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Article (Accepted Version)

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The Moderating Role of Distance, Ownership Strategy and Subsidiary Experience

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ABSTRACT

How does distance attenuate the value of MNC parent intangible assets on affiliate profitability? Beyond the basic assumption of internalization theory about the positive relationship between parent intangibles and foreign affiliate performance, we test how this relationship, is contingent on ownership strategy, subsidiary experience, and is moderated by the distance between home and host economies, in terms of differences in technological capacity, intellectual property regimes, economic development, language and geography. Based on newly-available accounting data on intangible assets, we test hypotheses on a sample of over 2000 multinationals and 5000 of their overseas affiliates in 45 home and host economies.

Key Words: Multinational Enterprise, Intangibles, Profitability, Distance, Ownership Strategy, Subsidiary experience.

1. Introduction

Internalization theory has long proposed that the profitability of a multinational company's (MNC) foreign affiliate should correlate positively with the intangible assets of its parent (Buckley & Casson, 1976, or Dunning's (2001) OLI framework). But so far, MNC parent intangible value has mainly been tested by using proxies such as the all-company, or parent R&D/Sales ratio or marketing intensity. Recently however, more detailed accounting information has become available, where parent MNC intangible value is available as an actual financial number. This newly available financial data has not yet been used to test the hallowed assumption of internalization theory that parent intangible assets constitute the key competence of modern firms and that therefore we should expect a positive association between parent intangibles and subsidiary performance (Villalonga, 2004). We contribute to the literature on subsidiary performance by directly testing the link between parent intangibles and subsidiary profitability.

We build on this to focus on a more novel research question about the contingent value of parent firm's intangible assets: "how does the degree of difference between the home (MNC parent) and host (subsidiary) country, ownership strategy of the parent firm and subsidiary experience attenuate, or augment, the link between parent intangibles and foreign affiliate profits?" Recent academic literature operationalizes these differences as institutional, or cultural or geographical "distances" between the nation of the MNC parent and the country location of its subsidiary (e.g. Berry, Guillen & Zhou, 2010; Malhotra & Gaur, 2014). The literature on country location distances, more often than not, takes a negative view of country differences, arguing that distance increases the liability of foreignness and creates greater obstacles in transferring ownership-specific (parent intangible asset) advantages to distant locations.

This view emanates from traditional thinking on MNCs, where it was assumed that the value of

intangible assets of a MNC diminishes or attenuates as the psychic distance between the home and host country increases. However, this assumption is becoming increasingly invalid since (a) MNCs may invest in another similar or dissimilar country, and (b) MNCs from emerging and less developed economies are expanding internationally, and establishing subsidiaries in countries more institutionally and culturally advanced than their own, in search of resources and capabilities (Tung & Luo, 2007). Hence the measurement of distance has to take into account the directionality of the foreign direct investment (FDI), or how the destination (host) nation compares with the location of the parent. Setting up a subsidiary in a distant country may augment, or diminish, the parent firm's intangible assets (internalization advantage) depending on the directionality of the movement. Given that much of the extant literature treats distance bi-directionally neutral (Shenkar, 2012), we make an important contribution by examining the effect of directionality in the distance construct.

While distance is an exogenous factor, the value of parent intangibles may also be affected by the ownership strategy of the parent firms and the subsidiary experience. Accordingly, we argue that the parent intangibles – subsidiary performance relationship is likely to be also contingent on these parent and subsidiary specific factors. We test our theoretical arguments on data from a sample of 5,010 foreign affiliates belonging to 2,301 MNCs over a 12-year time period from 1996 to 2007. Past studies on subsidiary performance have often used subsidiary survival as a measure, due to limited availability of financial data at the subsidiary level. Other studies have used surveys to measure subsidiary CEO's perception of subsidiary performance. We contribute to this literature by using detailed, actual subsidiary and parent level financial data, which overcomes the limitations of relying on survival or perceptual measures.

2. Theory and Hypotheses

2.1. Why do multinational firms exist? Three theory perspectives

Internalization theory and the knowledge based view (KBV) address a fundamental question underlying our study: why do MNCs exist? After all, capital, labor and other inputs are nowadays freely and ubiquitously available worldwide. If local inputs were the only sources of competitiveness and profitability, local firms would always prevail over their multinational rivals who have to overcome the liabilities of distance and foreignness to reach all the way into foreign markets in order to compete with local firms. The traditional answer is that MNCs possess proprietary intangible assets -- tacit, embedded, or firm-specific, but internally transferrable -- that are so superior to those of other firms, including local rivals, that even after bearing the higher costs of the liability of foreignness (Gaur, Kumar & Sarathy, 2011; Ghemawat, 2001; Hymer, 1976), their foreign affiliates thrive and are profitable in distant foreign markets.

