality in foreign markets. The few studies at the organizational level have also emphasized the initial benefits such as ease of communication and information sharing. This study shifts attention from the short-run positive consequences of agglomeration to the long-run negative consequences, thus highlighting an important trade-off between ease of market entry and long-run competitiveness in foreign markets. I certainly do not suggest that agglomeration by nationality or homophily do not have benefits but emphasize instead the importance of a long-term perspective in location choice.

My dissertation is organized as follows. In Chapter Two, I review prior literature on the advantages and disadvantages of agglomeration, and the role of national identity in entry and agglomeration in foreign markets, and discuss the contribution of my study in each of these areas. In Chapter Three, I theorize the impact of agglomeration by nationality on firms' innovation activity and subsequent performance. Specifically, I argue that firms face a trade-off by agglomerating with firms of the same nationality in that exploitative innovation performance increases whereas explorative innovation performance can decrease. Furthermore, focusing on the negative impact of agglomeration by nationality on explorative innovation, I examine the behavioral mechanisms that lead to the negative outcomes when firms co-locate with other firms from the same home country. Finally, I explore the boundaries conditions of the argument by identifying firm-level characteristics that attenuate the negative effects of agglomeration by nationality. In Chapter Four, I empirically test the aforementioned theoretical arguments in the context of the global pharmaceutical industry. More specifically, I examine how co-location of

non-U.S. pharmaceutical firms in U.S. cities (and states) impacts their drug development (explorative innovation) and patent generation (exploitative innovation). Finally, in Chapter Five, I conclude by discussing my findings, limitations, theoretical contributions and managerial implications of my dissertation.

CHAPTER TWO. LITERATURE REVIEW

In this chapter, I review prior research on agglomeration and its impact on innovation, the role of national identity in foreign markets and foreign market entry, and agglomeration of individuals and organization by nationality in foreign markets. I begin with research on agglomeration and the positive and negative externalities associated with agglomeration before introducing national identity as a source of hitherto unexplored types of agglomeration disadvantages. I discuss next the importance of nationality as a salient part of firm identity in foreign markets, especially with regards to foreign market entry, and its function of connecting and aligning firms that share the same identity. Finally, I examine prior research on agglomeration by nationality, both at the individual and the organizational levels, and discuss how this study contributes to each of these streams of research.

Advantages and Disadvantages of Agglomeration

Following the seminal work by Marshall (1920), who identified the advantages of agglomeration as easier access to a skilled labor market, specialized suppliers, and knowledge spillover across firms, theoretical and empirical research has explored the positive and negative

externalities of agglomeration (see McCann and Folta, 2008 for a comprehensive review). The advantages of agglomeration can be both economic and non-economic. Through larger and higher quality labor markets (Krugman, 1991), access to better input markets (Folta, Cooper, and Baik, 2006), and knowledge spillovers from surrounding firms (Rosenkopf and Almeida, 2003), agglomeration has been shown to increase productivity. Furthermore, agglomeration can reduce the search costs for customers and therefore increase the demand and revenue for agglomerated firms (Graitson, 1982; Chung and Kalnins, 2001). The non-economic advantages of agglomeration are also important. Firms can, for example, obtain greater legitimacy by choosing to locate in areas where other firms have already entered rather than locating in isolation (Meyer and Rowan, 1977; Scott and Meyer, 1983). Furthermore, some research suggests that firms may benefit more from agglomerating and signaling conformity to the external stakeholders in uncertain or volatile situations such as entering new markets (Martin, Salomon, and Wu, 2010). In sum, prior research provides numerous motivations for firms to agglomerate in spite of the increased competition associated with co-locating with competitors in a geographically concentrated area.

The role of clusters is especially important in terms of facilitating innovative activities. Stemming from Marshall's notion of idea's being "in the air" (1920: 271), co-location with similar industry workers and firms has been shown to increase interactions and become the locus of new and creative ideas (Chung and Alcácer, 2002; Owen-Smith and Powell, 2004). The impact of cluster membership, however, is more nuanced and the benefit depends on factors such as the type of innovation and the culture within the cluster. Saxenian (1994), for example, argues in her study contrasting Silicon Valley to Boston's Route 128 that Silicon Valley is a home to more successful and sustainable technology firms because of its open culture as opposed to

Route 128's relatively closed culture. A recent study also argues that Chinese firms in industrial districts of Shanghai benefitted from cluster membership in terms of exploitative innovation but the membership had a negative effect on their explorative innovation (Ozer and Zhang, 2014). Taken together, these studies suggest that while agglomeration can benefit innovation performance in various aspects, the extent to which individual firms benefit from interactions with other firms within a cluster varies depending on what type of innovation they pursue and also the shared culture within the specific cluster. Building on this stream of research, my study takes a step further and argues that national identity plays a key role in creating the culture within a cluster. Moreover, focusing on firm behavior based on shared identity, I identify several specific mechanisms as to how cluster membership can benefit exploitative innovation but hinder explorative innovation.

Agglomeration is not only associated with positive externalities, but negative externalities exist as well. Most importantly, when the domains of firms overlap, as when they share geographical spaces, competition among these firms for limited resources increases (Hannan and Freeman, 1977; Baum and Mezias, 1992; Baum and Haveman, 1997). Moreover, although knowledge spillover among agglomerated firms may be advantageous for the cluster as a whole and for certain firms within the cluster, knowledge spillover may not be intentional and could represent knowledge leakages for other firms, leaving them vulnerable to competition (Shaver and Flyer, 2000; Chung and Alcácer, 2002). While the positive and negative externalities mentioned above apply generally across all participating firms in a geographic cluster, the competitive dynamics of agglomeration can become more asymmetric if firm heterogeneity is considered. The technological capabilities of firms provide one important source of firm heterogeneity. Research, for example, shows that technologically more advanced firms

tend to contribute more to the pool of knowledge while technologically less advanced firms tend to benefit more (Shaver and Flyer, 2000; Alcácer and Chung, 2007). As a result of the asymmetric advantages and disadvantages, some technologically advanced firms prefer not to agglomerate and instead locate in areas with high academic activity and fewer industrial competitors, whereas less technologically advanced firms tend to prefer agglomerated locations with more industrial competitors (Shaver and Flyer, 2000; Alcácer and Chung, 2007).

Another limitation to agglomeration and clusters is that the information flows within the cluster can increasingly become homogenous over time. As clusters evolve, the member firms of the cluster, rather than learning from competitors outside the clusters, tend to compete and learn from local rivals thus leading to less explorative innovations (Pouder and St. John, 1996; Ozer and Zhang, 2014). Similarly, Porter (1998) argues that clusters can be victim to groupthink as the firms, in the long run, tend to focus inward and are driven by inertia. Similar logic is found in the research comparing the advantages of small firms and large firms: While large firms have abundant resources to facilitate innovation in general, small firms are the ones that have the flexibility to search broadly giving them the advantage for exploration in contrast to the routinized and self-reliant large firms that are more equipped for incremental innovations (Schumpeter, 1934; Almeida and Kogut, 1997). My dissertation points to one specific condition under which clusters can evolve to resemble large firms and hinder certain aspects of innovation performance of its members. Departing from prior research that mostly focused on clusters as a whole, I examine how clusters can break out into smaller subsets of firms that share an identity and examine what the consequences are for firms to belong to certain subsets within a larger cluster.

In the next section, I focus on nationality as an important aspect of firm identity in

foreign markets and explain the impact of national identity on foreign market entry.

National Identity and Market Entry

Most studies examining the dynamics within clusters have focused on the heterogeneity of technological capabilities and argue that the net benefit for individual firms depends on how much firms can benefit from others' spillovers while protecting their own knowledge from leaking (Shaver and Flyer, 2000; Alcácer and Chung, 2007). I argue that firm identity is another important source of firm heterogeneity that, although not as explicit in its impact on competitive dynamics, can influence individual firm's behaviors and the competitive dynamics within the cluster. First, when a subset of firms in a cluster shares an identity, the shared identity can be a source of homophilic relationships. As documented in research, whether the source of shared identity comes from status, ethnicity or capabilities, shared identity is a strong predictor of relationship formation not only among individuals but also organizations as well (Chung, Singh, and Lee, 2000; McPherson, Smith-Lovin, and Cook, 2001; Jensen, 2003; Ingram and Morris, 2007). Shared identity increases the likelihood that the actors have a common background and behavioral traits making the communication between one another easier. Moreover, especially under situations of uncertainty, such as entering foreign markets, actors tend to prefer relationships with homogenous others (Fiske, 2011: 48). Thus, when a subset of firms share an identity within a cluster in a foreign market, shared identity functions as a magnetic force that pulls these actors together to facilitate connections and promote homogenous relationships based on share identity. For example, research shows that when Japanese auto manufacturers

established facilities in the U.S., not only were the buyer-supplier relationships from Japan recreated in the U.S., but new relationships were formed in the U.S. between Japanese firms that located in the same area (Martin, Mitchell, and Swaminathan, 1995).

Second, as relationships are formed on the basis of shared identity, these actors are also embedded into a social structure whereby certain behavioral expectations arise (Granovetter, 1985; Jensen, Kim, and Kim, 2011). As a magnet pulls and aligns objects in an orderly manner, identity can be a force that aligns the behavior of actors so that they follow a shared social norm. Scholars have indeed documented that members of clusters have shared cultures and conventions which govern the behavior and interactions between member firms (Saxenian, 1994; Powell, Packalen, and Whittington, 2012). Saxenian (1994), for example, argued that firms in the Silicon Valley cluster shared a more open culture where boundaries across organizations were porous whereas the firms in the Route 128 region shared a more self-reliant culture where firm boundaries were distinct. Once firms that share a nationality form relationships and create a community in a foreign market, behavioral expectations that correspond with the culture and conventions of the home country may arise. For example, in the case of the Japanese auto manufacturers, because of the recreated connections between Japanese buyers and suppliers, employees may be expected to speak Japanese and behave accordingly with the Japanese business culture even though they are located in the U.S.

While the source of shared identity can vary, I focus on national identity for two reasons. First, while nationality may not be an important aspect of firm identity when operating in the home market, it becomes an important part of firm identity in foreign markets where the foreign firms are often the minority and nationality as an identity becomes more salient (Mehra, Kilduff, and Brass, 1998; Mollica, Gray, and Treviño, 2003; Elango and Sethi, 2007). As widely

documented by the country-of-origin literature (Peterson and Jolibert, 1995; Al-Sulaiti and Baker, 1998; Verlegh and Steenkamp, 1999), firms are often categorized by their nationality in foreign markets by the external audiences such as the media, industry experts and foreign market customers. Auto manufacturers, for example, are often grouped together by their nationality – Ford and GM as American, Toyota and Honda as Japanese, and Hyundai and Kia as Korean carmakers. Not only are firms categorized by their nationality by external audiences, but firms from the same home country often exhibit similar behavior in foreign markets. Based on shared culture, language, and institutional norms, firms of the same nationality produce similar products, target similar customers, and pursue similar strategies in foreign markets (Bird and Beechler, 1995; Yip, Johansson, and Roos, 1997; Zhang and Dodgson, 2007).

Second, nationality is an important factor that influences location choice in foreign market entry. More specifically, firms often follow other firms from the same home country when they choose foreign market locations (Henisz and Delios, 2001; Guillén, 2002). Korean manufacturing firms, for example, followed the location choices of other Korean firms when moving into China, which eventually resulted in agglomerations of Korean firms in various districts of China (Guillén, 2002). Henisz and Delios (2001) also show that Japanese multinationals, especially those that lacked foreign market experience, chose to enter countries in which other Japanese firms were already present. While studies have focused on the foreign market entry choice and, as a result, the agglomeration of firms by nationality in foreign markets, the consequences of the agglomeration by nationality has received less attention. Whether it is to reduce the uncertainty in location choice (Henisz and Delios, 2001; Tan and Meyer, 2011) or to take advantage of the social capital within the ethnic community (Hernandez, 2014), there are well-documented entry stage benefits to agglomeration by nationality. The consequences,

however, are not so obvious given that most studies did not tract the impact of agglomeration by nationality on firms' performance outcomes after the initial entry. Building on research that focuses on entry location decisions, I move beyond the focus of initial entry and examine the under-researched but important question of how agglomeration by nationality influences firm behavior in a foreign market and subsequent outcomes especially in terms of innovation performance.

Agglomeration by Nationality

Although not tested directly, studies that have shown the existence of agglomeration by nationality have argued that firms imitate the foreign location choice of co-national firms because agglomeration by nationality has numerous benefits. First, by co-locating with same nationality firms, daily operations may be easier when setting up a subsidiary in a foreign location. Some of the firms may already have established relationships from the home country which may be an important source of information and partnerships also in the foreign market (Martin, Mitchell, and Swaminathan, 1995). Even when the direct relationship between the firms is missing, when firms are from the same home country, they tend to have higher trust for one another which makes communication easier (Tan and Meyer, 2011). Similarly, co-national firms view one another less as a competitor but more as a cooperative partner, reducing the competition level among each other (Miller et al., 2008). Moreover, the knowledge obtained by same nationality firms in the foreign location may be more relevant and this more useful. Second, in addition to the explicit operational benefits, these are legitimacy reasons to which firms

choose to agglomerate by nationality. In uncertain situations such as choosing a foreign market location in which to expand operations, choosing locations that have already been explored by other firms from the home country may help gain legitimacy among constituents in the home country (Henisz and Delios, 2001; Guillén, 2002).

While the phenomenon of agglomeration by nationality has mostly been studied at the entry stage for organizations, the consequences of agglomeration by nationality has received more scholarly attention at the individual level. At the individual level, research has documented the antecedents, characteristics, and the consequences for individuals participating in ethnic enclaves (Portes, 2010). Ethnic enclaves such as Chinatowns in various metropolitan cities and Cuban (Latin American) residences in Miami are residential areas or economic areas with a high ethnic concentration (Wilson and Portes, 1980) and are the typical example of agglomeration by nationality of individuals. Ethnic enclaves are formed when individuals immigrate to a foreign country and decide to locate and work within a sub-community of individuals of the same nationality rather than integrating into the larger economy of the host country. Although there are negative effects to participating in ethnic enclaves such as limited upward mobility and restrictions and sanctions when deviating from the social norms (Portes and Sensenbrenner, 1993), most studies have highlighted the positive outcomes: Individuals that participate in ethnic enclaves have on average higher earnings than those who do not (Zhou and Logan, 1989; Edin, Fredriksson, and Åslund, 2003).

Although the focus of my dissertation is the consequence of agglomeration by nationality at the organization level, the studies at the individual level have important implications for organizations as well. Often times, when firms are setting up subsidiaries in foreign markets, employees from the home country are sent to the foreign location as expatriates. These

individuals, as pointed out in ethnic enclave studies, tend to gravitate towards co-ethnic communities. For example, the expatriate families that work in New York have sorted into expatriate communities in Westchester – the French in Larchmont, Germans in White Plains, Japanese in Scarsdale, and so on (Foderaro, 2000). Especially in foreign locations, nationality becomes a key part of identity that drives relationship formation and in turn creates social communities that are comprised of actors of the same nationality. The creation of co-national social communities can influence the dynamics of organizations in the foreign location because social relationships can influence business relationships. For example, when two managers from different firms from the same home country have a social relationship, it increases the likelihood that they also form business relationships.

The few studies that have examined the consequences of agglomeration by nationality at the organization level have mostly focused on the social capital that can be gained from co-national actors and how that leads to positive outcomes in foreign markets (Yoo, 2003; Miller et al., 2008; Tan and Meyer, 2011; Hernandez, 2014). Miller et al. (2008), for example, showed that when Latin American banks located close by one another in North American locations, it helped legitimize their presence and operations among co-ethnic customers and, as a consequence, led to better survival likelihoods. From a slight different perspective, Hernandez (2014) argues that firms can benefit from the social capital of co-national immigrants and shows that both the instances of foreign investments and the survival of these subsidiaries are increased in U.S. locations with high ratios of co-national immigrants. In addition, a study on immigrant entrepreneurs in Silicon Valley argued that the ideal network for immigrants to obtain funding for their start-ups, was a dense connection with co-ethnic individuals at the initial stage but the co-ethnic networks ties were not as effective in later expansion stages (Yoo, 2003). Although

network connections with co-national actors an important aspect for firms in foreign markets, in my dissertation, I focus more on the role of national identity in driving firm behavior and strategies in the process of building a subsidiary in a foreign location and highlight the negative outcomes as opposed to the positives emphasized in prior studies.

In contrast to the generally positive consequences for individuals, I argue that agglomeration by nationality can have a negative impact on certain aspects of innovation. Having more actors from the same home country embeds the actors in a social structure that is similar to that of their home country which can create behavioral expectations that may differ from the economic market logic (Granovetter, 1985; Uzzi, 1996). For example, actors, both individuals and organizations, may face a conflict in terms of the economic imperatives such as partnering with actors from a different ethnic group that can bring more economic benefits, from the social imperatives such as loyalty towards actors from the same ethnic group. For individuals, behaving accordingly to social expectations similar to those of their home country may not hinder them from achieving their initial purpose of moving to a foreign country. On the other hand, for organizations, emphasis on social imperatives rather than economic imperatives may hinder their performance in continuous international competition. Therefore, I argue that, for organizations, agglomeration by nationality can create certain social structures and imperatives which may ultimately lead to unintended negative consequences.

In this chapter, I reviewed prior research on the advantages and disadvantages of agglomeration focusing on how agglomeration affects the innovation outcome of member firms. In this study, I take a slightly different view from prior research by focusing on a subset of firms that share an identity within a cluster and identify an important negative externality of

agglomeration which stems from the function of identity as a magnet that connects and aligns firms of the same identity. I focus on national identity of firms that agglomerate in foreign markets because prior research has shown that nationality plays an important role in foreign market entry. Research on agglomeration by nationality, as reviewed above, has mostly explored the benefits of co-locating with co-national actors. My dissertation, however, focuses on the under-researched area of the negative impact of agglomeration by nationality and highlights that identity, while facilitating foreign market entry, may have unintended consequences once firms start their operations in the foreign market. In the next chapter, I discuss why agglomeration by nationality can have negative effects on certain types of innovation, propose specific mechanisms to explain the pathway by which the negative consequences occur, and explore boundary conditions to the main proposition.

CHAPTER THREE. IMPACT OF AGGLOMERATION BY NATIONALITY ON INNOVATION IN FOREIGN MARKETS

In this chapter, I examine the impact of agglomeration by nationality on innovation activity in foreign markets. More specifically, I explore the trade-off that firms face in terms of innovation outcomes by agglomerating with other firms from the same home country and explore behavioral mechanisms that may explain the outcomes. First, I focus on the direct effect that agglomeration by nationality has on innovation and argue that agglomeration by nationality can have both a negative and positive impact depending on the type of innovation. Second, focusing on the under-researched negative effects of agglomeration by nationality, I explore the role of national identity on relationship formation and imitation of strategies as potential behavioral mechanisms that mediate the negative direct effect agglomeration by nationality has on explorative innovation. Finally, having explored the main effect and the mechanisms in-depth, I identify the boundary conditions of the arguments by examining firm-level characteristics that make certain firms more resistant to the impact of identity and, therefore, moderate the negative effect of agglomeration by nationality on innovation performance. Specifically, I argue that the firms that are early movers among the group of firms of the same nationality to a focal location, the firms that have more experience in other locations of the host country, and the firms that are from home countries with individualistic cultures will be less negatively affect by co-locating with more co-national firms in the focal foreign market. See Figure 1 for a summary of the

hypotheses.

Insert Figure 1 around here

In the first section, I examine how co-locating with same nationality firms can influence different types of innovation such as exploitative and explorative innovation. I argue that having more firms from the same home country in the focal foreign location can have opposite effects on exploitative and explorative innovation.

Internationalization, Agglomeration, and Innovation

Firms expand to foreign markets for different reasons. Historically, internationalization of firms was mostly driven by firms from mature markets seeking new markets to sell existing products (Buckley and Casson, 1976; Dunning, 1988). The reasons for foreign expansion have recently become more diverse, however, including firms moving abroad for knowledge-seeking purposes. Firms locate R&D facilities in more developed countries (Chung and Alcácer, 2002; Martin and Salomon, 2003) as well as developing countries (Zhao, 2006), and even newly established firms seek knowledge from foreign markets shortly after their founding (Knight and Cavusgil, 2004). Accordingly, with the increased importance of knowledge-seeking foreign expansion, innovation has also become a key aspect of firm performance along with more traditional performance measures such as firm survival, growth or profitability in foreign markets. Studies, for example, have examined patent applications and citations, and product innovation to measure various aspects of innovation performance of firms in foreign markets

(Frost, 2001; Penner-Hahn and Shaver, 2005; Salomon and Shaver, 2005). In the more traditional purposes of foreign expansion, choosing a foreign market that is similar to the home market was important given that firms wanted to expand to a similar customer base to supply existing goods. In the newer model of expanding internationally to obtain new knowledge and innovate, it has become more important for firms to not only find locations with the best knowledge pools but also locations where they are able to take advantage of and learn from these knowledge pools (Feinberg and Gupta, 2004; Alcácer and Chung, 2007).

An important decision in terms of location choice is whether to locate within an existing cluster of firms or to locate in a less populated area given that agglomeration can have an important influence on the firms' innovation. For example, scholars have studied the agglomeration of firms in regional clusters like Silicon Valley and Boston's Route 128 to examine how ideas are transferred across firms to facilitate and generate innovation (Saxenian, 1994; Audretsch and Feldman, 1996; Fleming, King, and Juda, 2007). Others have argued that for certain types of firms or for certain types of innovation, being a member of a cluster can hurt the focal firm's innovation activities. Firms that have high technological capabilities, for example, contribute more to the knowledge pool than they benefit, therefore, tend to avoid agglomeration (Alcácer and Chung, 2007). The competitive dynamics within the cluster can, however, become more complicated once firm identity is brought into the picture. When firms choose to locate in a cluster, they may do so for the knowledge pool that exists in the cluster. The accessibility of the knowledge pool, however, may depend on the competitive dynamics within the cluster. I argue, in the following section, that co-locating with other firms that share a national identity may enable firms to obtain more knowledge and resources required for exploitative innovation, but hinder them from obtaining knowledge and resources outside the

sub-community of co-national firms. As a result, having a large sub-community of co-national firms in a larger cluster will increase exploitative innovation performance but decrease explorative innovation performance.