Knowledge-seeking investments, sometimes the motivation for MNCs based in emerging countries who wish to access knowledge from a subsidiary in an advanced nation location, can benefit the firm as a whole. Clearly, we need to empirically distinguish between subsidiary locations which are institutionally and economically inferior, or comparable versus superior to those of the parent nation.

Three streams of literature in the international management field suggest why companies invest abroad despite liabilities of foreignness: (i) Internalization Theory (e.g., Buckley & Casson, 1976; Dunning, 1981; Hennart, 1982), whereby the MNC accumulates firm-specific capabilities and experience which are more easily transferrable, shared and valuable within in its own network of foreign affiliates than exploitable through external market-based methods (Delios & Beamish, 2001) ; (ii) the Knowledge-Based Perspective of the firm in which the MNC through its network of subsidiaries seeks, or exploits, internally accumulated proprietary knowledge, intellectual property, trade secrets and organizational routines – knowledge which is, once again, "sticky" within the firm and best transferred within the firm's hierarchy (Kogut & Zander, 1992; Nelson &

Winter, 2002), and (iii) the Resource Based View of the firm (Barney, 1991) wherein the firm develops internal assets – mainly intangible – that are valuable, inimitable, rare and best transferrable within the MNC's network of affiliates. The internal transfer of parent intangibles or headquarters capabilities creates value (economic rents) in the subsidiary location not merely because of their intrinsic worth (Dunning & Lundan, 2008; Dunning, 2009; Buckley & Casson, 2009, 2010; Hennart, 2010), but also because of the additional benefits of a multinational scope, *per se*, as articulated by Contractor (2012).

The question addressed in this paper is the extent to which the differences between the countries of the parent and subsidiary degrade, or augment, the value of the intangible assets transferred. MNCs pursue strategies to attenuate the liability of foreignness while enhancing the value their subsidiaries can derive in a foreign location, utilizing the parent's intangibles. The net effect on subsidiary profitability depends on the relative importance of institutional, economic and other environmental factors in the host market.

2.2. Intangible assets and subsidiary performance

Parent firm or company-wide intangible assets include technology or proprietary knowledge, intellectual property (IP) such as patents or brands, internal organizational routines (Nelson & Winter, 2002), production processes (Markusen, 1995), and the firm's relationships and reputation. These assets (i) are distinctive or unique to the firm, (ii) intangible, (iii) proprietary: can be confined or internalized within the firm's boundary, and (iv) transferable to foreign affiliates, so as to extend the MNC's competitiveness to the foreign nation.

We propose initially to test this venerable assumption – a positive relationship between a MNC's intangible assets and the performance of foreign subsidiaries – using more detailed accounting data on MNC subsidiaries that has recently become available. Our initial baseline test on a comprehensive international sample of 2,301 multinational parents and their 5,010 overseas affiliates, in 45 economies, between 1996 and 2007. The

longitudinal nature of our data allows us to conduct a number of robustness tests, and a falsification exercise that seeks to control for the role of common shocks affecting the profitability of both the parent and its affiliate.

Having established the baseline effect, we examine why different affiliates of a MNC perform unequally, despite having the same parent knowledge or capability base. The variation of profitability across subsidiaries must be partially explainable by firm-specific factors and country differences between parent and subsidiary locations.

2.3. Distance between home and host country

Country differences could be a double-edged sword (Björkman, Stahl, & Vaara, 2007; Reus & Lamont, 2009). On the one hand, differences in formal and informal institutions such as culture, norms and regulations between the home and host country create informational disadvantages for the foreign subsidiary, making it more difficult for the parent to transfer its intangibles to its subsidiary. Even within a single firm (the transmission of capabilities from MNC parent to its wholly owned subsidiaries), problems arise due to differences in technological capacity, economic development, IP protection and language between the home and host countries. These country level differences create monitoring, oversight, and coordination costs even in the case of wholly owned subsidiaries; albeit at lower levels as compared to arms-length licensing contracts, or alliance-based relationships. On the other hand, distance also provide opportunities to derive benefits such as learning and arbitrage, which may not be available in proximate locations (Gaur and Lu, 2007). Thus, in some cases, MNCs may derive greater rent by transferring their intangible assets to distant locations if they provide learning and arbitrage opportunities. Given these seemingly contradictory effects of distance, it is important to assess how distance affects the relationship between MNC's intangibles and subsidiary performance.

In the past, an overwhelming majority of empirical studies measured inter-country differences based

on cultural distance, with three-quarters using Hofstede's (1980) operationalization (Dow & Larimo, 2009). The Hofstede cultural distance measures have received serious criticism on many counts. There is some consensus that cultural distance measures provide "… *a poor predictor of distance perceptions*" (Hakanson & Ambos, 2010) and overall empirical conclusions from various studies remain *"…ambiguous and contradictory"* (Berry, Guillen & Zhou, 2010; Popli, Akbar, Kumar & Gaur, 2016). Recent studies have proposed that country differences should be measured using multiple dimensions (Berry et al., 2010; Hakanson & Ambos, 2010).

Following recent studies on cross-national difference, we use five alternate measures to operationalize the distance or asymmetry between an MNE's headquarters nation and the nation of the affiliate. For each home-host country dyad, we measure the differences in (i) technological capacity, (ii) IP regime, (iii) level of economic development, (iv) use of common language, and (v) geographical distance. These country differences are identified as important ones for subsidiary performance in several studies (Berry et al., 2010; Gaur & Lu, 2007; Malhotra & Gaur, 2014). The first three of distance measures are bi-directionally asymmetrical. We hypothesize that the MNC subsidiary's ratio of benefits derived from parent intangibles *versus* costs of liabilities of foreignness, will differ depending on whether the subsidiary is located in an advanced country as opposed to a less advanced country. This is consistent with the approach in some recent studies (Berry et al., 2010; Zaheer et al., 2012). In the following sections, we develop hypotheses about the moderating effect of each of the five distance variables and two firm-specific variables.

2.4. Hypotheses

2.4.1. Technological distance. The transfer of technology and innovations to another country usually involves an asymmetry between transferor and recipient, in terms of technical capacity or absorptive capacity. Even when the transfer occurs between a MNE parent and its foreign affiliate (or vice versa), the two

organizations, in separate nations, will likely have a disparity in terms of the skill sets of their personnel (Farjoun, 1998). In the case of foreign subsidiaries, most technical and administrative personnel are drawn from the local talent pool. Their educational background and training is dependent on the level of technological development of the local market (Florida, 2002). Depending on the relative technological development of the host market, there may be a considerable variation in absorptive capacity and learning (Berry et al., 2010).

There are competing arguments about the effect of technological distance as it may enhance as well as diminish the value of parent intangibles for the subsidiaries. With a parent in an advanced nation and its subsidiary in a less technologically advanced country, the disparity in technological level is likely to make it more difficult for the parent firm to transfer knowledge, particularly when knowledge is tacit (Bell & Zaheer, 2007). It may also be more difficult for the subsidiary to derive value from the parent's intangible assets. Personnel from the parent MNC may find it more difficult to articulate and teach their skills to their counterparts in such a foreign affiliate (Jensen & Szulanski, 2004). A study by Ambos and Ambos, (2009) examined communication and coordination mechanisms used within multinational companies. They found that, while the effectiveness of technical coordination mechanisms (such as protocols, manuals and codified procedures) did not degrade over geographical distance between units of the MNE, the effectiveness of interpersonal coordination mechanisms (such as face to face meetings, mentoring and learning) was compromised with distance.

On the other hand, when the MNE subsidiary is in a more technologically advanced nation, the challenges of knowledge transfer from the parent to subsidiary are likely to be lower. The more advanced technological environment of the subsidiary's country might provide greater opportunities for the MNC to exploit its knowledge by combining it with the locally available knowledge, or simply by accessing new capabilities (Luo and Tung, 2007). Accordingly, we expect technology distance to enhance the positive value of

parent intangibles when subsidiaries are located in technologically more advanced locations, but diminish the

same when subsidiaries are located in technologically less advanced locations.

> **Hypothesis 1a (i):** *Technology capability distance moderates the relationship between parent intangibles and subsidiary performance such that the parent intangibles are a) more valuable when subsidiaries are in technologically more advanced nations and b) less valuable when subsidiaries are in technologically less advanced nations.*

One could also argue for a counter-hypothesis. As firms move from a technologically more advanced

nation to a less advanced one, the importance of parent intangibles for subsidiaries in less advance nations may

become greater if the local market in an emerging nation exhibits lower competition, and the foreign technology

is relatively novel. The extant literature on ownership specific advantages of advanced country MNCs provides

support for this argument. The literature suggests that advanced country MNCs' superior technological assets

more than overcome the liability of foreignness and other disadvantages in less developed foreign locations

(Dunning & Lundan, 2008; Dunning, 2009; Buckley & Casson, 2009; Delios & Beamish, 2001).