Impact of Agglomeration by Nationality on Innovation

Agglomeration by nationality on exploitative innovation

I first focus on the direct effect of agglomeration by nationality on firms'[1] innovation performance in foreign markets. I specifically examine the trade-off that firms face when they are located within a community of firms that are from the same home country in balancing exploitative and explorative innovation. Prior studies have documented numerous benefits that arise from agglomerating with firms from the same home country. First, choosing locations where similar firms have already entered reduces a large amount of uncertainty and enhances the legitimacy of the foreign expansion (Henisz and Delios, 2001; Guillén, 2002). Second, after entry, interactions with firms from the same home country are easier due to the shared culture and language. Easier communication establishes a higher level of trust between these firms which facilitates the transfer of tacit knowledge regarding the local business environment (Tan and Meyer, 2011). Finally, firms that are from the same home country perceive one another less as a competitor and more as a cooperative partner, reducing the level of competition in the foreign market (Miller et al., 2008). In sum, the benefits mentioned above suggest that having

[1] I use the term "firm" in developing the hypotheses, but I refer to the foreign subsidiary of a parent firm not the headquarters or the entire firm as an entity.

other firms with the same nationality will enhance the efficiency of the operations in a foreign market. Especially some of the advantages that accrue at the stage of entry can continue to benefit firms as they continue to operate in the foreign location.

For firms entering foreign markets for R&D and knowledge-seeking purposes, the benefits that accrue from easier communication and cooperative partnerships may translate into benefits for exploitative innovation. Exploitative innovation which is defined as "the refinement and extension of existing competencies, technologies, and paradigms" (March, 1991: 85) requires "improvements in existing components and build[s] on the existing technological trajectories" (Benner and Tushman, 2002: 679). The key distinction between exploitative and explorative innovation is that exploration requires experimentation and shifting to a new technological trajectory, whereas exploitative innovation focuses more on learning from local search and refinement and reuse of existing routines. Studies have shown that formal organizational structures whereby rules, procedures and communication channels are well-developed can promote exploitative innovation (Zander and Kogut, 1995; Benner and Tushman, 2003; Jansen, Van Den Bosch, and Volberda, 2006). Firms that are co-located with more firms of the same nationality are well-equipped to create these types of formal structures ideal for exploitative innovation given the shared language, culture, and potentially similar technological backgrounds. Shared nationality can reduce the variance in behavior and activities, helping the focal firm achieve operational efficiency and refine their existing competencies in the foreign market.

Therefore, I argue that agglomeration by nationality will benefit firms in terms of exploitative innovation.

H1: Firms have higher exploitative innovation performance when they are co-located with more firms from the same home country in a foreign market.

Agglomeration by nationality on explorative innovation

In contrast to exploitative innovation, explorative innovation refers to innovating through processes of concerted variation, planned experimentation, and play (Baum, Li, and Usher, 2000). While local search and refinement can enhance exploitative innovation, explorative innovation requires diverse knowledge that deviates from existing knowledge that mostly comes from interactions with distant partners and experimenting with unfamiliar knowledge (Levinthal and March, 1993; McGrath, 2001; Benner and Tushman, 2002). While certain firms enter foreign markets to incrementally enhance their existing knowledge base, often times foreign R&D operations are established in order to further the firms' distant knowledge searches by interacting with partners from diverse backgrounds with diverse knowledge pools. Therefore, the diversity of the knowledge pool of the partners can have a significant impact on the direction of innovation of the firms in the focal location (Rosenkopf and Almeida, 2003). Especially, by locating in existing R&D clusters, firms aspire to interact with not only other firms from the host country but other foreign firms that are located in the clusters and tap into the diverse knowledge pool in the foreign location.

While agglomerating with more firms that share a national identity can provide the structure and resources required for exploitative innovation, it may simultaneously hinder the firms' pursuit of diverse knowledge towards explorative innovation. Being an only firm with a

particular nationality in a foreign location will naturally pressure the firm to seek diverse partners and to adapt to the foreign market. Absent a community of co-nationals, the firm may face difficulties initially in setting up their operations in the foreign location, but because they feel more need to interact with more unfamiliar actors. By interacting with distant partners and deviating from their existing routines, however, the focal firm can be exposed to resources required for explorative innovation (Jansen, Van Den Bosch, and Volberda, 2006). If a firm is agglomerated with many other firms from the same home country, on the other hand, there is less pressure to seek diverse contacts and explore distant opportunities given the easier communication and information sharing among firms of the same nationality. By joining a cluster with more firms from the same home country, firms can take advantage of the entry stage benefits and, therefore, are more likely to become embedded in a network of similar actors. While firms, in this case, may have an easier experience initially setting up the subsidiary, they may be hindered from deviating from the existing relationships and seek less variations in their search for knowledge. Furthermore, tightly knit homogenous group of firms of the same nationality may also put pressure towards conformity, making it more difficult for firms to be flexible and establish connections with firms outside the group. As a consequence, agglomeration by nationality can, despite the initial intentions at entry, lead to receiving redundant, instead of diverse, knowledge and information and more routinized innovation activities, instead of experimentation.

In sum, co-locating with more firms from the same home country can become a potential source of rigidity by decreasing the diversity in knowledge and the flexibility in forming relationships, both important factors in generating explorative innovation. Therefore, I posit that:

H2: Firms have lower explorative innovation performance when they are co-located with more firms from the same home country in a foreign market.

Behavioral Mechanisms of Agglomeration by Nationality

Thus far I have explored the trade-offs that firms face in terms of exploitative and explorative innovation when agglomerating with same nationality firms in a foreign market. Specifically, I argued that agglomeration by national identity positively impacts exploitative innovation but negatively impacts explorative innovation. Given that most prior research has already documented the mechanisms by which the positive outcomes of agglomeration by nationality arise, I now focus only on the negative impact on explorative innovation and unpack the pathways by which the negative innovation outcomes emerge. I argue that in the process of setting up a subsidiary in a foreign market, national identity functions as a magnet and influences the behavior of firms first by pulling co-national firms together to form relationships and second, by aligning the strategic behavior of firms. By focusing on the activities conducted by firms after entering foreign markets, I examine three different behavioral mechanisms that represent important aspects of establishing a subsidiary in a foreign market and that could mediate the negative direct effect. After entering foreign markets, firms take various steps to adapt to the local market and build up operations in the new location. Early on, firms need to form relationships with individuals and organizations in the local market by, for example, hiring new employees and forming new alliances with local actors (Makino and Delios, 1996; Anand and Delios, 1997). Moreover, firms need to formulate strategies to take advantage of the

opportunities in the foreign market. I argue that agglomerating with other firms from the same home country will influence the relationships formed in terms of the nationality of employees and alliance partners in the foreign market and also impact the strategies of the firm in the foreign market, which in turn will subsequently impact the explorative innovation performance of firms in foreign markets.

Relationship formation

The first mechanism I highlight is the internal and external relationships that firms form in foreign markets. I argue that national identity is a magnetic force that facilitates the relationship formation between co-national actors which is one mechanism by which agglomeration by nationality leads to negative outcomes. Although some employees are transferred from the home country, most firms still need to hire new employees in the new market in order to better operate in and adjust to the local market (Zaheer, 1995; Mezias, 2002). In addition to new employees, firms need to form new partnerships with other organizations in the foreign market (Parkhe, 1991; Barkema et al., 1997). Therefore, I focus on two different types of relationships – the types of employees that firms hire and the types of alliances that firms form in the foreign market. Although employees and alliances are relationships at different levels, and they serve different purposes for firms entering new markets, the mechanisms by which they mediate the relationship between agglomeration by nationality and innovation performance are similar. Therefore, I combine and theorize the two mediators – the nationality of employees and the nationality of alliances partners – together under the "relationship formation"

umbrella. Relationship formation is important in setting up a foreign subsidiary because relationships can influence the degree to which a firm adapts to the foreign market. Firm identity, however, can affect what types of relationships are formed and, as a consequence, affect the outcome in the foreign market. Therefore, I first argue that agglomeration by nationality will lead to more relationships based on nationality and, in turn, lead to lower performance in terms of explorative innovation.

As the first step of the mediation, I begin with the argument that co-locating with more firms with the same national identity will lead to more homogenous relationships based on nationality. Foreign markets represent a situation in which uncertainty is high (Martin, Mitchell, and Swaminathan, 1995; Haveman and Nonnemaker, 2000; Henisz and Delios, 2001), especially in terms of knowing with whom to form relationships. Prior studies have emphasized that under high uncertainty, actors tend to prefer existing relationships, or forming relationships with similar others (Gulati, 1995; Beckman, Haunschild, and Phillips, 2004). Especially in foreign markets, nationality becomes a salient part of firm identity that can reduce the uncertainty in the counterpart and drive relationship formations. When firms enter a foreign market that lacks a co-ethnic community, they will be pressured to form relationships with distant or unfamiliar partners. However, when many firms from the same home country are co-located in a foreign location, a larger social community based on nationality is likely to be created in the region. When such communities are created, rather than forming unfamiliar and distant relationships, actors have the option to form relationships with similar others or those with the same nationality. An ethnic social community in which actors that share the same language and culture can interact will naturally create an environment where nationality becomes a more salient part of not only the social life of the expatriates but also the corporate and business culture in the focal

location. Through the interactions within the co-national community, individuals create social networks based on nationality and have the opportunity to find potential co-workers for their foreign subsidiary.

Relationships based on nationality are accelerated because there are obvious benefits, especially at the early stage of building a foreign subsidiary. Because firms or individuals from the same home country share the same language and business culture, the initial effect required to form relationships are lower (Martin, Mitchell, and Swaminathan, 1995). Homogeneity in terms of language and culture makes daily interactions more fluent and, due to the predictability in interactions, fewer conflicts will arise (Sørensen, 2002; Miller et al., 2008). Therefore, when firms are co-located with more firms from the same home country and have a larger pool of potential employees in the foreign market, it increases the likelihood that they will prefer to work with employees that are from the same home country and thus, have a higher composition of co-national employees in a foreign market. By the same token, in inter-firm relationships, firms will prefer to form partnerships or alliances with other firms that share a nationality, and thus business cultures. In other words, agglomeration by nationality first, increases the pool of same nationality actors and creates social communities based on nationality, facilitating relationships. Social ties, when coupled with the benefits of homogenous ties, leads to more relationships based on nationality. Therefore, I argue that co-locating with more firms from the home country in a foreign market will lead to more relationships – both in terms of employee composition and alliance formations – with individuals and firms with the same nationality.

Next, to show the second step of the mediation effect, I argue that more relationships with co-national actors will lead to negative outcomes in terms of explorative innovation. While there are benefits to homogenous relationships (that actually accelerate the formation of

relationships based on shared nationality), there are also costs to forming relationships mostly with homogenous actors as well (Van den Steen, 2010). Because firms have limits to the number of relationships they can form (both in terms of hiring employees and forming alliances), developing strong relationships with those of the same nationality will naturally leave less time and resources to commit and devote to actors in the host country as well as those from other foreign countries. Being confined to relationships with actors of the same nationality can, first of all, restrict the diversity in knowledge flow. The importance of bridging between different pools of knowledge on creativity and explorative innovation is well documented (Burt, 1992, 2005). Being constrained to a sub-community of actors of the same nationality, however, can isolate the focal firm from the larger community in the host market despite the possibility that they located there initially to obtain new knowledge from new relationships. Increased homogeneity in relationships can also hurt firms from explorative innovation because homogenous groups tend to be more conservative in their decision making and thus, conduct less experimentation (Van den Steen, 2010).

In sum, I hypothesize that having higher composition of employees of the same nationality and forming alliances with firms of the same nationality are two mechanisms by which agglomeration by nationality leads to lower innovation performance.

H3: Higher composition of employees of the same nationality as the focal firm mediates the relationship between agglomeration by nationality and lower explorative innovation performance.

H4: Formation of alliances with other firms from the same home country as the focal

firm mediates the relationship between agglomeration by nationality and lower explorative innovation performance.

Imitation of technological trajectories

As another mechanism that mediates the relationship between agglomeration by nationality and explorative innovation outcomes, I focus on the technological trajectories firms follow in the foreign location. I argue that national identity, in addition to connecting similar actors, aligns the behavior of co-national actors which is one mechanism by which agglomeration by nationality leads to negative outcomes. Along with forming new relationships, firms also need to formulate new strategies for their subsidiary in the foreign market. For firms that enter foreign markets for R&D, setting the technological trajectory often becomes an important strategy that can influence long term performance outcomes (Kenney and Von Burg, 1999). Especially if the firms expands to the foreign market in pursuit of new knowledge and pursue innovation, setting the appropriate technological trajectory may greatly impact what type and amount of knowledge the firm can obtain from the focal foreign location. In the process of setting s technological trajectory in the foreign market, I specifically focus on which other firms the focal firm pays attention to and benchmarks in the foreign market.

As the first step of the mediation, I begin with the argument that co-locating with more firms with the same national identity will lead to more imitation of technological trajectories of co-national firms. Research has well documented that imitation is a common response to uncertainty (DiMaggio and Powell, 1983; Haveman, 1993; Jensen, 2006). More specifically, due

to high levels of uncertainty and unfamiliarity in foreign markets, firms tend to imitate other firms from the same home country when choosing locations in foreign markets (Henisz and Delios, 2001; Guillén, 2002; Tan and Meyer, 2011). By similar logic, I argue that firms are also more likely to imitate the technological trajectories of firms from the same home country even after they have entered the foreign market, especially when they are agglomerated with more firms of the same nationality. First, firms are more likely to know or have information regarding the operations of other firms of the same nationality. Firms for the same nationality are not only more salient and thus, more visible in foreign markets, but also are more likely to have established communication channels among each other and to form new relationships based on nationality (Martin, Mitchell, and Swaminathan, 1995). Having a large community of firms from the same home country will also create a network of co-nationals, increasing the likelihood that information flows between these actors. Second, in addition to having more information, having a shared nationality may make imitation of strategies easier. Firms from the same home country may share similar traits or backgrounds that make it easier to understand each other's' operations and have more relevant local knowledge that is transferable to one another (Chang and Park, 2005). Thus, I argue that when firms are agglomerated with more firms from the same home country, they will be more likely to imitate or follow the technological trajectories of these same nationality firms.

Next, as the second step of the mediation, I argue that more imitation of technological trajectories of co-national firms will lead to a decrease in explorative innovation performance. Imitating the technological trajectories of firms of the same nationality can be unproblematic in certain context. In fact, studies have shown that imitation can, especially under uncertainty, benefit firms by increasing the speed of adopting superior strategies and facilitating collusion or

reducing competition (Lieberman and Asaba, 2006). For firms conducting R&D in foreign markets, however, imitating the technological trajectories of firms from the same home country can lead to negative outcomes such as a decrease in explorative innovation. First, if firms tend to pay more attention to those of the same nationality, they will naturally devote less attention to the firms outside the co-national community (Porac et al., 1995). When less attention is devoted to a diverse set of potential partners or knowledge sources, the search for knowledge can become biased in the sense that the local firm is losing out on potentially valuable information. If firms in the cluster start imitating one another's technological trajectories, they can become victim to groupthink and collective inertia (Porter, 1998). Tightly-knit clusters, like those of same nationality firms, also have the danger of competing within the cluster and evolving inwards rather than focusing on the external developments (Pouder and St. John, 1996). In other words, shared nationality as an identity can function as a lens through which firms are bound to myopic knowledge searches which can have a negative impact on explorative innovation.

In sum, I argue that imitation of technological trajectories of firms of the same nationality is another mechanism by which agglomeration by nationality leads to lower explorative innovation performance.

H5: Imitation of technological trajectories of other firms from the same home country mediates the relationship between agglomeration by nationality and lower explorative innovation performance.

Boundary Condition of the Impact of Agglomeration by Nationality

Having presented the arguments for the main effect and the mechanisms, I now explore the boundary conditions of the impact of agglomeration by nationality on negative explorative innovation performance depending on firm-level heterogeneity. I focus on three firm characteristics – the order in which the firm entered the focal location, prior experience of the firm in the host country, and the individualistic/collectivistic culture of the home country – that can influence the degree to which these firms are affected by national identity. In other words, I argue that while identity may function as a magnet to pull similar actors together, some firms are more able to resist the magnetic force and therefore, be less negatively affected by agglomeration by nationality. Elaborating on the contingencies and examining moderators also provide more support of and help validate the mechanisms proposed above.

First mover vs. Followers

First, I compare the first movers from the specific home country to the focal location to later followers. Studies have shown that first movers enjoy advantages including preemption of resources, proprietary learning effects, and larger market shares (Lieberman and Montgomery, 1988; Mitchell, 1991). I argue that being a first mover can, under certain situations, shield these firms from unintended negative consequences. More specifically, I argue that co-locating with more firms of the same nationality will have a difference impact depending on the order in which the focal firm entered the foreign location. If ten firms from a specific home country, for

example, are co-located in a foreign location, the first of those ten firms to enter the location will be less negatively affected by agglomeration by nationality than the second of the firms to enter, the second less than the third and so on. Following the mechanisms by which firms build up foreign operations, I argue that the process of building relationships and forming strategies in the foreign market can be different depending on when the firm entered the market and therefore, agglomeration by nationality can lead to different outcomes. First, a firm that is the first to locate in the focal foreign location among those of the same nationality is initially likely to face high uncertainty and unfavorable conditions (Montgomery and Lieberman, 1998; Dobrev and Gotsopoulos, 2010) including the absence of a community of co-nationals in the region on which they can rely. Therefore, rather than relying on others of the same nationality, the first mover firm is naturally pressured to form relationships with actors of various nationalities and integrate more into the host market. Second, a first mover firm also does not have others from the same home country to benchmark in the foreign market. Therefore, these firms have to either develop their own routines and strategies in the focal location or to branch out and benchmark the strategies of firms from different countries. As a consequence, even when other firms from the same home country later enter the foreign location, first movers are more likely to already have developed their own set of relationships and strategies and thus are less likely to be negatively influences by the co-national community.

Firms that are not the first from a specific home country to enter the focal foreign market have an alternative path by which they can build up the foreign subsidiary. First, in contrast to the first mover, the flowing firms have a precedence of other firms from the same home country that have already entered the focal foreign market and thus, face less uncertainty in the market (Wernerfelt and Karnani, 1987). Once firms of the same nationality start moving into the same

foreign location, sub-communities based on nationality are likely to form. Therefore, the following firms are given the option of initially forming relationships with others that share the same nationality. Second, by having a community of co-national actors, as well as forming relationships, the followers have the opportunity to also follow the technological trajectories of firms of the same nationality. In sum, while following firms may, in certain aspects, benefit from having other firms of the same nationality in the focal foreign market, forming relationships with these firms and emulating the technological trajectories of these firms may not always result in better innovative performance. On the other hand, the first mover firms may struggle initially in the foreign market given the lack of benchmarks but later on, when a community of co-national firms form in the focal foreign market, they may be better equipped to take advantages of the benefits and be less affected by the negative aspects of co-locating with same nationality firms. Therefore, I posit that the explorative innovation performance of first movers will be less negatively affected by agglomeration by nationality, whereas the followers will be more negatively affected.

H6: The negative effect of agglomeration by nationality on explorative innovation performance is weaker for firms that are the first movers from a focal home country in the focal location.

Prior experience in the host country

Next, I compare firms that have already entered other regions in the foreign country to

those that do not have prior experience in the host country. Studies have shown that firms benefit differently from agglomeration depending on their technological capabilities and experiences (Shaver and Flyer, 2000). The negative impact of agglomeration by nationality is therefore also likely to differ depending on the firm's ability to access resources, form relationships, and develop and execute strategies in foreign markets. Prior studies provide evidence that the firm's prior experience in other regions of the host country substantially influences their activities in the focal location. As firms gain experience within the host country, they develop location specific knowledge and strategies (Shaver, Mitchell, and Yeung, 1997), making them less dependent on knowledge and resources from external actors (Tuschke, Sanders, and Hernandez, 2013; Hernandez, 2014). Therefore, the importance and impact of agglomerating with firms from the same home country should differ across firms with different levels of experience in the host country.

Firms that already have some experience in the host country, although not exactly the same location as the focal location, are, first, less likely to be dependent on others of the same nationality, and therefore, less likely to form relationships based on nationality. Prior experience in the foreign market may have given these firms expertise in formatting relationships with more distant partners and may also have relationships with actors of various nationalities from prior entries that can be extended in the focal market as well. On the other hand, firms without experience in the host country are more likely to rely on other firms of the same nationality in order to build up the subsidiary especially at the entry stage. When these firms are agglomerated by nationality, the ones that lack experience in the host country are the ones more likely to be influenced by the community of same nationality actors and form more relationships based on nationality. Second, firms with more experience in the host country are also less likely to imitate

other firms from the same home country in terms of the strategies in the foreign market. These firms are more likely to have entered the focal location with a better sense of strategic directions, whereas firms with less experience in the general foreign market will be more likely to follow strategic directions of similar firms in the focal location. Therefore, the firms with less experience in the host country will be affected more by co-locating with other firms of the same nationality.

H7: The negative effect of agglomeration by nationality on explorative innovation performance is weaker for firms with more prior experience in other locations of the host country.