The counter-hypothesis also holds that MNCs emanating from emerging nations often do not have

technological and other intangible assets that may provide them with a competitive advantage against local

incumbents in advanced economies. The competitive advantage of such MNCs is often based on factor cost

differentials and institutional resources (Gaur, Kumar & Singh, 2014; Singh & Gaur, 2013). In fact, emerging

market based MNCs often invest in advanced nation subsidiaries to gain access to, and augment their own,

intangible assets (Luo & Tung, 2007). These arguments suggest a competing counter-hypothesis as under:

> **Hypothesis 1a (ii):** *Technology capability distance moderates the relationship between parent intangibles and subsidiary performance such that the parent intangibles are a) less valuable when subsidiaries are in technologically more advanced nations and b) more valuable when subsidiaries are in technologically less advanced nations.*

2.4.2. Intellectual property protection regimes. How does the quality of the IP regime affect the value of

parent intangibles to affiliate performance? MNCs are less confident in operating in environments with weak

IP protection (McCalman, 2004). As the standards of IP protection differ between the home and host countries, MNCs become more careful about transferring their proprietary knowledge and technologies to foreign subsidiaries for fear of losing such knowledge. Weaker IP protection also dampens innovation (Kanwar & Evenson, 2003). Weaker government enforcement lowers returns on intangible assets and underutilizes talent at the affiliate country level (Zhao, 2006), increases fears of unintended technology spillover and to that extent inhibits the transfer of the latest technologies from MNE headquarters to such affiliates (Maskus & Yang, 2004).

In contrast, when firms move to stronger IP protection regimes, the fear of misappropriation is substantially reduced. This encourages MNCs to transfer their most advanced technological knowhow and even enhance it by making use of locally available technology. Thus, when the perceived level of IP protection is seen as low in the subsidiary country, MNCs not only are loath to transfer intangible assets and knowledge from parent to the subsidiaries, they also do not do much knowledge-intensive work at the subsidiary level.

Subsidiaries in weaker IP protection regimes, *ceteris paribus*, operate typically at the low value portions of the value chain. While these lower-end activities add to the overall firm value, the profitability of subsidiaries doing such activities is not very good. On the other hand, MNCs perform their high value-added activities in locations with high IP protection and derive greater value from transferring knowledge from parent to the subsidiary. Thus, difference in IP regimes condition the relationship between parent intangibles and subsidiary performance depending on the relative strength of IP regimes between the home and host locations.

Hypothesis 1b: *IP distance moderates the relationship between parent intangibles and subsidiary performance such that the parent intangibles are a) more valuable when subsidiaries are in stronger IP regime nations and b) less valuable when subsidiaries are in weaker IP regime nations.*

2.4.3. Economic distance. Economic distance, as measured by difference in the per capita income levels between the nation of the MNC parent and the country of its subsidiary, has been used by scholars as a

surrogate for institutional or psychic distance (Berry et al., 2010; Hakanson & Ambos, 2010). The traditional theory approach has been to focus on institutional isomorphism (DiMaggio & Powell, 1983). This view suggests that similarity in economic levels facilitates the replication of the MNC parent's capabilities in a foreign setting, while dissimilarity increases the liability of foreignness and the foreign market entry threshold (Dow & Karunaratna, 2006). While the correlation is not perfect, institutional isomorphism has been linked to similarity in levels of economic development (Beckert, 2010). Yang, Martins and Driffield (2013) found that the economic distance between home and host countries plays significant role on multinational performance.

But in this study we expand the concept and refine it further to ask about the 'directionality' of the difference. One can identify two cases. (1) where the level of economic development of the home/parent firm nation is higher than that of the subsidiary, or (2) where the home nation level is lower than the country of the subsidiary. In both cases there are obstacles and liabilities of foreignness to be overcome which, *ceteris paribus*, will negatively affect subsidiary performance. However, firms can derive more value from their intangible assets from subsidiaries in more economically developed countries than their home markets, because of greater purchasing power, per capita. Often, consumers in economically more developed countries are willing to pay a higher premium for high quality products. Such markets also value, and are willing to reward, innovations and are more amenable to new products, which carry a higher unit price[1] (Hummels & Lugovskyy, 2009). On the other hand, in economically less developed countries, consumers have lower purchasing power, and therefore may not be willing to pay a premium (i.e., adequately value or compensate for MNC intangibles). Anecdotal evidence suggests that emerging market firms often take their most sophisticated products to advanced

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[1] Marketing and economics models recognize that competition or "crowding" can reduce the value of higher unit prices on profitability, but nevertheless conclude, in general, that advanced nations provide superior returns.

economies to derive more value from their intangible assets. Thus, while we hypothesize that economic distance diminishes the positive effect of MNC intangibles on subsidiary performance, in general, we add qualifications or contingencies noted in the hypothesis below.

> **Hypothesis 1c:** *Economic distance moderates the relationship between parent intangibles and subsidiary performance such that the parent intangibles are a) more valuable when subsidiaries are in more economically developed nations and b) less valuable when subsidiaries are in less economically developed nation.*

2.4.4. Dissimilarity in language. Language plays an important role in international business operations in terms of understanding foreign culture and customers, in communications between parent and subsidiary personnel, operating procedures and organizational routines, and in adapting marketing strategies. Several studies have found language distance to affect foreign market entry choices (Ghemawat, 2001; Johanson & Wiedersheim-Paul, 1975), negotiations in establishing foreign enterprises (Brewer, 2007), and foreign subsidiary management in general (Hakanson & Ambos, 2010). In a study of bilateral trade between the US and other nations, Hutchinson (2005) found that trade flow deteriorated with a larger linguistic distance between English and the language of the trading partner nation. These results were robust for both exports and imports as well as for consumer and intermediate goods.

Chen, Geluykens, and Choi (2006) and Shenkar et al. (2008) detail the challenges that language barriers create for MNCs due to the difficulties in communication and coordination across borders. MNCs have to put in extra resources to make sure that the messages between the MNC parent and its subsidiaries are not misinterpreted. Fearing miscommunication, MNC parents often scale down their involvement in a country with greater language distance. Language differences also make it more difficult for MNCs to achieve global integration (Marschan, Welch, & Welch, 1997). Thus language differences are likely to adversely affect subsidiary profitability.

When it comes to transferring intangibles between the MNC parent and its subsidiaries, language barriers create significant challenges to knowledge flows (Harzing & Feely, 2008), often leading to misinterpretation by different parties. DePalma and Beninatto (2002) found that firms in English speaking countries spend upwards of 2.5% of their total non-US revenue in translation-related expenses. These costs are accentuated in industries with a greater emphasis on innovations and patenting. These findings suggest that there are significant costs in transferring parent intangibles to subsidiaries located in countries with a different language. Thus language differences have a negative moderating effect on the relationship between parent intangibles and subsidiary performance.

Hypothesis 1d: *Dissimilarity in language negatively moderates the relationship between parent intangibles and subsidiary performance.*

2.4.5. Geographical distance. Geographic distance has been used in several studies as a measure of friction in international operations. As the geographic distance between the home and host countries increases, MNCs face a heightened level of information asymmetry. For example, Ragozzino and Reuer (2011) find that geographic distance increases information asymmetry in the case of cross-border acquisitions. Likewise, Ragozzino (2009) finds that acquirers find it easier to gather information through informal channels if the target firm is located in proximate countries. On first blush, simple geographical distance may seem to be a rather crude indicator. However, several studies have used geographic distance as a measure of information asymmetry and other difficulties that firms face in foreign countries. For example, scholars have shown that measures of geographic distance negatively affects the volume of global trade (Disdier & Head, 2008), and even in service industries, such as informational technology offshoring, where transportation costs become irrelevant (Aubert, Rivard & Templier, 2011). Malhotra & Gaur (2014) show how geographical distance alters the propensity of MNCs to opt for full versus partial equity in cross-border acquisitions.

High levels of information asymmetry lead to the problems of adverse selection and moral hazard in foreign subsidiary management. With incomplete information about the host markets, MNCs often make sub-optimal choices when it comes to selecting suppliers and distributors or other local business partners, and it is not easy for MNCs to monitor the local supply chain or marketing partners. As a result, subsidiaries that are located in geographically distant locations perform worse than those that are in proximate locations. In the case of cross-border alliances, Zaheer & Hernandez (2011) found that alliance performance was inversely related to the average mileage distance from an exploration alliance to the nearest subsidiary.