Collectivistic vs. Individualistic culture of the home country

Finally, I compare firms that are headquartered in countries with collectivistic cultures to those headquartered in countries with individualistic cultures. The cultural backgrounds of the firms are likely to influence their behavior in the foreign market and influence the degree to which firms are impacted by agglomeration by nationality. Among various cultural characteristics, I focus on the difference between individualism and collectivism which refers to how actors define themselves and their relationships with other of the group. In individualistic societies, the actors are expected to look after oneself while in collectivistic societies, actors are integrated into cohesive in-groups that protect one another (Hofstede, 1980). In other words, individuals from collectivistic cultures tend to have a "preference for tightly knit social

frameworks" whereas those from individualistic cultures prefer loosely knit social structures (Hofstede, 1984: 83). At the organizational level, research has provided evidence that firms from collectivistic and individualistic cultures also exhibit differences in behavior such as having different owner-manager relationships and consequently differences in R&D investments (Lee and O'Neill, 2003). When firms are co-located with other firms from the same home country, depending on the cultural characteristics of the home country, firms are likely to exhibit differences in their behavior. First, given their tendency to prefer tightly knit relationships, firms from collectivistic cultures are more likely to form relationships with others based on shared nationality. Studies have shown, for example, that firms from collectivistic cultures tend to form tight relationships among one another such as forming alliances involving equity ties whereas firms from individualistic cultures preferred arms-length alliances (Steensma et al., 2000). Along similar lines, the tendency to form homophilic relationships in a foreign location is likely to be stronger for firms from collectivistic cultures. Second, given the tendency to focus on in-group members, firms from collectivistic cultures are also more likely to pay more attention to one another and follow the strategies or technological trajectories of co-national firms.

Firms from individualistic cultures, on the other hand, have a weaker tendency to prefer tighter relationships with in-group members. Therefore, even when these firms are agglomerated with others of the same nationality, they are less likely to hire same nationality employees and form alliances with other firms from the same home country. Second, given the fewer relationships with co-national actors and the weaker tendency to focus on in-group members, firms from individualistic cultures are less likely to pay more attention to in-group members in the foreign location and thus, less likely to imitate the technological trajectories of other firms from the same home country. In sum, while nationality is an important aspect of firm identity

especially in foreign markets, the cultural background of firms can impact the degree to which these firms gravitate towards one another in the foreign market. I argue that firms from collectivistic cultures will show a stronger tendency to forms relationships with others from the same home country and imitate the strategies of these firms, compared to firms from individualistic cultures. As a consequence, firms from collectivistic cultures are more likely to be impacted negatively by agglomeration by nationality. Therefore I posit that:

H8: The negative effect of agglomeration by nationality on explorative innovation performance is stronger (weaker) for firms that are from a more collectivistic (individualistic) home country.

In this chapter, I explored impact of co-locating with other firms from the same home country on the focal firm's innovation performance in a foreign location. I first argued that by agglomerating with co-national actors, firms may benefit in terms of operational efficiency but suffer in terms of gaining access to diverse knowledge which results in a trade-off between their exploitative innovation and explorative innovation. Focusing on the less-research area of the negative consequences on explorative innovation, I further examined the behavioral mechanisms that lead to the negative outcomes. I emphasized the importance of national identity functioning as a magnet to promote homogenous relationships such as hiring co-national employees and forming alliances with co-national firms which in turn hinders the explorative innovation performance of the focal firm in the foreign market. I also argued that shared national identity will increase the likelihood of co-national firms imitating one another's technological trajectories which will also lead to lower explorative innovation. Finally, I argued that firms with certain

characteristics such as first movers from the home country, those with more experience in foreign markets and those from individualistic cultures are better able to resist the magnetic force of national identity and therefore, will be less negatively affected by agglomeration by nationality. In the next chapter, I empirically test the theoretical arguments using a sample of non-U.S. pharmaceutical firms conducting R&D operations in various U.S. locations.

CHAPTER FOUR. EMPIRICAL ANALYSIS: DATA, METHODS, AND RESULTS

Empirical Setting: Global Pharmaceutical Industry

I study the impact of agglomeration by nationality on innovation activities in the setting of the global pharmaceutical industry where firms expand overseas for R&D and innovation. I focus on the non-U.S. pharmaceutical firms that enter the U.S. from 1980-2006 to conduct R&D, generate patents and develop new drugs. The global pharmaceutical industry provides an interesting setting to test my arguments for several reasons. First, the pharmaceutical industry is highly globalized and firms of many nationalities agglomerate in geographically concentrated areas worldwide for R&D collaboration. Firms invest approximately 20% of the revenue on R&D, confirming that it is a highly knowledge intensive industry in which innovation is an important aspect of firm performance (Henderson and Cockburn, 1996). The estimated cost of discovering, developing and launching a new drug has increased to more than $1.5 billion in 2010 (Turk, 2013). To manage the strong demand on R&D, pharmaceutical firms set up R&D facilities worldwide in their effort to learn from the expertise of other organizations (Cockburn, 2008). Second, new drug development is a long and complicated process that on average takes 12 years (Turk, 2013). During the process of discovering, developing, and launching a new drug, firms also patent their intermediary innovations. The diverse outputs of innovations such as

patents and new drug developments, provides a unique opportunity to compare the firm's performance on exploitative and explorative innovations (Acs and Audretsch, 1989; Cardinal, 2001; Penner-Hahn and Shaver, 2005).

Third, I focus on non-U.S. pharmaceutical firms entering the U.S. market because the U.S., as well as being the leader in terms of pharmaceutical R&D, has historically been a very attractive location for pharmaceutical R&D due to its limited use of price regulation and government purchasing, and its strong patent protection rights (Cockburn, 2008). Given that the U.S. is the locus of knowledge and innovation in the industry, most foreign firms enter the U.S. market in order to benefit from knowledge spillovers. Moreover, because the U.S. is an important market for foreign pharmaceutical firms, most innovations should be filed under the United States Patent and Trademark Office (USPTO) for patent protection which also makes it easier to track the location of R&D activities of the firms (Henderson and Cockburn, 1996). Finally, nationality plays an important role in terms of the products developed by pharmaceutical firms: The demand for pharmaceuticals varies with country-level institutions, policies, and culture and thus, pharmaceutical firms tend to produce different types of products depending on their nationality (Fabrizio and Thomas, 2012). The level of treatment for migraine headaches, for example, varies significantly across cultures (reported number of patients is significantly higher in individualistic cultures) even though the actual incidence of migraine headache is very similar across countries (Unger, 2006). This provides a setting where I can observe variations in drug portfolios by the nationality of the firms.

Sample

Pharmaceutical firms are extremely heterogeneous in terms of their size and the activities in which they participate. In my empirical analyses, I focus mostly on the firms that are involved in explorative innovation or competing to develop new entity drugs. Therefore, I focus on a sample of pharmaceutical firms that are involved in explorative innovation or, in my setting, developing new entity drugs. New entity drugs exclude rebranding or repackaging of existing drugs as well as generics, making them an appropriate measure of explorative innovation for pharmaceutical firms in a new market (Cardinal, 2001; Fabrizio and Thomas, 2012). I, first, identify a full list of new entity drugs developed in the U.S. from 1980-2006 provided by IMS Health, a leading provider of market data for healthcare and pharmaceutical industries (Fabrizio and Thomas, 2012). My main sample consists of 80 non-U.S. pharmaceutical firms from 16 different countries[2] that developed 231 out of 485 total new entity drugs in various U.S. locations during 1980-2006.

The main sample consists of pharmaceutical firms that have developed at least one new entity drug over the period of 1980-2006 which may be a representative sample of firms participating in explorative innovation but may not capture the community of pharmaceutical and related firms that interact in a focal location. As an alternative I also identify a larger sample as a robustness check to supplement the analyses using the main sample. For the larger alternative sample that may better represent the community of pharmaceutical and related firms, I follow Hall, Jaffe, and Trajtenberg (2001) and include all firms that have patented in pharmaceutical and related USPTO primary patent classes (Drugs: 424, 514; Surgery and medical instruments:

[2] The countries represented are as follows: Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Japan, Netherlands, Russia, South Korea, Sweden, Switzerland, United Kingdom.

128, 600, 601, 602, 604, 606, 607; Biotechnology: 435, 800; Miscellaneous – drug and medical: 351, 433, 623). This sample comprises of approximately 1,100 non-U.S. pharmaceutical related firms that patented in the U.S. from 1980-2006. I include both the number of pharmaceutical firms developing new entity drugs and the number of firms patenting in related areas as independent variables in all the analyses. As a robustness check, I conduct the entire analyses using a sub-sample of the alternative sample of firms as well as the main sample, not just including them as independent variables (See Table 10).

I use multiple other sources of data to supplement the data on new entity drug development and patenting activities. First, IMS Health's drug development data links the individual drugs to related patents. I then link the detailed patent information from the USPTO database to determine the U.S. city and state-level location of the drug development which is also used to determine firm (subsidiary) location within the U.S. In addition, the patent database is used to construct a list of employees (inventors) by firm, and to construct multiple control variables including the firms' history of patents, and the firms' areas of expertise. Second, to identify the ethnicity of individual employees (inventors listed on patents), I used two databases from Melissa Data Corporation and List Services Direct, both of which were originally developed to enhance the quality of target marketing by attaching the ethnicity of individuals using their first and last names (Kerr, 2008a; Kerr, 2008b). I use two separate databases to code all the names of inventors in order to crosscheck the possible errors from either one of the databases. The final output from Melissa Data Corporation and List Services Direct gave an estimate of 90.8% and 87.1% accuracy, respectively. Finally, I used the SDC database to collect information on alliance formation between firms (Schilling, 2009). In order to control for the misinformation of the SDC database, I crosschecked the alliance information by searching the

news database for each alliance to verify the information provided.

Variables

Boundaries of Agglomeration

To measure the impact of agglomeration by nationality on firms' innovation performance, I first have to define the boundaries of agglomeration. Following prior studies on agglomeration in the U.S. context, I use economic areas as my primary boundary to define agglomeration (Alcácer and Chung, 2007). The Bureau of Economic Analysis (BEA) divides the U.S. into 171 economic areas based mostly on commuting data.[3] Each economic area consists of one or more economic nodes (metropolitan or micropolitan statistical areas that serve as regional centers) and surrounding counties that are economically connected to these nodes, including both the work site and residence of its labor force (Johnson and Kort, 2004).

U.S. states also represent legal boundaries by which agglomeration can be defined and have been used as geographic units in research on agglomeration (Shaver, 1998; Shaver and Flyer, 2000; Singh and Marx, 2013; Hernandez, 2014). I use economic areas as the primary boundary given that my theoretical arguments assume that firms within the same boundary interact with one another both socially and for business purposes therefore making economic areas that bound work and residential sites more appropriate. Some states, for example, such as California is too large to assume that firms in San Francisco and San Diego actually interact, and

[3] The BEA first established the economics areas in 1977 and continues to redefine them based on the population and economic growth in the U.S. Given the period of my study, I use the definition and boundary from 1995.

in some states such as New York and New Jersey, cities cross state boundaries making the state boundary almost meaningless. Nevertheless, I conduct the same analyses using U.S. states as the boundary for agglomeration (see the section on robustness checks).

Dependent Variables

Using U.S. economic areas (states) as the boundaries of agglomeration, I measure firms' innovation performance by their activities within the focal economic area (state). First, to test the impact of agglomeration by nationality on exploitative innovation stated in Hypothesis 1, I count the number of patents generated in the economic area (state) as a proxy of exploitative innovation performance (Acs and Audretsch, 1989; Penner-Hahn and Shaver, 2005). Second, to test the impact of agglomeration by nationality on explorative innovation hypothesized from Hypothesis 2 onwards, I count the number of new entity drug developments in the focal economic area (state) in the next five years.[4] Although in other contexts, patents can be regarded as explorative innovation, given that new entity drugs are based on multiple new molecule patents, I regard a new entity drug a more novel and radical innovation outcome compared to a single patent. The origin or the location of the patents and the new drugs are identified using the address of the first inventor on the patents. While the original location of patents is easily identifiable, frequently, multiple patents are related to a single drug development, making the origin difficult to identify.[5] In these cases where the multiple patents are filed from different

[4] I aggregate the number of drug developments given the long timeline in generating a single new entity drug. I also use three, seven, and ten year periods as robustness checks and the results show similar patterns.

[5] In some cases, the locations of the inventors are outside the U.S. In most of these cases, the address of the inventor is in the home country of the parent firm, suggesting that inventors of the home country and those in the host country collaborate in innovative activities. While the process of co-development is interesting and an important research area, my study does not focus

locations, I assign the drug to the economic area (state) that is the most prevalent location. Using economic areas (states) as the geographic unit of agglomeration, I can observe the same firm located across multiple locations in the U.S., all of which have different levels of agglomeration of co-national firms, and, therefore, compare the exploitative and explorative innovation performance of the same firm across multiple locations with varying degrees of agglomeration.

Independent Variables

The main independent variable of interest is the degree of agglomeration by nationality within a U.S. state, which I measure, first, by counting the number pharmaceutical firms from my main sample (one that have developed new entity drugs from 1980-2006) that are from the same home country within the economic area (*Same Nationality Firms (Pharma)*). Because I cannot observe firms exiting the focal location with my data, I assume that firms have exited or discontinued their R&D operation within a state if they have not patented in the focal location for three years. I also expand the period to five years and the results remain unchanged. While the non-U.S. pharmaceutical firms in the main sample may account for the firms that compete in the market for innovation, they may also interact and collaborate with a broader set of pharmaceutical related firms in foreign markets. Therefore, I also measure the degree of co-national agglomeration using a broader alternative sample of firms in the pharmaceutical and related industries (*Same Nationality Firms (Related)*). I include both variables to indicate the degree of agglomeration by nationality in the analyses.

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on the involvement of the parent firm (other than including a parent firm fixed effect in the models) and leave this area open for future research.

Mediators

First, to examine if firms that agglomerate with co-national firms tend to have a higher composition of co-national employees and if that leads to lower explorative innovation posited in Hypothesis 3, I first use the patent data to obtain a list of inventors of each firm in the focal foreign location. Then I use two ethnicity-name matching databases (Melissa Data Corporation and List Services Direct) to infer the nationality from the inventors' names. I only use the nationalities when the two databases show a match, and code all other cases as unknown.[6] After having identified the nationality, I count the number of inventors of the same nationality (logged) as the focal firm in the focal year (*Same Nationality Inventors*), controlling for the total number of inventors of other or unknown nationalities.

Second, to test the second proposed mediation in Hypothesis 4 that firms that are co-located with more firms of the same nationality will form more alliances with co-national firms and that, in turn, will lead to lower explorative innovation, I first obtain a full list of alliances among firms in my sample from 1980-2006 from the SCD database. Then, to ensure alignment with my theoretical arguments, I exclude all alliances that are not related to research and development as well as those that are defined at the international level. If an alliance is formed between two firms in the U.S. and the two firms are in the same locations, I count these alliances as relevant within the focal economic area (state). After having identified the relevant alliances, I count the number of alliances with firms of the same nationality as the focal firm in the focal year (*Same Nationality Alliances*), controlling for the total number of alliance with firms of other nationalities.

[6] American/English made up the largest group with 33.7%, German second with 18.6% and Italian third with 5.6%.

Finally, to test Hypothesis 5 that firms that are agglomerated by nationality are more likely to follow the technological trajectories of others firms of the same nationality and that will lead to lower explorative innovation, I calculate an imitation ratio based on the overlap of patent portfolio between the focal firm and the other firms of the same nationality in the same economic area controlling for the baseline likelihood of imitation given the overlap in therapeutic areas. First, I use the subclass of patents developed in the focal location and divide a weighted sum of patent subclasses that overlap with same nationality firms by the total number of patents by the focal firm. For example, if firm *i* patents in one in subclass 101, and two in subclass 102, and all other firms from the same home country patents five in subclass 101, and three in subclass 102, firm *i*'s imitation ratio would be [(5*1)+(3*2)]/3= 11/3. Then, I compare this number with the baseline likelihood of imitation by dividing a weighted sum of the therapeutic areas of the all previously developed drugs by the focal firm that overlap with other co-national firms by the total number of drugs by the focal firm, the same procedure as above. The imitation ratio is obtained by subtracting the second number by the first (*Same Nationality Imitation Ratio*). In other words, I calculate the degree of overlap in patent subclasses controlling for the previous overlap in therapeutic areas. This ratio can be influenced by other factors including the number of patents by same home country firms. I discuss this issue in detail in the next section where I explain the control variables.

Moderators

From Hypothesis 6 to Hypothesis 8, I explore the boundary conditions of the previous arguments that agglomeration by nationality can hinder explorative innovation. I argue that firm-

level characteristics can attenuate the negative effect of agglomeration by nationality on explorative innovation and examine three different moderators. First, to test Hypothesis 6, I focus on the order in which the focal firms entered the location compared to other firms from the same home country. By focal economic area, I number the entry sequence of the firm for each home country (*Entry Sequence (by Nationality)*). For example, for all Swiss firms that have an R&D operation during 1980-2006 in economic area #1, the first one to enter will be coded as 1, the second as 2, and so on. I also divide the sample into the first mover and followers (all firms that are not the first to enter) and use a binary variable and the results remain the same. Second, to test Hypothesis 7, I examine the prior experience the focal firm had in the U.S. prior to their entry into the focal economic area. As a proxy for experience, I count the number of prior entries the focal firm had into the U.S. before entering the specific location (*Prior Experience (# of Prior US Entries)*). Third, I focus on the cultural background of the home country and test whether the firms from more individualistic culture will be less negatively affected by agglomeration by nationality as posited in Hypothesis 8. To measure the degree of individualism of the home country of the focal firm, I use Hofstede, Hofstede, and Minkov's (2010) survey measure Individualism versus Collectivism (*Individualism (Hofstede score)*).

Control Variables

I control for firm-economic area level, firm-level, and economic area level characteristics that could affect the relationship between the independent, mediation, and dependent variables. First, at the firm-economic area level, I control for the number of immigrants from the same

home country of the focal firm in the economic area (*Same Nationality Immigrants*). I use the U.S. immigration data from a 5% public use micro sample (IPUMS) from the 1980, 1990 and 2000 census (Hernandez, 2014) to calculate the number of immigrants by each nationality. Having a large community of co-national immigrants in the economic area can affect the likelihood of entry of firms of the same nationality and also different aspects of their performance in the foreign market (Hernandez, 2014). Because I focus mostly on interactions between actors in the pharmaceutical or related industries, I control for the general population of co-national actors in the focal foreign location. Second, I control for the number of other nationality pharmaceutical firms including the American firms that develop new entity drugs in the focal economic area (*Other Nationality Firms (Pharma)*). I also include the number of pharmaceutical related firms from other countries that patent in the economic area but not develop new entity drugs (*Other Nationality Firms (Related)*). It is important to include these variables because I can tease out the effect of agglomeration in general from the effect of agglomeration with same home country firms on exploitative and explorative innovation performance. A positive coefficient of this control variable will infer that there are positive externalities from co-locating in general with more pharmaceutical firms whereas a negative coefficient will infer that there are general negative externalities of agglomeration on innovation performance.

I also add a number of variables that may affect the mediators included in the models. First, I control for the total number of other and unknown nationality employees (*Total Inventors*), and the total number of alliances (*Total Alliances*) to ensure that number of employees and alliances with actors of the same nationality doesn't simply reflect the size of the firm or operations in the focal economic area. The imitation ratio of firms from the same home

country can be higher if the firms of the same nationality are simply patenting more (higher probability of overlap) and thus, I control for the number patents by firms of the same nationality (*Total Patents by Same Nationality Firms*). While firms may be imitating R&D strategies of firms from the same home country, they could also be following their own firm's R&D trajectory or patenting in areas where other firms, not just same nationality ones, are patenting. I include a self-imitation ratio (*Self Imitation Ratio*) and other nationality firm imitation ratio (*Other Nationality Imitation Ratio*), calculated using the same procedure as the *Same Nationality Firm Imitation Ratio* to control for these possibilities.

At the firm-level, I account for the firm's stock of prior knowledge and capabilities by including a control variable for the cumulative number of drugs the firm has developed at the parent-firm-level (*Cumulative Drug Developments*).[7] Moreover, given the high frequency of merger activity in the pharmaceutical industry, I include a binary variable to indicate for merger year to next five years (*Merger Year +5*). At the economic area (state) level, I include the percentage of individuals in science and engineering occupations out of the total workforce in the economic area which represents the available R&D resources in the location (*R&D Workforce*). As an alternative specification, I included the economic area GDP as a control variable and the results remained stable.

Endogeneity

One main concern measuring location-based performance is that performance can be an

[7] For Models 1-3 in Table 2 where I focus on the number of patents in the focal location, I include the cumulative number of patents instead.

endogenous outcome of firm's choice of location (Shaver, 1998). Since I only observe innovation performance in the focal location if an entry occurs, the performance outcome is dependent on the initial location choice and thus, I control for the selection bias in two ways. First, I account for the potential endogeneity issue by using the instrumental variable Poisson regression (Mullahy, 1997). Following prior research, I identify instrumental variables including geographic distance between the home country and the focal location, yearly inches of snow in each economic area and the average temperature difference between the home country of the firm and the focal location (Hernandez, 2014), that affect firms' probability of entering the focal economic area but not the subsequent innovation performance.[8] Second, as an alternative to the instrumental variable approach, I include firm-economic area pair fixed effects in the models to control for the heterogeneity across the firm-economic area pairs. These fixed effects will control for any matching factors between the firm and the focal location that are time invariant. The results are robust using both approaches for accounting for endogeneity and I present both results below.

Statistical Analysis

To test the direct effect of agglomeration by nationality on exploitative and explorative innovation (Hypothesis 1 and Hypothesis 2), I use a Poisson regression as the dependent

[8] The results reported in the main analyses instruments the endogenous variable *Same Nationality Pharma Firms* using the three instrumental variables as the exogenous instrumental variables. To ensure the significance for the instruments, I followed Stock and Yogo's (2005) approach. The joint significance of the instruments results in the F-statistic of 15.39, which exceeds 13.91, the recommended critical value ensuring bias under 5%. The Sagan test also validated the exogeneity of the instrumental variables, indicating they are uncorrelated with the structural error ($p > 0.10$).

variables are a count of the number of patents and the number of drug developments. The data does not show signs of overdispersion (Long, 1997), but I also conduct robustness checks using negative binomial regression, and the results remain unchanged. In this paper, I only report the results using Poisson regressions. To correct for the inconsistency in the estimates and to make interpretation straight forward, I log all the independent and control variables (Gourieroux, Monfort, and Trognon, 1984; Hausman, Hall, and Griliches, 1984; Winkelmann, 2008).

Next, I focus on explorative innovation or new drug development and test and mediation and moderation effects. To test the mediation effects (Hypothesis 3, 4 and 5), I follow the 3-step approach developed by Baron and Kenny (1986). Specifically, I regress the number of firms of the same nationality on the number of new drug developments (Model 8 in Table 3; Model 11 in Table 4; Model 14 in Table 5), the number of firms of the same nationality on the mediators (Models 9 in Table 3; Model 12 in Table 4; Model 15 in Table 5), and the number of firms of the same nationality and the mediators on the number of new drug developments (Models 10 in Table 3; Model 13 in Table 4; Model 16 in Table 5). I finally if the indirect impact of the number of co-national firms on the number of drug developments through the mediator is stastistically significant using the z-mediation test (Iacobucci, 2012). The commonly used Sobel, Goodman, and Aroian tests were developed for linear OLS regression and are therefore, unlike the z-mediation test (Iacobucci, personal communication, 2013), not directly applicable to non-linear count models (MacKinnon, 2008; Iacobucci, 2012). Finally, the moderation effects posited in Hypotheses 6 to 8 are also tested using Poisson regressions.

Results

As the main set of results, I present the analyses using my main sample (pharmaceutical firms that have developed new entity drugs) with economic areas as the geographic unit of agglomeration and instrumental variable Poisson regression to control for endogeneity issues. I begin by presenting the results illustrating the trade-off on exploitative and explorative innovation of agglomeration by nationality (Table 2) that provide support for Hypotheses 1 and 2. Next, focusing on the negative impact of agglomeration by nationality on explorative innovation, I test the proposed mechanisms that explain the pathway by which the negative impact occurs in Table 3 (composition of co-national employees - Hypothesis 3), Table 4 (alliance formation with co-national firms - Hypothesis 4), and Table 5 (imitation of technological trajectories - Hypothesis 5). In Table 6, I present an analysis of the moderators (Hypotheses 6-8).

As robustness checks, I re-run all the analyses using different specifications. First, instead of the instrumental variable Poisson regression to control for the endogeneity, I use firm-economic area fixed effects (Table 7). Second, instead of using economic areas as the geographic unit to illustrate agglomeration, I use U.S. states as the boundaries of agglomeration and re-run all the models using the instrumental variable Poisson regression approach (Table 8) and also using the fixed effects approach (Table 9). Finally, in Table 10, I use a larger sample of firms to re-run all the models, using economic areas as geographic boundaries and instrumental variables to account for endogeneity.

Results suggest that agglomerating with more firms from the same home country indeed increases the number of patents but decreases the number of drug development in the focal location. The results also show support for some of the proposed mechanisms including

employee composition and imitation of technological trajectories. Moreover, I find support for the moderators that first mover firms, firms with more experience in the host country, and firms from individualistic cultures are less negatively impacted by agglomeration by nationality on their drug developments.

Table 1 presents the summary statistics with the bivariate correlations.

Insert Table 1 around here

Trade-off of agglomeration by nationality on exploitative and explorative innovation

Table 2 provides the results examining the trade-off that pharmaceutical firms face in foreign markets in terms of exploitative and explorative innovation. In Models 1-3, I test whether agglomerating with firms of the same nationality impacts the number of patents generated in the focal foreign market. Given that the degree of agglomeration may take a few years to have an impact on innovation performance, I use lag all the number of firms by 1 year, 2 years and 3 years in Models 1, 2 and 3, respectively. In Model 1 and Model 2, both the number of co-national pharmaceutical firms (0.29**, $p < 0.01$; p.17*, $p < 0.05$) and the number of co-national firms in related areas (0.52**, $p < 0.01$; 0.29*, $p < 0.05$) have a positive effect on the forward 1 and 2-years patent count. The impact of the number of co-national firms in related areas is also positive and significant for the forward 3-years patent count (0.72***, $p < 0.001$), but the number of co-national pharmaceutical firms is not significant. These results provide support that co-locating with more firms of the same nationality has a positive impact on exploitative innovation as posited in Hypothesis 1. I also note that the number of other nationality firms all

have strong negative effects on the number of patents, suggesting that having more firms, in general, may increase competition and negatively impact exploitative innovation.

To compare the impact of agglomeration by nationality on exploitative innovation to that on explorative innovation, I test whether the number of firms from the same home country has a different impact on new drug development in Models 4-6. The results provide support for Hypothesis 2. Using forward 3, 5, and 7-years count of new entity drug development as the dependent variable, both the number of co-national pharmaceutical firms (-0.13, $p < 0.05$; -1.18*, $p < 0.05$; -0.83*, $p < 0.05$) and the number of co-national firms in related industries (-0.27*, $p < 0.05$; -0.81**, $p < 0.01$; -0.59**, $p < 0.01$) in the same economic area have a negative impact on the forward 3, 5, and 7-years number of drug developments.[9] Taken together, the models presented in Table 2 provide strong support for the first two hypotheses and suggest that agglomeration by nationality positively impacts patent generation, a short-term exploitative innovation outcome, but negatively impacts new drug development, a long-term explorative innovation outcome.

Mediation effects: Mechanisms that lead to the negative outcomes

Having examined the trade-off of agglomeration by nationality on patenting (exploitative innovation) and drug development (explorative innovation), I next focus on the under-researched area of the negative effect on explorative innovation and explore mediators that may explain the negative consequences on explorative innovation. I use forward 5-year number of drug

[9] I also tried curvilinear specifications for the number of firms by including square terms for these numbers. However, I did not find significant results and therefore, do not include the square terms in the reported results.

developments as the dependent variable going forward. The results, however, are stable using both 3-year and 7-year cumulative number of drug developments.

Model 7 in Table 3 provides a baseline model containing all the control variables for the instrumental variable Poisson regression on forward 5-year drug developments. It shows that having more co-national immigrants in the economic area has a positive and significant effect on drug developments. The results also show that more pharmaceutical firms that develop new entity drugs (other nationality) in the economic area the higher the number of drug developments indicating some evidence for positive effects from agglomeration, a distinct contrast from Models 1 to 3. However, co-locating with more firms in related areas does not affect drug development. All the moderators including being a first mover from a specific home country into the focal economic area, having more prior experience in the U.S. and coming from an individualistic culture have a positive and significant effect on new drug development. At the parent firm-level, cumulative drug development positively affects the drug development at the focal location. Moreover, a recent merger positively affects the number of drug developments suggesting that pharmaceutical firms may be acquiring other firms that are close to new drug developments.

Insert Table 3 around here

In Models 8, 9 and 10, I test the first proposed mechanism that higher proportion of same nationality employees will mediate the relationship between the number of same nationality firms and lower explorative innovation performance in the focal location as posited in Hypothesis 3. First, in Model 8, I add the main independent variables of the number of same nationality pharmaceutical firms developing new entity drugs and the number of same nationality

firms patenting in related areas providing evidence that agglomerating with same nationality firms has a negative impact on innovation performance. The coefficients indeed show that as the numbers of same nationality firms (both pharmaceutical firms and firms in related areas) increase, the forward 5-year drug development is significantly reduced (-1.18*, $p < 0.05$; -0.81**, $p < 0.01$). These negative main effects are significant across all models reported here. I also note that compared to Model 7, the positive and significant coefficient of the number of co-national immigrants is no longer significant in Model 8. To examine the mechanisms that mediate the main effect, I first focus on ethnic composition of inventors and regress the same set of variables on the number of co-national inventors. Second, in Model 9, I test whether the number of co-national firms in the focal economic area affects the number of co-national inventors controlling for the total number of inventors in the focal location. Results show that co-locating with both a larger number of same nationality pharmaceutical firms and related firms increases the number of same nationality employees (0.31*, $p < 0.05$; 0.27**, $p < 0.01$). Finally, in Model 10, I include both the main independent variables and the mediator. The results show that the number of same nationality inventors has a significant negative effect on the number of forward 5-year drug developments (-1.26***, $p < 0.001$).The coefficients of the number of same nationality pharma firms and the number of same nationality related firms are reduced from -1.18 to -1.15, and from -0.81 to -0.59 respectively, but still remain significant, suggesting that the mediation effects are partial.

Figure 2 clearly illustrates the mediation effect and provides support for Hypothesis 3. The results of the z-mediation test indicate that the number of same nationality inventors significantly mediates the relationship between the number of co-national pharmaceutical firms and the number of forward 5-year drug development (-1.68*, $p < 0.05$) and also the relationship

between the number of co-national firms in related areas and the number of forward 5-year drug developments (-2.54**, $p < 0.01$).

Insert Figure 2 around here

In Table 4, I test for the second proposed mechanism that forming more alliances with same nationality firms will mediate the relationship between agglomeration by nationality and drug development performance as posited in Hypothesis 4. Model 11 is a duplicate of Model 8 presented only for the convenience of illustrating the mediation effect. In Model 12, I test whether the number of co-national pharmaceutical firms and related firms affect the nationality of alliances formed in the focal economic area. The results show that agglomerating with more co-national pharmaceutical firms and firms in related areas increases the likelihood of forming an alliance with other co-national firms in the co-located area (0.18**, $p < 0.01$; 0.13*, $p < 0.05$). Model 13, however, does not support Hypothesis 4 that forming more alliances with firms of the same nationality will lead to fewer number of future drug developments (-0.85, $p > 0.10$). The z-mediation test illustrated in Figure 3 also does not provide evidence of a significant mediation effect (-0.49, $p > 0.31$; -0.73, $p > 0.23$).

Insert Table 4 around here

Insert Figure 3 around here

There are two potential reasons why I do not find support for Hypothesis 4. First, empirically, I was not able to comprehensively assign each alliance to a specific location. Most

alliance announcements are made at a national-level or a general-level without specifying the specific location in which the alliances. By searching the detailed announcement for each alliance, I tried to fully identify the region where the alliances originated but could not find comprehensive information for many of the observations. For the alliance that I could not assign to a specific economic area, I assigned them to specific locations when all relevant firms in the alliance located in the same economic area at the time of alliance announcement. This method, however, may be misidentifying the origin of the alliance and thus, attributing to non-significance of the mediation tests. Second, alliances which are relationships between firms, and hiring of employees which is a relationship between an organization and an individual, could represent two different types of relationships that are theoretically dissimilar. I further discuss the potential theoretical dissimilarities and future directions in the conclusion section of this dissertation.

In Table 5, I test the third proposed mediation (Hypothesis 5) that the imitation of technological trajectories among same nationality firms is another pathway by which agglomeration by nationality leads to lower explorative innovation performance. Model 14 is a duplicate of Model 8 presented only for the convenience of illustrating the mediation effect. Model 15 indicates that agglomerating with more same nationality pharmaceutical firms and firms in related areas increases the likelihood that the focal firm imitates the patenting strategy of same nationality firms (0.83*, $p < 0.05$; 0.16*, $p < 0.05$). Model 16 includes both the mediator (imitation ratio) and the main effects (number of co-national pharmaceutical firms and firms in related areas) as well as all the control variables. Higher imitation ratio of the same nationality firms decreases the number of future drug developments (-0.23*, $p < 0.05$). In addition, the coefficients of the number of same nationality pharmaceutical firms and the number of same

nationality related firms are -1.13 and -0.77, respectively, which are smaller than in Model 14 without the mediating variable. The main effects, however, still remain statistically significant.

Insert Table 5 around here

Figure 4 clearly illustrates the mediation effect and provides support for Hypothesis 5. The results of the z-mediation test indicate that the imitation of the technological trajectories of co-national firms significantly mediates the relationship between the number of co-national pharmaceutical firms and the number of forward 5-year drug development (-1.74*, $p < 0.05$) and also the relationship between the number of co-national firms in related areas and the number of forward 5-year drug developments (-1.42†, $p < 0.10$).

Insert Figure 4 around here

Finally, Model 17 of Table 5 presents a full model including all the mediators. The coefficients show similar patterns to the previous results and the meditation tests are also robust using the results of the full model. The main negative effect is reduced but still significant in the full model, suggesting that there may be other potential mediators that explain the main effect. I further discuss this issue in the conclusion.

Moderation effects: Boundary conditions

Having examined the main effect and the mediation effects, I next turn to the moderators

posited in Hypotheses 6-8 and explore the boundary conditions of the negative impact of agglomeration by nationality on explorative innovation. First, in Model 18, I add the interactions of the number of co-national pharmaceutical firms and the number of co-national firms in related areas by the entry sequence focal firm into the focal economic area by home country. Following the logic in Hypothesis 6, I expected a negative coefficient which would indicate that the negative impact of agglomeration by nationality is accentuated for firms that are followers whereas the negative impact is attenuated for firms that are early movers. The results show that the interaction between the number of co-national pharmaceutical firms by the entry sequence (-0.33**, $p < 0.01$) supports Hypothesis 6 but the interaction between number of co-national firms in related areas by the entry sequence is not statistically significant (0.21, $p > 0.10$). In other words, the negative impact of co-locating with more co-national pharmaceutical firms on drug development is reduced for firms that were the ones to enter the focal location before other firms from the same home country. However, the impact of co-locating with co-national firms in related industries is not affected by the entry sequence.

Insert Table 6 around here

Second, I examine the moderating effect of prior experience in the host country on the relationship between co-locating with co-national firms and explorative innovation as posited in Hypothesis 7. In Model 19, I add the interactions of the number of co-national pharmaceutical firms and the number of co-national firms in related areas by the prior experience of the focal firm in other locations in the U.S. prior to entering the focal economic area. As argued in Hypothesis 7, I expected a positive coefficient which would indicate that the negative impact of agglomeration by nationality is attenuated for firms that have more experience in the host

country. The results support Hypothesis 7 and show that the interaction between the number of co-national pharmaceutical firms by prior experience (2.59**, $p < 0.01$) and the interaction between number of co-national firms in related areas by prior experience (0.83**, $p < 0.01$) are both statistically significant in the predicted direction. In other words, the negative impacts of co-locating with more co-national pharmaceutical firms and with more co-national firms in related areas on drug development are reduced for firms that have more experience in entering other locations in the U.S. before entering the focal economic area.

Finally, I examine the moderating effect of the individualistic (as opposed to collectivistic) culture of the home country on the relationship between co-locating with co-national firms and explorative innovation as posited in Hypothesis 8. In Model 20, I add the interactions of the number of co-national pharmaceutical firms and the number of co-national firms in related areas by the individualism score of the firm's home country culture. Following the argument previously laid out in Hypothesis 8, I expected a positive coefficient which would indicate that the negative impact of agglomeration by nationality is attenuated for firms that are from a more individualistic culture whereas the negative impact will be magnified for those from collectivistic cultures. The results support Hypothesis 8 and show that the interaction between the number of co-national pharmaceutical firms by the individualism score (0.12**, $p < 0.01$) and the interaction between number of co-national firms in related areas by the individualism score (0.05*, $p < 0.05$) are both statistically significant in the predicted direction. In other words, the negative impacts of co-locating with more co-national pharmaceutical firms and with more co-national firms in related areas on drug development are reduced for firms that are from individualistic home countries.

To summarize, the results provide evidence that support the main argument in Hypotheses 1 and 2 that pharmaceutical firms face a trade-off between patent generation (exploitative innovation) and drug development (explorative innovation) when they are co-located with more firms with the same nationality. Agglomeration by nationality increases the number of patents generated in the focal economic area whereas it decreases the number of drug developments. Next, the mediation analyses provide support for Hypothesis 3 and Hypothesis 5 but not Hypothesis 4. The results show that having a larger composition of co-national inventors and imitating the technological trajectories of co-national firms mediate the negative relationship between agglomeration by nationality and the number of future drug developments in a focal economic area. Finally, the results provide evidence that support Hypotheses 6 to Hypotheses 8: The negative impact of agglomeration by nationality on explorative innovation is attenuated for firms that are first movers to the focal location from their home country, firms that have more experience in the host country and firms from home countries that have an individualistic culture.

Robustness Checks

To check the stability of the previous results, I conduct various robustness checks using difference specifications. First, in Table 7, instead of the instrumental variable Poisson regression to control for the endogeneity, I use firm-economic area fixed effects. The results presented in Table 7 show similar patterns to the previous results. Model 7a to Model 20a correspond to Model 7 to Model 20 in the tables presented above (Model 11a and Model 13a are

missing since they are identical to Model 8a). Model 8a supports Hypothesis 2 that co-locating with more firms of the same nationality, both pharmaceutical competitors and related firms, leads to lower number of drug developments. Models 9a and 10a provide additional support for Hypothesis 3 that having more inventors of the same nationality mediates the negative outcome. Similar to prior results, Models 12a and 13a do not show support for Hypothesis 4 which posited that forming more co-national alliances will also mediate the negative impact of agglomeration by nationality. Furthermore, Models 15a and 16a provide evidence that support Hypothesis 5 and shows that imitation of technological trajectories of co-national firms is another mechanism by which agglomeration by nationality leads to lower explorative innovation performance. Finally, Models 18a, 19a, and 20a test the significance of the moderating effects. The results show the same patterns as Models 18, 19 and 20: Firms that have more prior experience in the U.S. and firms from individualistic cultures are less negatively affected by co-locating with co-national firms in terms of drug development, supporting Hypotheses 7 and 8. Hypothesis 6 is partially supported: Being a first mover as opposed to a follower moderates the impact of co-locating with more co-national pharmaceutical firms on future drug development but not the impact of co-locating with more co-national firms in related industries.

Insert Table 7 around here

Next, in Table 8 and Table 9, instead of using economic areas as the geographic unit to illustrate agglomeration, I use U.S. states as the boundaries of agglomeration and re-run all the models. I use the instrumental variable Poisson regression approach in Table 8 and the fixed effects approach in Table 9. Model 7b/c to Model 20b/c correspond to Model 7 to Model 20 in the tables presented above (Model 11b/c and Model 13b/c are missing since they are identical to

Model 8b/c). Models 8b and 8c both show support for Hypothesis 2 that co-locating with more firms of the same nationality in the focal U.S. state has a negative impact on future drug developments. Models 9 b/c to 16 b/c that test for the mediations show the same patterns as the previous results: The models support Hypothesis 3 and 5 but not Hypothesis 4. Having more inventors of the same nationality and following the technological trajectories of the co-national firms mediate the relationship between agglomeration by nationality and lower future drug development. Finally, the tests of moderations in Models 18 b/c to 20 b/c show similar results as to those presented above and support Hypotheses 6 to 8 that firms that are followers, firms with less experience in the U.S. and firms from collectivistic cultures are more negatively affected by co-locating with more firms of the same nationality in terms of long-term drug development in the foreign market.

Insert Table 8 around here

Insert Table 9 around here

Finally, in Table 10, instead of using the main sample of 80 pharmaceutical firms, I use a larger sample of firms to test the hypotheses. By using the main 80 pharmaceutical firms as the sample, I follow the approach of other research on pharmaceutical firms that only examines firms that have developed at least one new entity drug (Fabrizio and Thomas, 2012) and research on firms in other industries such as studies that examine investment banks that have participated at least once in underwriting activities (Podolny, 1993; Jensen, 2003). Nevertheless, I may be omitting the pharmaceutical firms that have tried to develop new entity drugs but did not succeed

during the period of 1980-2006. Given that I am interested in firms that are in the competition for explorative innovation, I would, ideally, like to get the list of all the firms that have tried to develop new entity drugs regardless of their success to do so. However, given the limited amount of information on the failed attempts to develop new drugs, I am only able to identify those that have succeeded in developing at least one drug (my main sample) or those that have patented in pharmaceutical or related areas (my alternative sample). Using the latter sample may result in noisy estimations given that a majority of these firms are not attempting to develop new drugs. Nevertheless, as another robustness check, I tried using the entire latter sample of 1,100 firms to test the hypotheses. However, excluding the 80 firms from the main sample, most of these firms have never developed a new entity drug, making the dependent variable zero in most of the cases. The models, as a result, did not converge. As an alternative approach, I added random sample of 80 firms from the 1,100 to the main sample of 80 firms and re-ran the analyses using 160 firms.

Table 10 presents the results using 80 firms from the main sample and 80 firms from the alternative sample. I used economic areas as the geographic unit of analysis and the instrumental variable Poisson regression to control for endogeneity issues. The results largely show similar patterns, but weaker in significance, to the prior results using just the main sample. Model 8d shows that the number of co-national firms (both pharmaceutical and related) has a negative impact on future number of drug developments. Of the three proposed mechanisms, only the number of co-national inventors was a significant mediator (see Models 9d and 10d) whereas the number of co-national alliances and the imitation of technological trajectories did not mediate the relationship between agglomeration by nationality and the number of drug developments. The moderators were significant in the predicted directions only for the number of co-national

pharmaceutical firms: The negative impact of co-locating with same nationality pharmaceutical firms on future drug developments are attenuated for first mover firms, firms with more experience in the U.S. and firms from individualistic cultures. The moderation effects for the number of co-national firms in related areas are not support in Models 19d and 20d, and the impact is significant in the opposite direction in Model 17d. Although the results in Table 10 are largely similar to prior analyses, the insignificance of some of the mediators and moderators suggest caution to the generalization of the arguments. In other words, the theoretical arguments regarding the behavioral mechanisms and the boundary conditions may not apply to firms that do not invest in or put less emphasis on explorative innovation.

Insert Table 10 around here

In sum, the empirical analysis in the global pharmaceutical industry show support for most of the theoretical arguments. First, the results show evidence that agglomerating with more co-national firms have a positive impact on patent generation while having a negative impact on drug developments. This supports Hypothesis 1 and Hypothesis 2 that firms face a trade-off in exploitative and explorative innovation when agglomerating by nationality. Second, the results show support for two of the three proposed behavioral mechanisms that explain the negative impact on explorative innovation. I find that having a higher composition of co-national inventors and imitating the technological trajectories of co-national firms mediate the relationship between the number of co-national firms and the number of drug developments. Finally, the results show support for three moderators. I find that the negative impact of

agglomeration by nationality is attenuated for firms that are early movers from the home country, firms that have prior experience in the host country, and firms that are from individualistic cultures.