A high level of information asymmetry makes MNCs more cautious in transferring their intangibles to distant locations because of the risk that their technology is misappropriated by the local partners or employees. Even if the risk of misappropriation is absent, it is more difficult to effectively transfer intangible assets to locations about which when the parent firm may not have adequate understanding. As a result, foreign subsidiaries in distant locations may not be able to utilize the benefits of parent intangibles. Hence,

Hypothesis 1e: *Geographic distance negatively moderates the relationship between parent intangibles and subsidiary performance.*

2.5. Ownership strategy

In addition to the external factors, firm level strategies and experience also affect the value of parent or MNC-wide intangible assets at the subsidiary level. While most MNC affiliates are fully-owned, others have some equity held by local parties. The parent's ownership level in a foreign affiliate reflects its level of control and commitment towards affiliate's operations (Anderson & Gatignon, 1986; Dhanraj & Beamish, 2004). When parent firms have a higher level of ownership, they wish to control affiliate's operations by appointing their own people in key positions, especially in distant countries (Gaur, Delios, and Singh, 2007). Such deployment of personnel makes it easier to transfer firm specific resources and capabilities to the affiliate. Parent firm

employees in key affiliate positions can also ensure that affiliates pursue policies that are consistent with the overall strategic intent of the parent firm and do not diverge from their assigned mandate.

With greater control comes greater confidence. If a MNC parent is confident about the actions and strategic intent of its affiliate, it is more likely to transfer its intangible assets to the affiliate. With a higher level of ownership, the parent firm is likely to have less concern that the transferred knowledge may be misused by the foreign affiliate partner (Gaur & Lu, 2007). Extant literature suggests that finding trustworthy partners in foreign joint ventures is difficult (Gomes-Casseres, 1990). With a higher level of ownership, even if the local partner is not very trustworthy, the MNC parent can delineate roles of different partners and institute organizational mechanisms to ensure that the local partner does not take undue advantage of the intangibles transferred from the parent to the local affiliate.

Transfer of intangible assets also becomes easier if there are mechanisms in place for such transfers. With a greater equity control, MNCs can set up knowledge transfer mechanisms by employing the right set of people and establishing proper communication channels (Anderson, Gaur, Mudambi, & Persson, 2015). Thus, when an MNC holds a majority stake in an affiliate, it commitment, intent and ability to transfer intangible assets to the affiliate increases, while fear of misappropriation and misallocation reduces.   With a greater stake, MNCs have greater control over strategy formulation and implementation, resource allocation decisions, and operations at the affiliate level.   Accordingly, we hypothesize:

> **Hypothesis 2:** *MNCs' ownership strategy (majority versus minority control) positively moderates the relationship between parent intangibles and affiliate performance.*

2.6. Local subsidiary experience

Subsidiary experience is an important factor in overcoming the liability of foreignness over time. As subsidiaries age, accumulated local experience helps them in developing more social links, local market knowledge, and

rapport with local stakeholder groups (Sohn, 1994), which reduce unfamiliarity and relational hazards in the host country (Gaur & Lu, 2007). As subsidiaries develop a better understanding of the local context, they can adapt their strategies to local market needs (Mitchell, Shaver & Yeung, 1992). Subsidiaries also develop locally embedded resources and capabilities, which may be of some value to the peers or even the parent firm (Makino & Delios, 1996). All these factors enhance the value of parent intangibles for the subsidiary. When subsidiaries have a better understanding of the local context, they can effectively combine their local market knowledge with the parent firm capabilities to develop products and services suitable for the local markets.

Longer local market experience also enhances the transfer of an appropriate selection of resources and capabilities from the parent firm to the subsidiary (Delios & Beamish, 2001; Gaur, Kumar & Singh, 2014; Kostova, 1999). MNC capabilities and assets may not all be effective when transferred to another environment (Gaur & Lu, 2007), unless the subsidiary has gained a deep understanding of the local context (Jensen & Szulanski, 2004; Kostova, 1999; Luo, 1997) so as to know how to adapt the MNC parent's capabilities for effective local use. As subsidiaries age, they gain a better understanding of the local context, which then helps in effective transfer as well as better utilization of the parent intangibles at the subsidiary level. Accordingly, we hypothesize:

> **Hypothesis 3:** *Subsidiary age positively moderates the relationship between parent intangibles and subsidiary performance.*