CHAPTER FIVE. CONCLUSION

This study focused on nationality as a key aspect of firm identity and specifically examined how agglomeration by nationality can impact innovation performance of firms conducting R&D in foreign markets. While agglomeration by nationality has been shown to benefit firms entering foreign markets, it can also lead to homophilic relationships and imitative strategic decisions, restricting the diversity of information channels and limiting new knowledge flows. I argued therefore that for firms that enter foreign markets to conduct R&D, agglomerating with firms of the same nationality has a trade-off on innovation performance in that there are benefits in terms of exploitative innovation but can hinder explorative innovation. Contrasting with prior research that focused mostly on the benefits of agglomeration by nationality, I focused on the negative impact on explorative innovation and identified the important role of national identity in influencing firm behavior such as relationship formation and strategic imitation that account for the pathways by which agglomeration by nationality can lead to negative outcomes. I specifically argued that i) higher composition of employees of the same nationality, ii) more alliance formation among firms of the same nationality, and iii) imitation of technological trajectories of firms of the same nationality will lead to redundant knowledge and reduced flexibility and thus, lower the explorative innovation performance in the foreign market. Moreover, I explored the boundary conditions of these arguments by examining firm-level characteristics that impact the degree to which firms are negatively affected by

agglomerating with co-national firms. Specifically, I argued that first or early movers from the home country, firms with more prior experience in the host country, and firms from individualistic cultures are less negatively affected by co-locating with other firms from the same home country.

I used a sample of non-U.S. pharmaceutical firms conducting R&D in the U.S. to test the theoretical arguments. Results largely confirmed the theoretical arguments: First, the results showed that co-locating with more firms from the same home country leads to an increase in the number of patents generated in the focal foreign location but a decrease in the number of drug developments, illustrating a trade-off in terms of exploitative and explorative innovation outcomes. Second, the results also showed support for two of the proposed behavioral mechanisms: Having higher composition of same nationality employees and imitation of technological trajectories mediate the impact of agglomeration by nationality on innovation performance. Third, the empirical analyses show evidence that certain firms are able to resist the magnetic pull from national identity and are less negatively affected. More specifically, I find that early movers from the home country, more experienced firms and firms from individualistic cultures are less affected by agglomeration by nationality in terms of their drug development performance in the foreign market.

Contributions

By studying the process and the consequences of agglomeration by nationality in foreign markets, this dissertation offers important theoretical contributions in several areas. First, this

study contributes to research on agglomeration. Prior research on agglomeration has well documented the positive and negative externalities of agglomeration (Marshall, 1920; McCann and Folta, 2008). Studies have especially emphasized that agglomeration, in general, facilitates innovation but also that negative externalities arise from excessive competition among firms that locate in geographically proximate locations (Baum and Mezias, 1992; Baum and Haveman, 1997). This study, by focusing on the important role of organizational identity, identifies another important source of negative externality of agglomeration and shows that under certain conditions, agglomeration can hinder rather than facilitate innovation. While prior research has mostly focused on the competitive dynamics within agglomerated clusters, I argue that when a subset of actors that share an identity agglomerate, shared identity functions as a magnet and promotes certain behavioral tendencies which leads to negative performance outcomes. Using nationality as a salient indicator of shared identity of firms in a foreign market, I theorize that firms of the same nationality are more likely to interact in a cooperative manner, rather than intensely compete with each other, in a foreign market and consequently become embedded in a social structure by nationality, restricting them from a diverse set of connections. Specifically, I propose that when firms that share the same nationality agglomerate, they will initially form more relationships with actors of the same nationality and imitate one another's strategies which can consequently lead to negative explorative innovation outcomes.

Second, I contribute to the literature on identity by emphasizing the function of shared identity as a magnetic force and showing that shared identity can lead to significant outcomes for organizations. Research has well-documented the phenomenon of homophily or the tendency of actors that share an identity to form relationships (McPherson, Smith-Lovin, and Cook, 2001; Reagans, 2005; Ingram and Morris, 2007). My study builds on this stream of work and shows

that homophily at the individual level can aggregate up to the organizational level and generate unintended outcomes. Furthermore, I go beyond the function of shared identity to stimulate homogenous relationships and show that shared identity can also influence strategic decision making in firms. More specifically, I suggest that shared identity can function as a magnetic force that aligns behavior of actors that share similar identities and thus, increase the likelihood that these actors imitate one another's strategic decisions. In sum, by focusing on the role of national identity in foreign markets, I illustrate a specific example of how identity can lead to unintended but significant negative consequences by acting as a magnet and governing behavior such as promoting homophilic relationships and influencing strategic decisions.

Third, my study contributes to the research on foreign market entry by theorizing the processes that occur after entry. Prior research on foreign market entry has highlighted the imitative behavior of other firms from the same home country when choosing locations in foreign markets (Henisz and Delios, 2001; Guillén, 2002). I shift the attention from the entry stage and focus on firm behavior and performance after the initial entry to show the consequences of agglomerating by nationality. Tracing the processes throughout multiple stages of firms' foreign expansion is important given that the factors that contribute to location choice decisions may not always lead to the intended outcomes in terms of long term performance in the market. Finally, this study contributes to research on the agglomeration of actors by ethnicity/nationality. Most research on agglomeration by nationality have focused on individuals and ethnic enclaves (Portes, 2010) and highlighted the benefits of agglomeration by nationality in foreign markets. The few studies at the organizational level have also emphasized the initial benefits such as ease of communication and information sharing. This study shifts attention from the short-run positive consequences of agglomeration to the long-run negative consequences,

thus highlighting an important trade-off between ease of market entry and long-run competitiveness in foreign markets. I certainly do not suggest that agglomeration by nationality or homophily do not have benefits but emphasize instead the importance of a long-term perspective in location choice.

My dissertation has important implications for managers and policy makers as well. This study provides insights for firms with foreign operations, especially those with international R&D facilities, on where to locate in foreign markets to maximize their benefits. As knowledge seeking foreign expansion is increasingly becoming more prevalent, choosing the location to take advantage of innovation opportunities in foreign markets has become a key issue for multinational firms. Foreign market entry decisions are particularly important in the pharmaceutical industry where the trend in the industry is that not only pharmaceutical firms from developed countries but also those from emerging economies are moving away from simply producing generics to investing towards research and development of new molecules and choosing multiple locations worldwide to locate new facilities. This study suggests that agglomerating with other firms from the same home country, while beneficial for certain types of innovations, may not be the best decision for obtaining new and distant knowledge and producing new explorative innovations. If firms nevertheless decide to agglomerate in foreign markets, my analyses of the behavioral mechanisms accounting for the negative effects of aggregation point to important counter measures: benchmark foreign firms, partner with foreign firms, and hire foreign talent.

Limitations and Future Research

Although the findings largely support the theoretical arguments, this study has limitations that should be addressed in future research. First, although I found support for two of the three proposed mechanisms, I did not find empirical evidence in support of Hypothesis 4 which argued that forming more alliances with co-national firms will mediate the relationship between agglomeration by nationality and lower explorative innovation performance. The non-significance of the result may be due to the data limitation and not being able to accurately identify the geographic origin of alliances as discussed above. Another possibility is that alliance decisions are fundamentally different from hiring decisions. Alliances may be determined at the parent firm-level than at the subsidiary and therefore, less influenced by the business environment in the foreign location. Given that the negative main effect still remained significant with all the proposed mediators included in the models, a further investigation into other potential mediators including a comprehensive examination of the alliance formation mechanism is required in future research.

Second, due to data limitations, I was not able to distinguish between the employees that were hired in the foreign location from those that moved from the parent firm in the home country to the subsidiary in the host country. I was also not able to distinguish just from the name of the employee whether she actually possesses the cultural characteristics associated with the nationality of the name or she has a completely different cultural background. Being able to more accurately measure the cultural background of each employee will give a more nuanced understanding of the internal dynamics within a firm as well the interfirm dynamics. Finally, although I explored behavior mechanisms to explain the negative consequences of agglomeration

by nationality, future research should go even deeper and examine the micro mechanisms underlying the outcomes at the organization level. For example, by exploring the actual social networks of the expatriates in foreign markets, future research will be able to better identify the relationships between the expatriates and explore how the individual level social relationships affect business strategies at the organizational level.

In sum, my study suggests that firms may face a trade-off in their exploitative and explorative innovation outcomes by co-locating with other firms with the same national identity in foreign markets. I argue that national identity is a magnetic force that promotes relationships and aligns strategies between co-national actors which, in turn, leads to negative outcomes in terms of explorative innovation. I also provide boundary conditions to the argument by showing that certain firm characteristics attenuate the negative impact of agglomeration by nationality. Overall, despite its limitation, I believe that my dissertation provides valuable insights to the understanding of the role of national identity of firms in foreign markets.

FIGURES

FIGURE 1.
Summary of Hypotheses

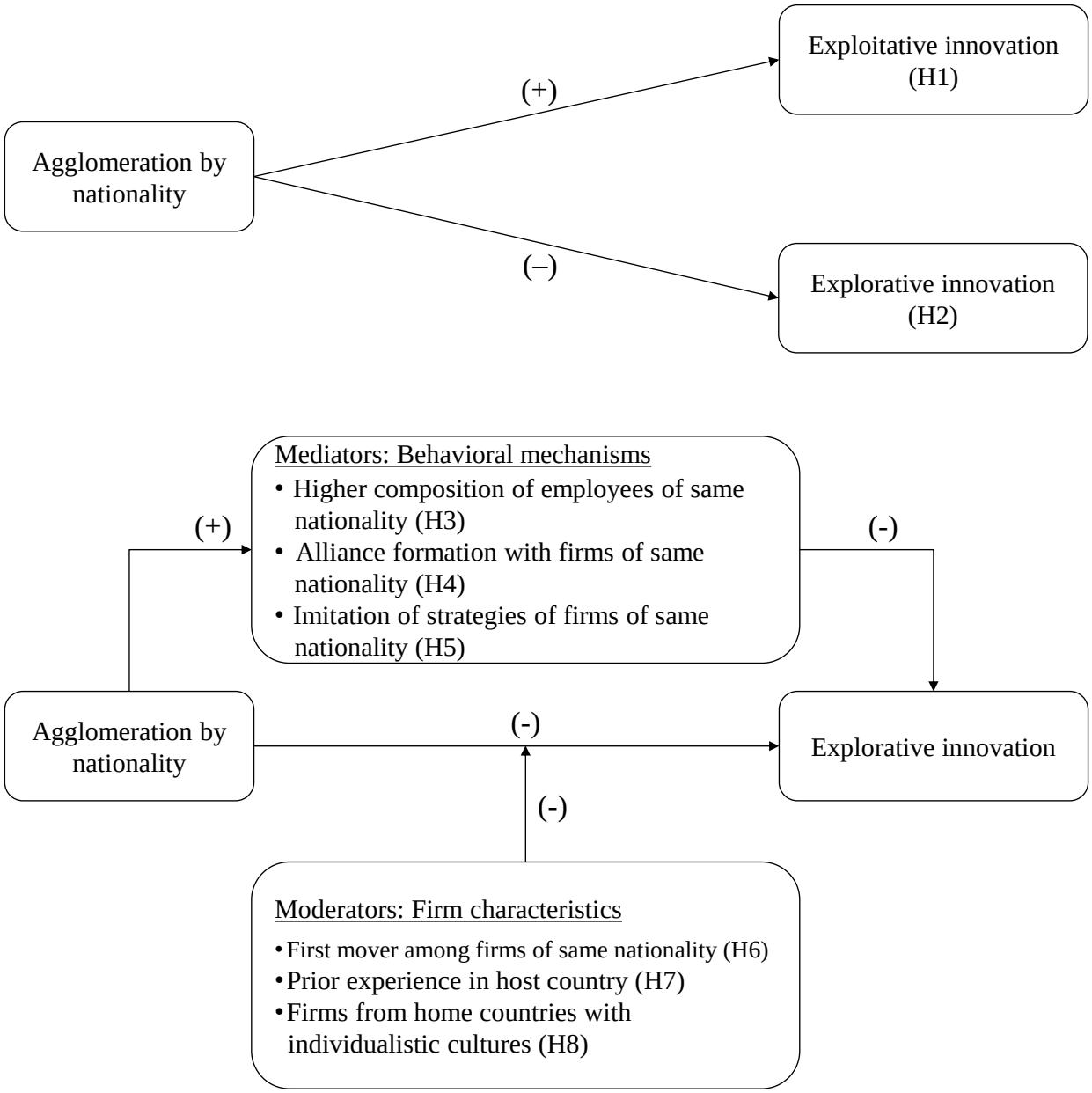
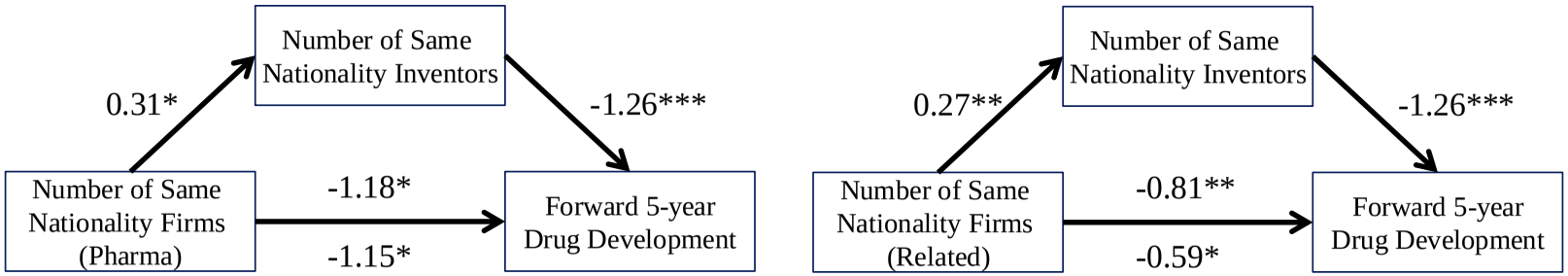


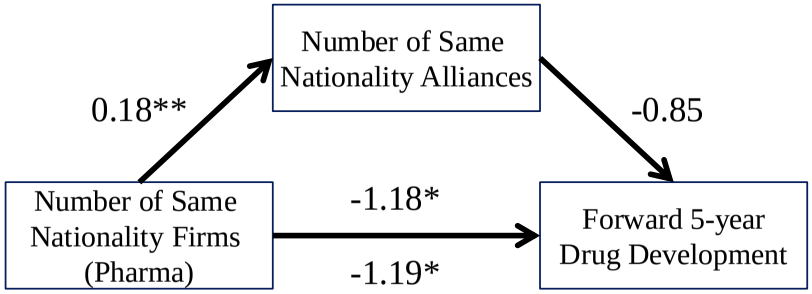
FIGURE 2.
Mediation Effect of Employee Composition



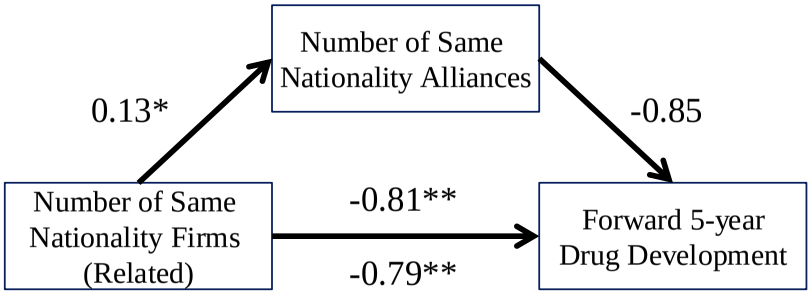
Test for mediation:
z(mediation) = -1.68* ($p < 0.05$)

Test for mediation:
z(mediation) = -2.54** ($p < 0.01$)

FIGURE 3.
Mediation Effect of Alliance Formation

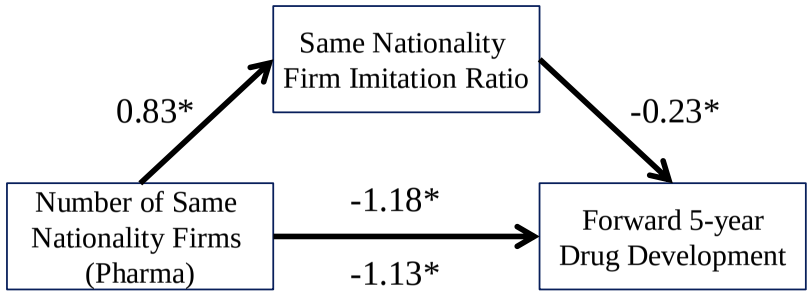


Test for mediation:
z(mediation) = -0.49 (p > 0.31)

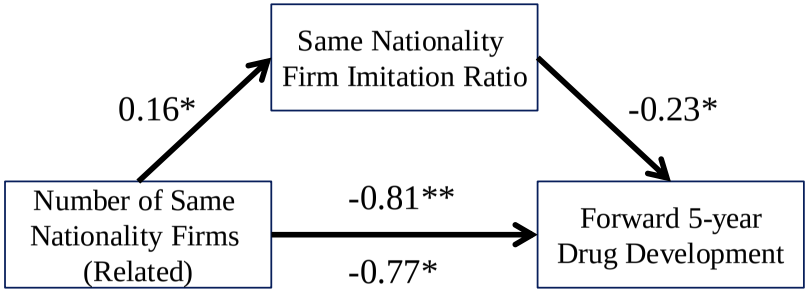


Test for mediation:
z(mediation) = -0.73 (p > 0.23)

FIGURE 4.
Mediation Effect of Technological Trajectory Imitation



Test for mediation:
z(mediation) = -1.74* ($p < 0.05$)



Test for mediation:
z(mediation) = -1.42† ($p < 0.08$)

TABLES

TABLE 1.
Summary Statistics and Bivariate Correlations

1A. Analysis on Number of Patents

	Mean	S. D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Number of Patents	3.56	12.41																
2. Same Nationality Firms (Related)	1.82	0.96	0.02															
3. Same Nationality Firms (Pharma)	1.12	0.39	0.20	0.11														
4. Same Nationality Immigrants	6.11	1.86	0.09	0.08	0.20													
5. Other Nationality Firms (Related)	2.93	0.79	-0.04	0.37	0.07	-0.06												
6. Other Nationality Firms (Pharma)	1.69	1.44	0.18	0.35	0.47	0.12	0.36											
7. Entry Sequence (by Nationality)	2.27	1.57	0.04	0.37	0.40	-0.08	0.32	0.32										
8. Prior Experience (# of Prior US Entries)	2.45	0.88	0.05	0.11	-0.04	-0.08	0.07	-0.10	-0.04									
9. Individualism (Hofstede score)	4.44	0.18	0.01	0.12	0.12	0.15	0.06	0.10	0.15	-0.14								
10. Total Inventors	0.76	1.53	0.31	0.03	0.21	0.09	0.05	0.27	0.05	0.15	-0.14							
11. Total Alliances	0.06	0.25	0.19	0.12	0.14	0.07	0.06	0.18	0.11	0.09	-0.07	0.39						
12. Total Patents by Same Nationality Firms	1.01	1.47	0.28	0.12	0.34	0.15	0.13	0.34	0.15	0.07	-0.09	0.43	0.32					
13. Self Imitation Ratio	0.55	1.17	0.19	0.18	0.25	0.02	0.18	0.27	0.22	0.18	-0.06	0.45	0.28	0.44				
14. Other Nationality Imitation Ratio	1.07	1.88	0.30	0.17	0.35	0.14	0.17	0.37	0.15	0.08	-0.10	0.40	0.35	0.45	0.45			
15. Cumulative Patents	4.23	2.41	0.24	0.05	0.28	-0.12	0.08	0.28	0.24	0.03	0.01	0.24	0.14	0.17	0.29	0.22		
16. Merger Year +5 (1, 0)	0.21	0.41	0.09	0.27	0.07	-0.11	0.30	0.14	0.31	0.21	0.04	0.22	0.26	0.15	0.25	0.22	0.24	
17. R&D Workforce	1.60	0.15	0.04	0.04	0.29	0.06	0.09	0.32	0.22	-0.01	0.13	-0.01	0.03	-0.02	0.03	0.00	0.11	0.04

1B. Analysis on Drug Developments

	Mean	S. D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Forward 5-year Drug Development	0.58	0.67																			
2. Same Nationality Firms (Related)	1.89	0.88	-0.02																		
3. Same Nationality Firms (Pharma)	1.13	0.39	0.24	0.12																	
4. Same Nationality Inventors	0.37	0.94	0.14	0.09	0.22																
5. Same Nationality Alliances	0.01	0.10	-0.01	0.07	0.13	0.15															
6. Same Nationality Firm Imitation Ratio	0.74	1.48	0.05	0.11	0.34	0.28	0.12														
7. Same Nationality Immigrants	6.02	1.87	-0.05	0.07	0.22	0.08	0.09	0.13													
8. Other Nationality Firms (Related)	2.96	0.78	-0.03	0.46	0.06	0.07	-0.05	0.05	-0.07												
9. Other Nationality Firms (Pharma)	1.83	1.43	0.20	0.36	0.47	0.20	0.09	0.32	0.10	0.36											
10. Entry Sequence (by Nationality)	2.34	1.62	0.16	0.35	0.48	0.06	0.05	0.16	-0.07	0.30	0.41										
11. Prior Experience (# of Prior US Entries)	2.53	0.86	-0.02	0.13	-0.03	0.16	0.10	-0.03	-0.09	0.10	-0.08	-0.04									
12. Individualism (Hofstede score)	4.26	2.23	0.02	0.10	0.13	-0.11	-0.07	-0.03	0.17	0.07	0.08	0.21	-0.15								
13. Total Inventors	0.71	1.49	0.17	0.04	0.20	0.43	0.18	0.25	0.09	0.02	0.25	0.02	0.13	-0.14							
14. Total Alliances	0.06	0.25	0.15	0.09	0.13	0.36	0.44	0.15	0.06	0.02	0.17	0.06	0.10	-0.09	0.40						
15. Total Patents by Same Nationality Firms	0.96	1.43	0.14	0.13	0.33	0.49	0.14	0.34	0.17	0.11	0.32	0.12	0.06	-0.09	0.31	0.31					
16. Self Imitation Ratio	0.54	1.15	0.18	0.16	0.25	0.49	0.12	0.22	0.04	0.13	0.26	0.19	0.17	-0.07	0.45	0.27	0.44				
17. Other Nationality Imitation Ratio	1.02	1.83	0.15	0.17	0.33	0.38	0.15	0.35	0.14	0.14	0.36	0.11	0.08	-0.10	0.49	0.34	0.44	0.44			
18. Cumulative Drug Developments	0.14	0.42	0.45	0.07	0.27	0.19	0.00	0.08	-0.12	0.07	0.28	0.23	0.04	0.02	0.20	0.13	0.14	0.25	0.19		
19. Merger Year +5 (1, 0)	0.25	0.43	0.12	0.27	0.03	0.24	0.10	0.05	-0.09	0.29	0.12	0.20	0.26	0.02	0.20	0.23	0.13	0.20	0.18	0.20	
20. R&D Workforce	1.60	0.15	0.07	0.04	0.28	-0.04	0.03	0.02	0.03	0.09	0.32	0.23	-0.02	0.11	-0.02	0.03	-0.02	0.02	0.00	0.12	0.04

TABLE 2.
IV Poisson Regression Results on the Trade-off of Agglomeration by Nationality on Exploitative and Explorative Innovation

	DV: Number of Patents			DV: Number of New Drug Developments		
	Number of Firms Lagged 1 Year	Number of Firms Lagged 2 Years	Number of Firms Lagged 3 Years	Forward 3-years Number of Drug Developments	Forward 5-years Number of Drug Developments	Forward 7-years Number of Drug Developments
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm-Economic Area Level						
Same Nationality Firms (Related)	0.52**	0.29*	0.72***	-0.27*	-0.81**	-0.59**
	(0.17)	(0.19)	(0.21)	(0.10)	(0.30)	(0.21)
Same Nationality Firms (Pharma)	0.29**	0.17*	0.08	-0.13*	-1.18*	-0.83*
	(0.09)	(0.12)	(0.12)	(0.50)	(0.47)	(0.38)
Same Nationality Immigrants	0.05	0.11*	0.11†	0.21	0.32	0.35†
	(0.04)	(0.05)	(0.06)	(0.18)	(0.17)	(0.20)
Other Nationality Firms (Related)	-0.59***	-0.50***	-0.44***	0.01*	-0.18	0.13
	(0.10)	(0.11)	(0.12)	(0.00)	(0.12)	(0.07)
Other Nationality Firms (Pharma)	-0.54***	-0.58***	-0.68***	0.09***	1.08***	1.11***
	(0.05)	(0.06)	(0.07)	(0.01)	(0.30)	(0.31)
Entry Sequence (by Nationality)	0.25***	0.40***	0.58***	0.21†	0.24*	0.31*
	(0.07)	(0.09)	(0.10)	(0.12)	(0.11)	(0.13)
Prior Experience (# of Prior US Entries)	0.05	-0.18*	-0.15†	0.80**	0.85**	0.63*
	(0.07)	(0.09)	(0.09)	(0.31)	(0.29)	(0.27)
Individualism (Hofstede score)	0.36	0.34	0.27	0.09**	0.10**	0.12**
	(0.27)	(0.26)	(0.17)	(0.02)	(0.03)	(0.04)
Total Inventors	0.31***	0.30***	0.37***	0.18	0.25	0.31
	(0.06)	(0.07)	(0.07)	(0.12)	(0.15)	(0.21)
Total Alliances	-0.09	-0.17	0.04	0.11	0.14	0.13
	(0.17)	(0.23)	(0.24)	(0.06)	(0.43)	(0.08)
Total Patents by Same Nationality Firms	0.01	-0.01	-0.05	0.21	0.19	0.25
	(0.07)	(0.08)	(0.08)	(0.13)	(0.13)	(0.16)
Self Imitation Ratio	0.00	0.12*	0.02	0.01	-0.21†	-0.30†
	(0.05)	(0.06)	(0.07)	(0.01)	(0.12)	(0.13)
Other Nationality Imitation Ratio	0.02	0.07	0.03	-0.11	-0.08	0.02
	(0.05)	(0.05)	(0.05)	(0.06)	(0.09)	(0.01)
Firm Level						
Cumulative Patents / Drug Developments	0.80***	0.61***	0.72***	1.71***	2.02***	2.71***
	(0.13)	(0.14)	(0.15)	(0.05)	(0.23)	(0.39)
Merger Year +5 (1, 0)	0.41**	0.07	-0.04	0.57†	0.66†	0.79*
	(0.16)	(0.17)	(0.19)	(0.24)	(0.40)	(0.34)
Economic Area Level						
R&D Workforce in State	1.60***	1.73***	2.00***	1.87†	1.73	2.30
	(0.46)	(0.52)	(0.53)	(0.89)	(2.10)	(1.23)
Constant	-7.87***	-9.84***	-12.74***	-18.92***	-22.69***	-46.98***
	(1.12)	(1.36)	(1.59)	(3.87)	(4.44)	(5.12)
Observations	2,289	2,112	1,926	2,689	2,394	2,157

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Parent firm fixed effects included.

TABLE 3.
Mediation Analysis: Composition of Co-National Inventors (n=2,394)

	Forward 5-year Drug Development	Forward 5-year Drug Development	Number of Co-National Inventors (ln)	Forward 5-year Drug Development
	Model 7	Model 8	Model 9	Model 10
Same Nationality Inventors				-1.26***
				(0.32)
Same Nationality Firms (Related)		-0.81**	0.27**	-0.59*
		(0.30)	(0.08)	(0.30)
Same Nationality Firms (Pharma)		-1.18*	0.31*	-1.15*
		(0.47)	(0.17)	(0.60)
Firm-Economic Area Level				
Same Nationality Immigrants	0.38***	0.32	-0.05	0.25
	(0.09)	(0.17)	(0.07)	(0.15)
Other Nationality Firms (Related)	-0.42	-0.18	0.07	-0.13
	(0.31)	(0.12)	(0.10)	(0.14)
Other Nationality Firms (Pharma)	1.22***	1.08***	-0.08	0.69*
	(0.29)	(0.30)	(0.08)	(0.27)
Entry Sequence (by Nationality)	0.16*	0.24*	0.01†	0.30**
	(0.08)	(0.11)	(0.01)	(0.11)
Prior Experience (# of Prior US Entries)	0.57*	0.85**	0.04	0.62*
	(0.26)	(0.29)	(0.03)	(0.30)
Individualism (Hofstede score)	0.12***	0.10***	0.00	0.10***
	(0.03)	(0.03)	(0.00)	(0.02)
Total Inventors	0.28†	0.25	0.54***	0.78***
	(0.14)	(0.15)	(0.02)	(0.23)
Total Alliances	0.07	0.14	-0.06	0.21
	(0.42)	(0.43)	(0.05)	(0.40)
Total Patents by Same Nationality Firms	0.19	0.19	0.02*	0.28†
	(0.13)	(0.13)	(0.01)	(0.15)
Self Imitation Ratio	-0.10	-0.21†	0.05***	-0.05
	(0.12)	(0.12)	(0.01)	(0.11)
Other Nationality Imitation Ratio	-0.05	-0.08	0.03**	-0.09
	(0.09)	(0.09)	(0.01)	(0.09)
Firm Level				
Cumulative Drug Developments	2.28***	2.02***	-0.02	2.08***
	(0.25)	(0.23)	(0.02)	(0.25)
Merger Year +5 (1, 0)	0.94*	0.66†	0.07*	0.79*
	(0.42)	(0.40)	(0.03)	(0.38)
Economic Area Level				
R&D Workforce	2.44	1.73	0.03	1.56
	(2.07)	(2.10)	(0.14)	(1.81)
Constant		-22.69***	-0.38	-23.05***
		(4.44)	(0.48)	(4.55)

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Parent firm fixed effects included.

TABLE 4.
Mediation Analysis: Co-National Alliance Formation (n=2,394)

	Forward 5-year Drug Development	Number of Same Nationality Alliances	Forward 5-year Drug Development
	Model 11	Model 12	Model 13
Same Nationality Alliances			-0.85
			(1.60)
Same Nationality Firms (Related)	-0.81**	0.13*	-0.79**
	(0.30)	(0.09)	(0.24)
Same Nationality Firms (Pharma)	-1.18*	0.18**	-1.19*
	(0.47)	(0.07)	(0.47)
Firm-Economic Area Level			
Same Nationality Immigrants	0.32	0.02	0.31
	(0.17)	(0.02)	(0.17)
Other Nationality Firms (Related)	-0.18	-0.05	-0.18
	(0.12)	(0.03)	(0.12)
Other Nationality Firms (Pharma)	1.08***	-0.04	1.08***
	(0.30)	(0.03)	(0.29)
Entry Sequence (by Nationality)	0.24*	0.00	0.25*
	(0.11)	(0.00)	(0.11)
Prior Experience (# of Prior US Entries)	0.85**	0.00	0.86**
	(0.29)	(0.01)	(0.29)
Individualism (Hofstede score)	0.10***	0.00	0.10***
	(0.03)	(0.00)	(0.02)
Total Inventors	0.25	0.01	0.25
	(0.15)	(0.01)	(0.15)
Total Alliances	0.14	0.15***	0.23
	(0.43)	(0.02)	(0.44)
Total Patents by Same Nationality Firms	0.19	0.00	0.19
	(0.13)	(0.00)	(0.13)
Self Imitation Ratio	-0.21†	0.00	-0.20†
	(0.12)	(0.00)	(0.12)
Other Nationality Imitation Ratio	-0.08	-0.01	-0.08
	(0.09)	(0.00)	(0.09)
Firm Level			
Cumulative Drug Developments	2.02***	-0.01	2.00***
	(0.23)	(0.01)	(0.23)
Merger Year +5 (1, 0)	0.66†	0.01	0.63
	(0.40)	(0.01)	(0.40)
Economic Area Level			
R&D Workforce	1.73	0.05	1.78
	(2.10)	(0.05)	(2.11)
Constant	-22.69***	0.16	-22.58***
	(4.44)	(0.16)	(4.55)

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Parent firm fixed effects included.

TABLE 5.
Mediation Analysis: Imitation of Technological Trajectory (n=2,394)

	Forward 5-year Drug Development	Same Nationality Firm Imitation Ratio	Forward 5-year Drug Development	Forward 5-year Drug Development
	Model 14	Model 15	Model 16	Model 17
Same Nationality Firm Imitation Ratio			-0.23*	-0.19*
			(0.11)	(0.10)
Same Nationality Alliances				-1.54
				(1.61)
Same Nationality Inventors				-1.09**
				(0.33)
Same Nationality Firms (Related)	-0.81**	0.16*	-0.77*	-0.54†
	(0.30)	(0.08)	(0.30)	(0.30)
Same Nationality Firms (Pharma)	-1.18*	0.83*	-1.13*	-1.04*
	(0.47)	(0.24)	(0.37)	(0.50)
Firm-Economic Area Level				
Same Nationality Immigrants	0.32	0.16	0.24	0.20
	(0.17)	(0.28)	(0.17)	(0.15)
Other Nationality Firms (Related)	-0.18	-0.07	-0.18	-0.16
	(0.12)	(0.40)	(0.12)	(0.14)
Other Nationality Firms (Pharma)	1.08***	0.39	1.11***	0.76**
	(0.30)	(0.32)	(0.30)	(0.28)
Entry Sequence (by Nationality)	0.24*	0.05	0.28*	0.32**
	(0.11)	(0.05)	(0.11)	(0.12)
Prior Experience (# of Prior US Entries)	0.85**	0.17	0.86**	0.67*
	(0.29)	(0.11)	(0.29)	(0.30)
Individualism (Hofstede score)	0.10***	0.00	0.10***	0.10***
	(0.03)	(0.02)	(0.03)	(0.02)
Total Inventors	0.25	-0.06	0.19	0.70**
	(0.15)	(0.07)	(0.15)	(0.23)
Total Alliances	0.14	0.10	0.07	0.27
	(0.43)	(0.22)	(0.43)	(0.42)
Total Patents by Same Nationality Firms	0.19	0.13**	0.19	0.25†
	(0.13)	(0.04)	(0.13)	(0.14)
Self Imitation Ratio	-0.21†	0.05	-0.21†	-0.08
	(0.12)	(0.03)	(0.12)	(0.11)
Other Nationality Imitation Ratio	-0.08	0.15**	0.00	-0.02
	(0.09)	(0.05)	(0.09)	(0.10)
Firm Level				
Cumulative Drug Developments	2.02***	-0.21*	2.04***	2.03***
	(0.23)	(0.10)	(0.24)	(0.25)
Merger Year +5 (1, 0)	0.66†	-0.08	0.66	0.74†
	(0.40)	(0.13)	(0.40)	(0.39)
Economic Area Level				
R&D Workforce	1.73	-0.99†	1.69	1.72
	(2.10)	(0.57)	(2.04)	(1.84)
Constant	-22.69***	1.51	-22.72***	-22.59***
	(4.44)	(2.00)	(4.47)	(4.61)

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Parent firm fixed effects included.

TABLE 6.
Results of the Moderation Effect Analysis (n=2,394)

	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development
	Model 18	Model 19	Model 20
Same Nationality Firms (Related) by Individualism			0.05*
			(0.02)
Same Nationality Firms (Pharma) by Individualism			0.12**
			(0.05)
Same Nationality Firms (Related) by Prior Experience		0.83**	
		(0.26)	
Same Nationality Firms (Pharma) by Prior Experience		2.59**	
		(0.91)	
Same Nationality Firms (Related) by Entry Sequence	0.21		
	(0.35)		
Same Nationality Firms (Pharma) by Entry Sequence	-0.33**		
	(0.11)		
Same Nationality Firm Imitation Ratio	-0.18†	-0.14†	-0.21†
	(0.14)	(0.12)	(0.12)
Same Nationality Alliances	-2.08	-2.28	-1.34
	(1.62)	(1.66)	(1.62)
Same Nationality Inventors	-1.17**	-1.45***	-1.02**
	(0.36)	(0.40)	(0.37)
Same Nationality Firms (Related)	-1.34**	-2.81***	3.11*
	(0.51)	(0.85)	(1.46)
Same Nationality Firms (Pharma)	-1.34†	-7.65***	-10.15**
	(0.73)	(2.32)	(3.37)
Firm-Economic Area Level			
Same Nationality Immigrants	0.21	0.29†	0.21
	(0.16)	(0.16)	(0.16)
Other Nationality Firms (Related)	-0.12	-0.12	0.32*
	(0.15)	(0.15)	(0.13)
Other Nationality Firms (Pharma)	0.63*	1.11***	1.08**
	(0.28)	(0.31)	(0.34)
Entry Sequence (by Nationality)	-0.41	0.24*	0.25*
	(0.52)	(0.12)	(0.11)
Prior Experience (# of Prior US Entries)	0.27	3.41**	0.47
	(0.29)	(1.32)	(0.31)
Individualism (Hofstede score)	0.10***	0.13***	0.29***
	(0.02)	(0.02)	(0.08)
Total Inventors	0.70**	0.78**	0.85***
	(0.24)	(0.27)	(0.25)
Total Alliances	0.38	0.10	-0.38
	(0.43)	(0.50)	(0.44)
Total Patents by Same Nationality Firms	0.22	0.29†	0.25†
	(0.16)	(0.16)	(0.14)
Self Imitation Ratio	-0.10	-0.06	-0.10
	(0.11)	(0.13)	(0.11)
Other Nationality Imitation Ratio	-0.04	0.03	-0.07
	(0.10)	(0.12)	(0.10)
Firm Level			
Cumulative Drug Developments	2.27***	2.28***	1.93***
	(0.27)	(0.25)	(0.25)
Merger Year +5 (1, 0)	1.01*	0.83*	1.05*
	(0.44)	(0.39)	(0.44)
Economic Area Level			
R&D Workforce	0.63	0.90	1.87
	(1.80)	(1.95)	(1.75)
Constant	-18.29***	-33.26***	-38.63***
	(4.17)	(7.20)	(7.52)

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Parent firm fixed effects included.

TABLE 7.
Robustness Check: Economic Area Level Analyses using Firm-Economic Area Fixed Effects (n=2,394)

	Forward 5-year Drug Development	Forward 5-year Drug Development	Number of Co-National Inventors (ln)	Forward 5-year Drug Development	Number of Same Nationality Alliances	Forward 5-year Drug Development	Same Nationality Firm Imitation Ratio	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development
	Model 7a	Model 8a	Model 9a	Model 10a	Model 12a	Model 13a	Model 15a	Model 16a	Model 17a	Model 18a	Model 19a	Model 20a
Same Nationality Firms (Related) by Individualism												0.02*
												(0.01)
Same Nationality Firms (Pharma) by Individualism												0.08***
												(0.02)
Same Nationality Firms (Related) by Prior Experience											0.83**	
											(0.26)	
Same Nationality Firms (Pharma) by Prior Experience											2.59**	
											(0.91)	
Same Nationality Firms (Related) by Entry Sequence										0.01		
										(0.04)		
Same Nationality Firms (Pharma) by Entry Sequence										-0.29**		
										(0.11)		
Same Nationality Firm Imitation Ratio								-0.23*	-0.08†	-0.08†	-0.14†	-0.08†
								(0.11)	(0.05)	(0.05)	(0.12)	(0.05)
Same Nationality Alliances						-0.66			-0.63	-0.68	-2.28	-0.80
						(0.60)			(0.60)	(0.60)	(1.66)	(0.61)
Same Nationality Inventors				-0.30**					-0.36*	-0.46**	-1.45***	-0.35*
				(0.11)					(0.11)	(0.11)	(0.40)	(0.11)
Same Nationality Firms (Related)		-0.17†	0.01***	-0.15†	0.02	-0.26*	0.18*	-0.16*	-0.12†	-0.66**	-2.81***	-1.44*
		(0.10)	(0.00)	(0.08)	(0.01)	(0.10)	(0.05)	(0.06)	(0.07)	(0.19)	(0.85)	(0.62)
Same Nationality Firms (Pharma)		-0.53*	0.11***	-0.51*	0.03***	-0.54*	0.76***	-0.52*	-0.51*	-1.37***	-7.65***	-6.31***
		(0.24)	(0.03)	(0.23)	(0.01)	(0.24)	(0.11)	(0.23)	(0.24)	(0.41)	(2.32)	(1.57)
Firm-Economic Area Level												
Same Nationality Immigrants	0.39	0.42	-0.03	0.32	-0.01	0.31	0.08	0.24	0.32	0.31	0.23	0.26
	(0.21)	(0.21)	(0.02)	(0.21)	(0.01)	(0.21)	(0.07)	(0.17)	(0.21)	(0.21)	(0.16)	(0.22)
Other Nationality Firms (Related)	0.19***	0.16**	0.03***	0.13*	0.01***	0.16**	-0.14***	0.18	0.16*	0.16*	0.12	0.23***
	(0.05)	(0.06)	(0.01)	(0.06)	(0.00)	(0.06)	(0.03)	(0.12)	(0.07)	(0.07)	(0.15)	(0.07)
Other Nationality Firms (Pharma)	0.60***	0.49*	0.14***	0.62***	0.00	0.49*	0.23***	1.11***	0.51**	0.49*	1.11***	0.65**
	(0.18)	(0.19)	(0.02)	(0.18)	(0.00)	(0.19)	(0.06)	(0.30)	(0.20)	(0.20)	(0.31)	(0.21)
Entry Sequence (by Nationality)	0.09†	0.06	0.00	0.10†	0.00	0.06	0.02	0.28*	0.08	0.51**	0.24*	0.1
	(0.06)	(0.06)	(0.01)	(0.06)	(0.00)	(0.06)	(0.03)	(0.11)	(0.06)	(0.19)	(0.12)	(0.06)
Prior Experience (# of Prior US Entries)	0.13	0.19	0.04*	0.13	0.00	0.18	0.18**	0.86**	0.20	0.12	3.41**	0.20
	(0.12)	(0.12)	(0.02)	(0.12)	(0.01)	(0.12)	(0.07)	(0.29)	(0.12)	(0.13)	(1.32)	(0.12)
Individualism (Hofstede score)	-0.30	-0.35	0.00	-0.33	0.00	-0.35	-0.03*	0.10***	-0.33	-0.34	0.13***	-0.42
	(0.80)	(1.13)	(0.00)	(1.23)	(0.00)	(1.96)	(0.01)	(0.03)	(201.81)	(225.07)	(0.02)	(187.39)
Total Inventors	-0.09	-0.10	0.54***	-0.05	0.00	-0.10	-0.04	0.19	-0.08	-0.08	0.78**	-0.09
	(0.06)	(0.06)	(0.01)	(0.08)	(0.00)	(0.06)	(0.03)	(0.15)	(0.09)	(0.09)	(0.27)	(0.09)
Total Alliances	0.49***	0.50***	-0.08**	0.48***	0.17***	0.53***	0.06	0.07	0.53***	0.48***	0.10	0.52***
	(0.14)	(0.14)	(0.03)	(0.14)	(0.01)	(0.14)	(0.12)	(0.43)	(0.14)	(0.14)	(0.50)	(0.14)
Total Patents by Same Nationality Firms	0.14*	0.13*	0.02**	0.15*	0.00	0.13*	0.12***	0.19	0.16**	0.16**	0.29†	0.17**
	(0.06)	(0.06)	(0.01)	(0.06)	(0.00)	(0.06)	(0.03)	(0.13)	(0.06)	(0.06)	(0.16)	(0.06)
Self Imitation Ratio	-0.02	-0.01	0.05***	-0.01	0.00	-0.02	0.05†	-0.21†	0.00	0.00	-0.06	0.00
	(0.05)	(0.05)	(0.01)	(0.05)	(0.00)	(0.05)	(0.03)	(0.12)	(0.05)	(0.05)	(0.13)	(0.05)
Other Nationality Imitation Ratio	0.01	0.01	0.03***	0.02	0.00	0.00	0.13***	0.00	0.02	0.01	0.03	-0.01
	(0.05)	(0.05)	(0.01)	(0.05)	(0.00)	(0.05)	(0.02)	(0.09)	(0.05)	(0.05)	(0.12)	(0.05)
Firm Level												
Cumulative Drug Developments	0.98***	0.93***	-0.03†	0.97***	-0.01†	0.93***	-0.24**	2.04***	0.92***	0.89***	2.28***	0.83***
	(0.08)	(0.09)	(0.02)	(0.08)	(0.01)	(0.09)	(0.08)	(0.24)	(0.09)	(0.09)	(0.25)	(0.09)
Merger Year +5 (1, 0)	-0.29	-0.28	0.06**	-0.28	0.02**	-0.26	-0.1	0.66	-0.25	-0.27	0.83*	-0.29
	(0.20)	(0.20)	(0.02)	(0.20)	(0.01)	(0.20)	(0.09)	(0.40)	(0.20)	(0.20)	(0.39)	(0.20)
Economic Area Level												
R&D Workforce	1.93**	1.98**	0.08	1.90**	0.00	1.96**	-0.88***	1.69	1.99**	1.54*	0.90	1.97**
	(0.63)	(0.63)	(0.05)	(0.63)	(0.02)	(0.63)	(0.22)	(2.04)	(0.63)	(0.67)	(1.95)	(0.65)
Constant	4.87	6.34	-0.48†	6.00	0.02	6.35	3.26**	-22.72***	5.55	5.21	-33.26***	9.66
	(3.84)	(5.44)	(0.26)	(5.09)	(0.07)	(3.42)	(1.09)	(4.47)	(6.28)	(7.54)	(7.20)	(8.80)
χ^2 (Adjusted-R^2 for Models 9a, 12a, and 15a)	1245.45***	1251.93***	0.5059	1257.48***	0.2532	1253.29***	0.2659	1256.31***	1256.85***	1263.75***	1275.42***	1277.53***
$\Delta\chi^2$		7.51*		4.67*		1.20		4.12*	9.06*	6.79*	12.95**	20.75***

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Firm-Economic area fixed effects included.