3. Methods

3.1. Sample and data

We draw our sample from the Orbis database of Bureau van Dijk which recently began to publish detailed accounting and financial information for firms across the world including their intangible assets. Orbis defines foreign affiliates as firms where the parent company has a minimum of 25.01% shareholding, although most

are majority or fully owned. Accounting and financial information for parents and affiliates are longitudinal, while the information on the link between the affiliate and the parent is only available for the last year in which the parent appears in the data. We assume that the two firms were linked during all years for which we have information on affiliates. A few other papers (e.g. Yang et al., 2013, Driffield et al 2016) make this similar assumption when using Amadeus (European version of Orbis) and Orbis data. The initial firm samples we have include 3,438 multinational parents and their 9,280 overseas subsidiaries. We only include those firms for which the database has complete information on sales, return on assets, capital, leverage, intangible assets and employment levels. We include a vector of these variables in our regression estimation to measure firm heterogeneity. This criterion leads to the exclusion of several firms in some countries, in particular Brazil, Canada, China, Iceland, Indonesia, Luxembourg, Mexico, New Zealand, Philippines, South Africa, and Turkey. However, this is not a relevant problem for the overwhelming majority of countries.

With the above restrictions, we obtained complete information on a total of 2,301 multinational parents and 5,010 of their foreign subsidiaries over a 12-year time period from 1996 to 2007. A total of 1,575 out of 5,010 affiliates are located in entirely different continents than their parents.

3.2. Variables

Intangible assets are considered by economists and accountants to be the primary determinant of the long term profitability of companies (Villalonga, 2004). Intangible assets reported in Orbis data use International Accounting Standard (IAS) 38 (Ribeiro et al. 2010). An intangible asset is an identifiable asset -- without physical substance, but allocated a monetary value -- such as computer software, patents, copyrights, motion picture films, customer lists, mortgage servicing rights, licenses, import quotas, franchises, customer and supplier relationships, marketing rights, and development costs, that is expected to generate income in the future.

Intangible assets in Orbis are initially valued by accountants at cost less any amortization and impairment losses, followed later by a reassessed valuation based on fair market value determined with reference to an active market. Our dependent variable is affiliate performance measured by its *return on assets*. We measure ownership strategy depending on if the subsidiary is majority owned or not. The '*Majority owned*' dummy variable is equal to one if the parent company owns at least 50% share in its overseas affiliate. We measure subsidiary experience by taking a natural log of the age of a subsidiary. *Subsidiary age* reflects the maturity of the foreign subsidiary and is a direct measure of the experience in a specific product-geographic market (Gaur, Delios and Singh, 2007).

Next, to determine whether the country differences in technological capacity, IP protection, economic development, common language and geographic distances between the home and host locations moderate the effect of intangibles on affiliate performance, we add distance variables as below.

3.2.1. Technological capacity difference between pairs of countries. This is obtained from the difference in the total number of resident patent applications per one million population in the two countries, as available from the World Bank indicators.

$$(Patent_{HomeCountry}^{residents} / Population_{HomeCountry}) - (Patent_{HostCountry}^{residents} / Population_{HostCountry})$$

Patent data are often used as a surrogate measure of a nation's technological capability (Berry et al 2010).

3.2.2. Intellectual property rights (IPR) differences. This is computed from the difference in the Park (2008) IPR index for the two countries. We used the 2000 IPR indexes for the period corresponding to 1996-2000 and the 2005 IPR indexes for the period corresponding to 2001-2007.

3.2.3. Economic development differences. This is the difference in GDP per capita between the country where the parent is located and the country where the affiliate is located, obtained from the World Development

Indicators (World Bank, 2010). This measure of course can include both positive and negative values, although the first type is much more prevalent – suggesting that, as a generalization, the overwhelming bulk of FDI continues to originate from countries with a higher economic level and flows to nations with lower economic development.

3.3.4. Common language. As a proxy we constructed a dummy variable equal to one if the two countries have the same official language, and zero otherwise.

3.4.5. Geographical distance. The distance (log kilometers) between the capital cities of parent and affiliate country, following the `great circle formula', as available from the CEPII Distances Dataset.

3.5. Control variables

We also include control variables suggested by the literature to measure heterogeneous firm characteristics namely *firm age* (Yang and Driffield 2012), *debt to equity ratio* (Pantzalis 2001), *wage per worker* (Martins and Yang 2015) and *capital per worker* (Driffield et al 2016). Additionally, we control for *country fixed effects*, *year fixed effects* and *the home and host country GDP*.