TABLE 8.
Robustness Check: State Level Analyses using Instrumental Variable Poisson Regressions (n=919)

	Forward 5-year Drug Development	Forward 5-year Drug Development	Number of Co-National Inventors (ln)	Forward 5-year Drug Development	Number of Same Nationality Alliances	Forward 5-year Drug Development	Same Nationality Firm Imitation Ratio	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development
	Model 7b	Model 8b	Model 9b	Model 10b	Model 12b	Model 13b	Model 15b	Model 16b	Model 17b	Model 18b	Model 19b	Model 20b
Same Nationality Firms (Related) by Individualism												0.05†
												(0.01)
Same Nationality Firms (Pharma) by Individualism												0.23*
												(0.09)
Same Nationality Firms (Related) by Prior Experience											1.41**	
											(0.55)	
Same Nationality Firms (Pharma) by Prior Experience											-0.05	
											(0.20)	
Same Nationality Firms (Related) by Entry Sequence										-4.88*		
										(2.27)		
Same Nationality Firms (Pharma) by Entry Sequence										-1.39*		
										(0.49)		
Same Nationality Firm Imitation Ratio								-0.17*	-0.16*	-0.55†	-0.19**	-0.66†
								(0.09)	(0.08)	(0.34)	(0.07)	(0.29)
Same Nationality Alliances						-4.36			-10.29	-3.08	-0.38	-6.22
						(2.95)			(6.60)	(3.08)	(0.71)	(5.01)
Same Nationality Inventors				-0.88*					-2.19†	-1.46*	-0.33*	-2.73†
				(0.34)					(1.13)	(0.66)	(0.13)	(1.01)
Same Nationality Firms (Related)		-1.83*	1.81*	-1.79*	-0.10	-2.49*	1.52*	-1.81*	-1.19†	-0.33†	-0.49†	-1.66†
		(0.98)	(0.72)	(0.69)	(0.45)	(1.62)	(0.83)	(0.98)	(0.60)	(0.18)	(0.27)	(0.85)
Same Nationality Firms (Pharma)		-3.82*	1.61**	-3.75*	0.15	-4.98†	0.96*	-3.76*	-3.52†	-2.18	-2.19†	-2.89
		(1.67)	(0.37)	(1.24)	(0.36)	(2.61)	(0.36)	(1.82)	(1.41)	(1.98)	(1.59)	(0.98)
Firm-State Level												
Same Nationality Immigrants	-0.76	-0.76	0.42	-0.95	-0.02	-0.80	-0.06	-0.73	-1.66	-0.39	-0.01	-1.56
	(0.32)	(0.34)	(0.54)	(0.53)	(0.07)	(0.41)	(0.55)	(0.35)	(1.19)	(0.36)	(0.07)	(1.19)
Other Nationality Firms (Related)	0.76***	1.52**	-0.66	1.77*	0.02	1.99*	0.42	1.54*	3.50	1.86*	0.20**	2.75
	(0.22)	(0.58)	(1.16)	(0.87)	(0.14)	(0.92)	(1.20)	(0.63)	(2.18)	(0.75)	(0.07)	(2.13)
Other Nationality Firms (Pharma)	-0.01	2.16†	-0.82	2.34†	0.05	3.03†	0.48	2.21†	4.74	3.43†	0.05	3.32
	(0.46)	(1.12)	(1.61)	(1.33)	(0.20)	(1.76)	(1.66)	(1.19)	(3.05)	(1.80)	(0.13)	(3.21)
Entry Sequence (by Nationality)	0.21	-0.66	-0.14	-0.29	-0.01	-1.00	0.10	-0.57	-0.54	3.59†	0.23**	1.66
	(0.34)	(0.73)	(0.26)	(0.86)	(0.03)	(0.95)	(0.27)	(0.73)	(1.07)	(2.10)	(0.08)	(0.98)
Prior Experience (# of Prior US Entries)	1.53**	1.86**	-0.04	1.74**	0.03	1.83**	0.09	1.69**	2.25	1.84†	-0.81	0.89
	(0.50)	(0.57)	(0.19)	(0.64)	(0.02)	(0.70)	(0.20)	(0.59)	(1.51)	(1.01)	(0.63)	(1.12)
Individualism (Hofstede score)	0.15***	0.18***	0.08	0.18***	0.00	0.20***	-0.02	0.18***	0.25*	0.14**	0.04***	0.33
	(0.04)	(0.05)	(0.11)	(0.05)	(0.01)	(0.06)	(0.11)	(0.05)	(0.11)	(0.05)	(0.01)	(0.13)
Total Inventors	1.92**	1.18	-0.08	1.28	0.00	1.15	0.17	1.18	1.87	0.37	0.74***	1.82
	(0.72)	(0.79)	(0.25)	(1.00)	(0.03)	(0.81)	(0.26)	(0.77)	(1.50)	(1.06)	(0.16)	(1.91)
Total Alliances	0.64†	0.90†	-0.06	0.89	0.13***	1.65†	0.42†	0.84†	2.39	0.86	0.56***	0.64
	(0.37)	(0.55)	(0.23)	(0.56)	(0.03)	(0.92)	(0.24)	(0.50)	(1.49)	(0.59)	(0.15)	(0.41)
Total Patents by Same Nationality Firms	-2.37*	-1.20	-0.62	-0.46	0.00	-1.04	0.09	-1.10	0.25	1.58	-0.82***	1.11
	(0.95)	(0.98)	(0.44)	(1.00)	(0.05)	(1.04)	(0.46)	(0.95)	(1.25)	(1.51)	(0.23)	(1.10)
Self Imitation Ratio	0.45	0.27	-0.02	0.21	0.00	0.42	0.11†	0.21	0.54	-0.37	0.00	0.19
	(0.33)	(0.41)	(0.06)	(0.45)	(0.01)	(0.38)	(0.07)	(0.39)	(0.57)	(0.71)	(0.06)	(0.20)
Other Nationality Imitation Ratio	0.50†	0.01	-0.12	-0.09	0.00	-0.23	0.17	-0.03	-0.65	-0.8	0.19**	-0.51
	(0.27)	(0.33)	(0.27)	(0.36)	(0.03)	(0.44)	(0.28)	(0.34)	(0.63)	(0.52)	(0.07)	(0.31)
Firm Level												
Cumulative Drug Developments	2.91***	5.72**	-0.20	6.61*	-0.02	7.45*	-0.02	5.77*	12.98	9.42*	1.47***	9.63
	(0.56)	(2.16)	(0.23)	(3.11)	(0.03)	(3.64)	(0.24)	(2.35)	(8.42)	(4.37)	(0.11)	(5.69)
Merger Year +5 (1, 0)	-1.41*	-1.76*	-0.08	-2.06†	0.00	-2.38*	-0.17	-1.56†	-4.16	-1.76	-0.54*	-1.39
	(0.71)	(0.83)	(0.18)	(1.12)	(0.02)	(1.06)	(0.18)	(0.88)	(2.66)	(1.28)	(0.24)	(1.29)
State Level												
R&D Workforce	4.63†	2.67	-0.84	2.80	0.01	2.70	0.31	2.64	4.79	3.49	0.25	9.60
	(2.52)	(2.37)	(2.18)	(2.67)	(0.27)	(2.40)	(2.25)	(2.34)	(4.23)	(3.61)	(0.66)	(8.21)
Constant	-28.64***	-33.63***	-4.51	-37.63**	-0.12	-37.68**	0.36	-33.12***	-61.78†	-54.28**	-7.36***	-76.08
	(8.28)	(9.09)	(5.21)	(14.14)	(0.63)	(12.02)	(5.37)	(9.44)	(35.03)	(20.14)	(2.20)	(40.31)

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Parent firm fixed effects included.

TABLE 9.
Robustness Check: State Level Analyses using Firm-Economic Area Fixed Effects (n=919)

	Forward 5-year Drug Development	Forward 5-year Drug Development	Number of Co-National Inventors (ln)	Forward 5-year Drug Development	Number of Co-National Alliances	Forward 5-year Drug Development	Co-National Firm Imitation Ratio	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development
	Model 7c	Model 8c	Model 9c	Model 10c	Model 12c	Model 13c	Model 15c	Model 16c	Model 17c	Model 18c	Model 19c	Model 20c
Same Nationality Firms (Related) by Individualism												0.03†
												(0.02)
Same Nationality Firms (Pharma) by Individualism												0.07*
												(0.03)
Same Nationality Firms (Related) by Prior Experience											0.67*	
											(0.27)	
Same Nationality Firms (Pharma) by Prior Experience											1.05†	
											(0.65)	
Same Nationality Firms (Related) by Entry Sequence										-0.24†		
										(0.15)		
Same Nationality Firms (Pharma) by Entry Sequence										0.27		
										(0.40)		
Same Nationality Firm Imitation Ratio								-0.18*	-0.17*	-0.18*	-0.13†	-0.13†
								(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Same Nationality Alliances						0.36			0.06	0.02	-0.19	-0.34
						(0.77)			(0.79)	(0.79)	(0.81)	(0.82)
Same Nationality Inventors				-0.29†					-0.26†	-0.25†	-0.17†	-0.12
				(0.15)					(0.15)	(0.15)	(0.08)	(0.16)
Same Nationality Firms (Related)		-0.41*	0.02*	-0.39*	0.02*	-0.42*	0.03†	-0.38*	-0.36*	-0.93**	-0.42	2.82†
		(0.17)	(0.01)	(0.17)	(0.01)	(0.17)	(0.02)	(0.17)	(0.13)	(0.32)	(0.36)	(1.69)
Same Nationality Firms (Pharma)		-1.00**	0.16	-0.88**	0.11***	-1.03**	0.63***	-0.89**	-0.80*	-1.12	-1.71†	-2.80
		(0.33)	(0.10)	(0.33)	(0.02)	(0.33)	(0.15)	(0.31)	(0.34)	(0.84)	(1.02)	(4.70)
Firm-State Level												
Same Nationality Immigrants	-0.98†	-1.22*	-0.09	-1.27*	-0.01	-1.21*	0.02	-1.19*	-1.24*	-1.19*	-1.35*	-1.37*
	(0.52)	(0.52)	(0.11)	(0.52)	(0.03)	(0.52)	(0.17)	(0.53)	(0.53)	(0.56)	(0.56)	(0.59)
Other Nationality Firms (Related)	0.25*	-0.15	0.11***	0.21†	0.02**	-0.15	0.10*	-0.15	0.20†	-0.19	-0.16	-0.17
	(0.11)	(0.11)	(0.03)	(0.12)	(0.01)	(0.12)	(0.04)	(0.11)	(0.12)	(0.12)	(0.12)	(0.13)
Other Nationality Firms (Pharma)	-0.26	-0.12	-0.01	-0.14	0.02	-0.12	0.35***	-0.02	-0.04	-0.05	-0.17	-0.24
	(0.27)	(0.28)	(0.07)	(0.28)	(0.02)	(0.28)	(0.10)	(0.28)	(0.28)	(0.30)	(0.28)	(0.31)
Entry Sequence (by Nationality)	-4.83	-4.21	2.01†	-4.83	0.00	-4.30	-7.67***	-3.76	-4.06	-5.23	-4.79	-7.30
	(5.61)	(9.58)	(1.22)	(8.68)	(0.28)	(2.85)	(1.81)	(7.09)	(5.97)	(3.50)	(8.37)	(9.91)
Prior Experience (# of Prior US Entries)	-0.23	-0.11	0.07	-0.12	0.02	-0.12	-0.35	-0.30	-0.31	-0.27	-0.44	1.24
	(0.89)	(0.89)	(0.39)	(0.90)	(0.09)	(0.89)	(0.58)	(0.90)	(0.90)	(0.90)	(1.77)	(1.95)
Total Inventors	0.08	0.19	0.04	0.26	-0.01	0.19	0.13*	0.24	0.30	0.24	0.50*	0.47*
	(0.18)	(0.19)	(0.04)	(0.19)	(0.01)	(0.19)	(0.06)	(0.19)	(0.19)	(0.20)	(0.20)	(0.21)
Total Alliances	0.26†	0.25†	0.05	0.26†	0.12***	0.24†	0.34***	0.32*	0.32*	0.35*	0.33*	0.32*
	(0.14)	(0.15)	(0.06)	(0.14)	(0.01)	(0.15)	(0.09)	(0.15)	(0.15)	(0.15)	(0.16)	(0.16)
Total Patents by Same Nationality Firms	0.33	0.14	-0.74***	-0.16	0.00	0.14	0.11	0.14	-0.13	-0.07	-0.30	-0.17
	(0.23)	(0.24)	(0.05)	(0.29)	(0.01)	(0.24)	(0.08)	(0.24)	(0.29)	(0.29)	(0.29)	(0.29)
Self Imitation Ratio	0.17*	0.18*	-0.02	0.18*	0.01*	0.18*	0.14***	0.25**	0.25**	0.22**	0.29***	0.24**
	(0.07)	(0.08)	(0.03)	(0.07)	(0.01)	(0.08)	(0.04)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)
Other Nationality Imitation Ratio	-0.19*	-0.12	-0.02	-0.11	0.00	-0.12	0.09**	-0.13	-0.12	-0.08	-0.14	-0.12
	(0.10)	(0.10)	(0.02)	(0.11)	(0.01)	(0.10)	(0.03)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Firm Level												
Cumulative Drug Developments	-0.06	0.18	-0.15†	0.15	-0.02	0.19	-0.06	0.23	0.20	0.25	0.03	-0.01
	(0.19)	(0.21)	(0.08)	(0.21)	(0.02)	(0.21)	(0.12)	(0.21)	(0.21)	(0.21)	(0.22)	(0.23)
Merger Year +5 (1, 0)	-0.92*	-1.00*	-0.13*	-1.01*	0.02	-1.01*	-0.03	-0.89**	-0.91**	-0.92**	-0.84**	-0.95**
	(0.37)	(0.48)	(0.07)	(0.48)	(0.02)	(0.46)	(0.10)	(0.28)	(0.28)	(0.29)	(0.28)	(0.30)
State Level												
R&D Workforce	-13.46	-15.32	6.11	-12.18	0.07	-15.28	-25.83***	-24.49	-21.15	-14.88	-20.19	-18.00
	(17.62)	(17.47)	(3.94)	(17.34)	(0.89)	(17.46)	(5.83)	(17.91)	(17.79)	(18.28)	(17.87)	(18.77)
Constant	19.51	21.00	-21.11	16.76	-0.31	21.06	84.74***	33.42	28.65	20.36	27.96	24.57
	(35.69)	(69.66)	(13.10)	(20.72)	(2.97)	(42.91)	(19.38)	(77.16)	(15.03)	(27.59)	(61.41)	(29.95)
χ^2 (Adjusted-R^2 for Models 9c, 12c, and 15c)	928.99***	943.64***	0.4489	947.40***	0.2614	943.85***	0.6714	949.21***	952.22***	955.33***	962.88***	961.28***
$\Delta\chi^2$		14.33***		3.91*		0.22		5.47*	8.41*	5.83*	10.11**	9.89**

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Firm-State fixed effects included.

TABLE 10.
Robustness Check: Larger Sample Economic Area Level Analyses using Instrumental Variable Poisson Regressions (n=4,526)

	Forward 5-year Drug Development	Forward 5-year Drug Development	Number of Co-National Inventors (ln)	Forward 5-year Drug Development	Number of Same Nationality Alliances	Forward 5-year Drug Development	Same Nationality Firm Imitation Ratio	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development	Forward 5-year Drug Development
	Model 7d	Model 8d	Model 9d	Model 10d	Model 12d	Model 13d	Model 15d	Model 16d	Model 17d	Model 18d	Model 19d	Model 20d
Same Nationality Firms (Related) by Individualism												-0.01
												(0.01)
Same Nationality Firms (Pharma) by Individualism												0.10***
												(0.03)
Same Nationality Firms (Related) by Prior Experience											-0.03	
											(0.14)	
Same Nationality Firms (Pharma) by Prior Experience											0.66*	
											(0.30)	
Same Nationality Firms (Related) by Entry Sequence										0.15**		
										(0.06)		
Same Nationality Firms (Pharma) by Entry Sequence										-0.24†		
										(0.13)		
Same Nationality Firm Imitation Ratio								-0.02	0.03	0.00	-0.01	-0.01
								(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
Same Nationality Alliances						0.51			-1.25	-1.13	-1.23	-1.55
						(1.95)			(1.47)	(1.46)	(1.48)	(1.48)
Same Nationality Inventors				-0.49†					-0.46†	-0.47†	-0.49†	-0.41
				(0.26)					(0.26)	(0.27)	(0.27)	(0.27)
Same Nationality Firms (Related)		-1.50†	0.17*	-0.93**	0.12†	-1.50†	0.68	-0.97**	-0.94**	-1.69***	-0.65	-8.58***
		(0.91)	(0.07)	(0.29)	(0.06)	(0.90)	(0.78)	(0.30)	(0.30)	(0.49)	(0.78)	(2.04)
Same Nationality Firms (Pharma)		-2.74*	0.22*	-0.28†	0.13	-2.72*	0.49	-0.29†	-0.27†	-0.77**	-0.21	0.91
		(1.08)	(0.09)	(0.15)	(0.09)	(1.09)	(1.12)	(0.15)	(0.15)	(0.25)	(0.38)	(0.84)
Firm-Economic Area Level												
Same Nationality Immigrants	0.78*	1.83**	-0.01	0.25***	0.00	1.82**	0.10	0.25***	0.25***	0.26***	0.25***	0.21**
	(0.31)	(0.70)	(0.02)	(0.08)	(0.01)	(0.70)	(0.06)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Other Nationality Firms (Related)	0.13	1.16**	0.11	-0.11	-0.05	1.15**	-0.29	-0.14	-0.12	-0.10	-0.13	-0.16
	(0.18)	(0.39)	(0.10)	(0.09)	(0.03)	(0.39)	(0.40)	(0.09)	(0.09)	(0.10)	(0.09)	(0.10)
Other Nationality Firms (Pharma)	0.28	0.53	-0.02	-0.04	-0.05	0.51	0.18	0.01	-0.04	-0.07	-0.09	-0.10
	(0.32)	(0.76)	(0.10)	(0.21)	(0.03)	(0.76)	(0.37)	(0.21)	(0.21)	(0.21)	(0.21)	(0.22)
Entry Sequence (by Nationality)	-0.07	0.67*	0.02	-0.01	-0.01	0.66*	0.02	-0.01	0.00	0.16	0.03	-0.02
	(0.13)	(0.31)	(0.02)	(0.06)	(0.01)	(0.31)	(0.06)	(0.06)	(0.06)	(0.18)	(0.06)	(0.06)
Prior Experience (# of Prior US Entries)	1.54**	3.15*	0.04†	0.13	0.00	3.13*	0.17*	0.11	0.13	0.08	-0.72	0.10
	(0.53)	(1.40)	(0.02)	(0.14)	(0.01)	(1.41)	(0.08)	(0.14)	(0.14)	(0.14)	(0.45)	(0.14)
Individualism (Hofstede score)	0.17*	0.32*	0.00	0.04***	0.00	0.31*	-0.01	0.04***	0.04***	0.04***	0.04***	0.18***
	(0.07)	(0.14)	(0.00)	(0.01)	(0.00)	(0.14)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.04)
Total Inventors	0.05	0.15	0.53***	-0.08	0.01	0.15	-0.02	-0.34**	-0.09	-0.09	-0.06	-0.08
	(0.20)	(0.26)	(0.02)	(0.18)	(0.01)	(0.26)	(0.07)	(0.12)	(0.18)	(0.18)	(0.18)	(0.18)
Total Alliances	-1.63*	-1.14	-0.04	-0.18	0.15***	-1.23	-0.02	0.03	-0.02	-0.10	-0.09	-0.03
	(0.79)	(1.08)	(0.06)	(0.43)	(0.02)	(1.21)	(0.23)	(0.40)	(0.45)	(0.45)	(0.46)	(0.45)
Total Patents by Same Nationality Firms	0.59*	0.28	0.03**	0.07	0.00	0.29	0.13***	0.06	0.07	0.07	0.07	0.03
	(0.25)	(0.34)	(0.01)	(0.10)	(0.00)	(0.34)	(0.04)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Self Imitation Ratio	0.37†	0.56*	0.05***	0.02	0.00	0.56*	0.04	0.00	0.01	0.05	0.01	0.03
	(0.19)	(0.24)	(0.01)	(0.08)	(0.00)	(0.23)	(0.03)	(0.08)	(0.08)	(0.09)	(0.09)	(0.09)
Other Nationality Imitation Ratio	-0.04	-0.11	0.04**	0.09	-0.01	-0.11	0.12*	0.07	0.08	0.08	0.09	0.05
	(0.14)	(0.15)	(0.02)	(0.07)	(0.01)	(0.15)	(0.06)	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)
Firm Level												
Cumulative Drug Developments	1.85***	1.10*	-0.02	1.24***	-0.01†	1.12†	-0.21*	1.26***	1.22***	1.17***	1.18***	1.05***
	(0.42)	(0.56)	(0.03)	(0.15)	(0.01)	(0.58)	(0.10)	(0.15)	(0.15)	(0.16)	(0.15)	(0.16)
Merger Year +5 (1, 0)	-1.55†	-2.43*	0.09*	-0.05	0.00	-2.42*	-0.16	-0.06	-0.03	0.04	0.01	-0.05
	(0.86)	(1.11)	(0.04)	(0.25)	(0.01)	(1.11)	(0.15)	(0.26)	(0.26)	(0.26)	(0.26)	(0.25)
Economic Area Level												
R&D Workforce	6.75**	3.29	-0.10	2.95***	0.07	3.34	-0.51	2.81***	2.95***	2.73***	2.96***	3.03***
	(2.59)	(3.64)	(0.19)	(0.73)	(0.06)	(3.63)	(0.74)	(0.73)	(0.73)	(0.77)	(0.74)	(0.75)
Constant	-36.94***	-57.58**	0.22	-14.43***	-0.05	-57.33**	-0.06	-14.13***	-14.41***	-14.03***	-12.08***	-25.06***
	(9.27)	(20.12)	(0.31)	(1.63)	(0.10)	(20.23)	(1.20)	(1.63)	(1.64)	(1.65)	(1.92)	(3.13)

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, † p<0.10
Parent firm fixed effects included.

REFERENCES

Acs, Z. and D. B. Audretsch
1989 "Patents as a measure of innovative activity." Kyklos, 42: 171–180.

Albert, S. and D. A. Whetten
1985 "Organizational identity." Research in Organizational Behavior, 7: 263–295.

Alcácer, J. and W. Chung
2007 "Location strategies and knowledge spillovers." Management Science, 53: 760–776.

Almeida, P. and B. Kogut
1997 "The exploration of technological diversity and geographic localization in innovation: start-up firms in the semiconductor industry." Small Business Economics, 9: 21–31.

Al-Sulaiti, K. I. and M. J. Baker
1998 "Country of origin effects: a literature review." Marketing Intelligence & Planning, 16: 150–199.

Anand, J. and A. Delios
1997 "Location specificity and the transferability of downstream assets to foreign subsidiaries." Journal of International Business Studies, 28: 579–603.

Audretsch, D. B. and M. P. Feldman
1996 "R&D spillovers and the geography of innovation and production." American Economic Review, 86: 630–640.

Barkema, H. G., O. Shenkar, F. Vermeulen, and J. H. Bell
1997 "Working abroad, working with others: How firms learn to operate international joint ventures." Academy of Management Journal, 40: 426–442.

Baron, R. M. and D. A. Kenny
1986 "The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations." Journal of Personality and Social Psychology, 51: 1173–1182.

Baum, J. A. C. and H. A. Haveman
1997 "Love Thy Neighbor? Differentiation and Agglomeration in the Manhattan Hotel Industry, 1898-1990." Administrative Science Quarterly, 42: 304–338.

Baum, J. A., S. X. Li, and J. M. Usher
2000 "Making the next move: How experiential and vicarious learning shape the locations of chains' acquisitions." Administrative Science Quarterly, 45: 766–801.

Baum, J. A. and S. J. Mezias
1992 "Localized competition and organizational failure in the Manhattan hotel industry, 1898-1990." Administrative Science Quarterly, 37: 580–604.

Beckman, C. M., P. R. Haunschild, and D. J. Phillips
2004 "Friends or strangers? Firm-specific uncertainty, market uncertainty, and network partner selection." Organization Science, 15: 259–275.

Benner, M. J. and M. Tushman
2002 "Process management and technological innovation: A longitudinal study of the photography and paint industries." Administrative Science Quarterly, 47: 676–707.

Benner, M. J. and M. L. Tushman
2003 "Exploitation, exploration, and process management: The productivity dilemma revisited." Academy of Management Review, 28: 238–256.

Bird, A. and S. Beechler
1995 "Links between business strategy and human resource management strategy in US-based Japanese subsidiaries: An empirical investigation." Journal of International Business Studies, 26: 23–46.

Buckley, P. J. and M. Casson
1976 The future of the multinational enterprise Vol. 1. Macmillan London.

Burt, R. S.
1992 Structural Holes: The Social Structure of Competition. Harvard University Press.

2005 Brokerage and Closure: An Introduction to Social Capital: An Introduction to Social Capital. Oxford University Press.

Cardinal, L. B.
2001 "Technological innovation in the pharmaceutical industry: The use of organizational control in managing research and development." Organization Science, 12: 19–36.

Chang, S.-J. and S. Park
2005 "Types of firms generating network externalities and MNCs' co-location decisions." Strategic Management Journal, 26: 595–615.

Chung, S. (Andy), H. Singh, and K. Lee
2000 "Complementarity, status similarity and social capital as drivers of alliance formation." Strategic Management Journal, 21: 1–22.

Chung, W. and J. Alcácer
2002 "Knowledge seeking and location choice of foreign direct investment in the United States." Management Science, 48: 1534–1554.

Chung, W. and A. Kalnins
2001 "Agglomeration effects and performance: A test of the Texas lodging industry." Strategic Management Journal, 22: 969–988.

Cockburn, I.
2008 "Pharmaceuticals." In J. T. Macher and D. C. Mowery (eds.), Innovation in Global Industries: U.S. Firms Competing in a New World: 207–230. Washington DC: The National Academies Press.

DiMaggio, P. J. and W. W. Powell
1983 "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields." American Sociological Review, 48: 147–160.

Dobrev, S. D. and A. Gotsopoulos
2010 "Legitimacy vacuum, structural imprinting, and the first mover disadvantage." Academy of Management Journal, 53: 1153–1174.

Dunning, J.
1988 "The eclectic paradigm of international production: a restatement and some possible extensions." Journal of International Business Studies, 19: 1–31.

Edin, P.-A., P. Fredriksson, and O. Åslund
2003 "Ethnic enclaves and the economic success of immigrants—Evidence from a natural experiment." The Quarterly Journal of Economics, 118: 329–357.

Elango, B. and S. P. Sethi
2007 "An exploration of the relationship between country of origin (COE) and the internationalization-performance paradigm." Management International Review, 47: 369–392.

Fabrizio, K. R. and L. G. Thomas
2012 "The impact of local demand on innovation in a global industry." Strategic Management Journal, 33: 42–64.

Feinberg, S. E. and A. K. Gupta
2004 "Knowledge spillovers and the assignment of R&D responsibilities to foreign subsidiaries." Strategic Management Journal, 25: 823–845.

Fiske, S. T.
2011 Envy up, scorn down: How status divides us. Russell Sage Foundation.

Fleming, L., C. King, and A. I. Juda
2007 "Small worlds and regional innovation." Organization Science, 18: 938–954.

Foderaro, L. W.
2000, May 7 "For expatriate families, a home away from home; Foreign enclaves dot the landscape as county attracts temporary residents." The New York Times.

Folta, T. B., A. C. Cooper, and Y. Baik
2006 "Geographic cluster size and firm performance." Journal of Business Venturing, 21: 217–242.

Frost, T. S.
2001 "The geographic sources of foreign subsidiaries' innovations." Strategic Management Journal, 22: 101–123.

Gourieroux, C., A. Monfort, and A. Trognon
1984 "Pseudo maximum likelihood methods: Theory." Econometrica: Journal of the Econometric Society, 52: 681–700.

Graitson, D.
1982 "Spatial competition a la Hotelling: A selective survey." The Journal of Industrial Economics, 11–25.

Granovetter, M.
1985 "Economic action and social structure: the problem of embeddedness." American Journal of Sociology, 91: 481–510.

Guillén, M. F.
2002 "Structural inertia, imitation, and foreign expansion: South Korean firms and business groups in China, 1987-95." Academy of Management Journal, 45: 509–525.

Gulati, R.
1995 "Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances." Academy of Management Journal, 38: 85–112.

Hall, B. H., A. B. Jaffe, and M. Trajtenberg
2001 "The NBER patent citation data file: Lessons, insights and methodological tools." NBER Working Paper Series, No. 8498.

Hannan, M. T. and J. Freeman
1977 "The population ecology of organizations." American Journal of Sociology, 83: 929–964.

Hausman, J. A., B. H. Hall, and Z. Griliches
1984 Econometric models for count data with an application to the patents-R&D relationship. National Bureau of Economic Research Cambridge, Mass., USA.

Haveman, H. A.
1993 "Follow the leader: Mimetic isomorphism and entry into new markets." Administrative Science Quarterly, 38: 593–627.

Haveman, H. A. and L. Nonnemaker
2000 "Competition in multiple geographic markets: The impact on growth and market entry." Administrative Science Quarterly, 45: 232–267.

Henderson, R. and I. Cockburn
1996 "Scale, scope, and spillovers: the determinants of research productivity in drug discovery." Rand Journal of Economics, 27: 32–59.

Henisz, W. J. and A. Delios
2001 "Uncertainty, Imitation, and Plant Location: Japanese Multinational Corporations, 1990-1996." Administrative Science Quarterly, 46: 443–475.

Hernandez, E.
2014 "Finding a home away from home: Effects of immigrants on firms' foreign location choice and performance." Administrative Science Quarterly, 59: 73–108.

Hofstede, G.
1980 Culture's consequences: International differences in work-related values. Sage Publications, Inc.

1984 "Cultural dimensions in management and planning." Asia Pacific Journal of Management, 1: 81–99.

Hofstede, G., G. J. Hofstede, and M. Minkov
2010 Cultures and organizations: software of the mind: 3rd edition. McGraw-Hill Professional.

Iacobucci, D.
2012 "Mediation analysis and categorical variables: The final frontier." Journal of Consumer Psychology, 22: 582–594.

Ingram, P. and M. W. Morris
2007 "Do people mix at mixers? Structure, homophily, and the 'life of the party.'" Administrative Science Quarterly, 52: 558–585.

Jaffe, A. B., M. Trajtenberg, and R. Henderson
1993 "Geographic localization of knowledge spillovers as evidenced by patent citations." Quarterly Journal of Economics, 108: 577–598.

Jansen, J. J., F. A. Van Den Bosch, and H. W. Volberda
2006 "Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators." Management Science, 52: 1661–1674.

Jensen, M.
2003 "The role of network resources in market entry: Commercial banks' entry into investment banking, 1991–1997." Administrative Science Quarterly, 48: 466–497.

2006 "Should we stay or should we go? Accountability, status anxiety, and client defections." Administrative Science Quarterly, 51: 97–128.

Jensen, M., B. K. Kim, and H. Kim
2011 "The importance of status in markets: A market identity perspective." In J. L. Pearce (ed.), Status in Management and Organizations: 87–117. Cambridge, UK: Cambridge University Press.

Johnson, K. P. and J. R. Kort
2004 "2004 redefinition of the BEA economic areas." Survey of Current Business, 84: 68–75.

Kenney, M. and U. Von Burg
1999 "Technology, entrepreneurship and path dependence: industrial clustering in Silicon Valley and Route 128." Industrial and Corporate Change, 8: 67–103.

Kerr, W.
2008 "The ethnic composition of US inventors." Harvard Business School Working Paper, No. 08-006.

Kerr, W.
2008 "Ethnic scientific communities and international technology diffusion." The Review of Economics and Statistics, 90: 518–537.

Knight, G. A. and S. T. Cavusgil
2004 "Innovation, organizational capabilities, and the born-global firm." Journal of International Business Studies, 35: 124–141.

Krugman, P.
1991 "Increasing Returns and Economic Geography." The Journal of Political Economy, 99: 483–499.

Lee, P. M. and H. M. O'Neill
2003 "Ownership structures and R&D investments of US and Japanese firms: Agency and stewardship perspectives." Academy of Management Journal, 46: 212–225.

Levinthal, D. A. and J. G. March
1993 "The myopia of learning." Strategic Management Journal, 14: 95–112.

Lieberman, M. B. and S. Asaba
2006 "Why do firms imitate each other?" Academy of Management Review, 31: 366–385.

Lieberman, M. B. and D. B. Montgomery
1988 "First-mover advantages." Strategic Management Journal, 9: 41–58.

Long, J. S.
1997 Regression models for categorical and limited dependent variables Vol. 7. Sage.

MacKinnon, D.
2008 Introduction to Statistical Mediation Analysis. New York, NY: Routledge.

Makino, S. and A. Delios
1996 "Local knowledge transfer and performance: Implications for alliance formation in Asia." Journal of International Business Studies, 27: 905–927.

March, J. G.
1991 "Exploration and exploitation in organizational learning." Organization Science, 2: 71–87.

Marshall, A.
1920 Principles of economics Vol. 1. London: Prometheus Books.

Martin, X., W. Mitchell, and A. Swaminathan
1995 "Recreating and extending Japanese automobile buyer'supplier links in north America." Strategic Management Journal, 16: 589–619.

Martin, X. and R. Salomon
2003 "Knowledge transfer capacity and its implications for the theory of the multinational corporation." Journal of International Business Studies, 34: 356–373.

Martin, X., R. M. Salomon, and Z. Wu
2010 "The institutional determinants of agglomeration: a study in the global semiconductor industry." Industrial and Corporate Change, 19: 1769–1800.

McCann, B. T. and T. B. Folta
2008 "Location matters: where we have been and where we might go in agglomeration research." Journal of Management, 34: 532–565.

McGrath, R. G.
2001 "Exploratory learning, innovative capacity, and managerial oversight." Academy of Management Journal, 44: 118–131.

McPherson, M., L. Smith-Lovin, and J. M. Cook
2001 "Birds of a feather: Homophily in social networks." Annual Review of Sociology, 27: 415–444.

Mehra, A., M. Kilduff, and D. J. Brass
1998 "At the margins: A distinctiveness approach to the social identity and social networks of underrepresented groups." Academy of Management Journal, 41: 441–452.

Meyer, J. W. and B. Rowan
1977 "Institutionalized organizations: Formal structure as myth and ceremony." American Journal of Sociology, 340–363.

Mezias, J. M.
2002 "Identifying liabilities of foreignness and strategies to minimize their effects: The case of labor lawsuit judgments in the United States." Strategic Management Journal, 23: 229–244.

Miller, S. R., D. E. Thomas, L. Eden, and M. Hitt
2008 "Knee deep in the big muddy: The survival of emerging market firms in developed markets." Management International Review, 48: 645–666.

Mitchell, W.
1991 "Dual clocks: Entry order influences on incumbent and newcomer market share and survival when specialized assets retain their value." Strategic Management Journal, 12: 85–100.

Mollica, K. A., B. Gray, and L. K. Treviño
2003 "Racial homophily and its persistence in newcomers' social networks." Organization Science, 14: 123–136.

Montgomery, D. B. and M. L. Lieberman
1998 "First-mover (dis) advantages: Retrospective and link with the resource-based view." Strategic Management Journal, 19: 1111–1125.

Mullahy, J.
1997 "Instrumental-variable estimation of count data models: Applications to models of cigarette smoking behavior." Review of Economics and Statistics, 79: 586–593.

Owen-Smith, J. and W. W. Powell
2004 "Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community." Organization Science, 15: 5–21.

Ozer, M. and W. Zhang
2014 "The effects of geographic and network ties on exploitative and exploratory product innovation." Strategic Management Journal.

Parkhe, A.
1991 "Interfirm diversity, organizational learning, and longevity in global strategic alliances." Journal of International Business Studies, 22: 579–601.

Penner-Hahn, J. and J. M. Shaver
2005 "Does international research and development increase patent output? An analysis of Japanese pharmaceutical firms." Strategic Management Journal, 26: 121–140.

Peterson, R. A. and A. J. Jolibert
1995 "A meta-analysis of country-of-origin effects." Journal of International Business Studies, 26: 883–900.

Podolny, J. M.
1993 "A status-based model of market competition." American Journal of Sociology, 98: 829–872.

Porac, J. F., H. Thomas, F. Wilson, D. Paton, and A. Kanfer
1995 "Rivalry and the industry model of Scottish knitwear producers." Administrative Science Quarterly, 40: 203–227.

Porter, M. E.
1998 "Clusters and the new economics of competition." Harvard Business Review, 76: 77–90.

Portes, A.
2010 Economic sociology: a systematic inquiry. Princeton, NJ: Princeton University Press.

Portes, A. and J. Sensenbrenner
1993 "Embeddedness and immigration: Notes on the social determinants of economic action." American Journal of Sociology, 98: 1320–1350.

Pouder, R. and C. H. S. John
1996 "Hot spots and blind spots: geographical clusters of firms and innovation." Academy of Management Review, 21: 1192–1225.

Powell, W. W., K. Packalen, and K. Whittington
2012 "Organizational and institutional genesis." In John F. Padgett and W. W. Powell (eds.), The Emergence of Organizations and Markets: 434–465.

Reagans, R.
2005 "Preferences, identity, and competition: Predicting tie strength from demographic data." Management Science, 51: 1374–1383.

Rosenkopf, L. and P. Almeida
2003 "Overcoming local search through alliances and mobility." Management Science, 49: 751–766.

Salomon, R. M. and J. M. Shaver
2005 "Learning by exporting: new insights from examining firm innovation." Journal of Economics and Management Strategy, 14: 431–460.

Saxenian, A.
1994 Regional advantage: Culture and competition in Silicon Valley and Route 128. Cambridge, MA: Harvard University Press.

Schilling, M. A.
2009 "Understanding the alliance data." Strategic Management Journal, 30: 233–260.

Schumpeter, J. A.
1934 The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle Vol. 55. Transaction Publishers.

Scott, W. R. and J. W. Meyer
1983 "The organization of societal sectors." In J. W. Meyer and W. R. Scott (eds.), Organizational Environments: Ritual and Rationality: 1–16. Beverly Hills, CA: Sage.

Shaver, J. M.
1998 "Accounting for endogeneity when assessing strategy performance: Does entry mode choice affect FDI survival?" Management Science, 44: 571–585.

Shaver, J. M. and F. Flyer
2000 "Agglomeration economies, firm heterogeneity, and foreign direct investment in the United States." Strategic Management Journal, 21: 1175–1193.

Shaver, J. M., W. Mitchell, and B. Yeung
1997 "The effect of own-firm and other-firm experience on foreign direct investment survival in the United States, 1987–92." Strategic Management Journal, 18: 811–824.

Singh, J. and M. Marx
2013 "Geographic constraints on knowledge spillovers: Political borders vs. spatial proximity." Management Science, 59: 2056–2078.

Sørensen, J. B.
2002 "The strength of corporate culture and the reliability of firm performance." Administrative Science Quarterly, 47: 70–91.

Stock, J. H. and M. Yoho Powell,
2005 "Testing for weak instruments in linear IV regression." In J. H. Stock and D. W. K. Andrews (eds.), Identification and Inference for Econometric Models: Essays in Honor of Thomas J. Rothenberg: Cambridge University Press.

Van den Steen, E.
2010 "Culture clash: The costs and benefits of homogeneity." Management Science, 56: 1718–1738.

Steensma, H. K., L. Marino, K. M. Weaver, and P. H. Dickson
2000 "The influence of national culture on the formation of technology alliances by entrepreneurial firms." Academy of Management Journal, 43: 951–973.

Tan, D. and K. E. Meyer
2011 "Country-of-origin and industry FDI agglomeration of foreign investors in an emerging economy." Journal of International Business Studies, 42: 504–520.

Turk, S.
2013 Brand name pharmaceutical manufactuing in the US (No. 32541a). IBIS World Industry Report.

Tuschke, A., W. M. Sanders, and E. Hernandez
2013 "Whose experience matters in the boardroom? The effects of experiential and vicarious learning on emerging market entry." Strategic Management Journal.

Unger, J.
2006 "Migraine headaches: A historical prospective, a glimpse into the future, and migraine epidemiology." Disease a Month, 52: 367–384.

Uzzi, B.
1996 "The sources and consequences of embeddedness for the economic performance of organizations: The network effect." American Sociological Review, 61: 674–698.

Verlegh, P. W. and J.-B. E. Steenkamp
1999 "A review and meta-analysis of country-of-origin research." Journal of Economic Psychology, 20: 521–546.

Wernerfelt, B. and A. Karnani
1987 "Competitive strategy under uncertainty." Strategic Management Journal, 8: 187–194.

Wilson, K. L. and A. Portes
1980 "Immigrant enclaves: An analysis of the labor market experiences of Cubans in Miami." American Journal of Sociology, 295–319.

Winkelmann, R.
2008 Econometric analysis of count data. Springer Publishing Company, Incorporated.

Yip, G. S., J. K. Johansson, and J. Roos
1997 "Effects of nationality on global strategy." Management International Review, 37: 365–385.

Yoo, M.
2003 The ties that (un)bind: Social networks and entrepreneurship in high-technology indistries. University of Michigan.

Zaheer, S.
1995 "Overcoming the liability of foreignness." Academy of Management Journal, 38: 341–363.

Zander, U. and B. Kogut
1995 "Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test." Organization Science, 6: 76–92.

Zhang, M. Y. and M. Dodgson
2007 "'A roasted duck can still fly away': a case study of technology, nationality, culture and the rapid and early internationalization of the firm." Journal of World Business, 42: 336–349.

Zhao, M.
2006 "Conducting R&D in countries with weak intellectual property rights protection." Management Science, 52: 1185–1199.

Zhou, M. and J. R. Logan
1989 "Returns on human capital in ethic enclaves: New York City's Chinatown." American Sociological Review, 54: 809–820.