4. Results

4.1. Descriptive Statistics

Table 1 presents key summary statistics for the 21,108 observations, covering 45 economies, in our data set -- each observation corresponding to a unique parent-affiliate-year combination. These 45 economies account for over 95% of all inward FDI stocks, UNCTAD (2015). As one would expect, we find that affiliates have much smaller average workforces (1,349 vs. 45,033 employees) and much smaller average levels of sales (€ 354 vs. € 9,723 million). Compared to affiliates, multinational parents tend to have more capital (€ 3,038 vs. € 66 million), and have more intangibles assets (€ 1,739 vs. 21 million). Monetary values were converted into Euros using

exchange rates retrieved from the IMF. In order to adjust for the purchasing power parity and inflation, all monetary data are converted in real terms using real effective exchange rates as a deflator. Twenty eight percent of affiliates are majority owned by parent companies.

------Insert Table 1 about here------

The time coverage of the data is centered around 2002, with a standard dispersion of 2.57 years. Each parent-affiliate match appears on average 5.3 times (standard deviation of 2.54), which facilitates a longitudinal analysis and thereby controlling for time-invariant (observed and unobserved) heterogeneity. The distance variables in Table 1 show that, on average, parents are located in countries with better IPR regimes and higher economic development, relative to the countries where their affiliates are located. We also find 20% of the parent-affiliate pairs operate in countries that have the same language, and the average geographic distance of the parent-affiliate pairs is 2,828 kilometers.

Table 2 reports the correlation among the explanatory variables. Among the firm-level variables we see that intangibles, wage, capital and employment have the expected correlation sign – intangibles positively correlated with firm capital, wage and firm size. Among the firm-level variables we see the calculated r values range from -0.004 to 0.1, suggesting no issue of multicollinearity. Among the distances variables we find that the calculated r values range from -0.167 to 0.469. As expected, economic distance between countries is positively correlated (0.264) with the distance of intellectual property rights. In addition, countries who share the same language are likely located in closer geographical distance, and are likely to have shorter distance in economic development, technological capabilities and intellectual property rights.

------Insert Table 2 about here------

The data cover 45 economies, including many OECD countries and also the largest developing nations.

Appendix Table A presents data separately for multinational parents and overseas subsidiaries, with the most important variables used in our analysis, and averages for return on assets and intangibles. Unsurprisingly, most parents are concentrated in developed countries, with significant numbers in Belgium, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, the U.K. and the U.S., which account for 91% of all parents. The greatest numbers of overseas subsidiaries are found in Belgium, the Czech Republic, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden and the U.K., which account for 92.7% of all overseas subsidiaries included in our data set [Refer to Appendix Table A at the end].

4.2. Results for the initial baseline check

Tables 3 reports our first set of estimates with Affiliate Profitability as the dependent variable. The results confirm our baseline check of internalization theory (not the principal intent of this paper) – that, in general, affiliate profitability is positively linked to intangible assets. We do this because, until recently, intangible assets were measured by proxies such as research or marketing intensity. Today, newly-available financial data enable us to test this venerable assumption of theory in a more focused accounting manner than before. In Table 3, Columns 1 and 2 control for affiliate fixed effects and year effects. Across all columns, we find that affiliate intangibles have the predicted positive effect upon affiliate performance, and affiliate firm age and wage and host country economic development also have expected positive effect on generating higher affiliate profitability, and affiliate leverage plays negative effect on affiliate profitability. In particular, MNE parent intangible assets have a positive (0.321) and significant effect upon affiliate profitability after controlling for

year fixed effects and differences in affiliate capital, leverage, firm age, wage, and employment[2].

------Insert Tables 3 about here------

While the affiliate fixed effects used in columns 1 and 2 Table 3 above control for time-invariant heterogeneity, one should check whether the estimates suffer from a simultaneity or endogeneity bias. For instance, parents and affiliates may suffer from demand shocks that occur at the same time which could lead to a misleading interpretation of the effect of parent intangibles on affiliate profitability. In addition, to some extent, the profits of an affiliate could redound back to the intangibles of its parent. In order to address these concerns we draw on a generalized method of moments instrumental variable (GMM-IV) estimator that instruments for current-period parent intangibles using one year and two-year lagged values of parent intangibles. At the same time, we also control for firm fixed effects and year effects.

Columns 3-5 of Table 3 uses no weights in column 3, weights by parent country FDI outflows in column 4, and weights by affiliate country FDI inflows in column 5. The estimates of the parent intangible effect on affiliate profitability range between 0.843 and 0.906 and are always significant. The instruments – one and two lagged parent intangibles also display significant effects in the first stage, as expected. Moreover, the Sargan test of over-identification and tests of weak-identification and under-identification indicate that the instruments are valid across all columns.

4.3. Falsification test

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[2] In order to check that that our sample of parents and affiliates is representative of the country distribution of foreign direct investment in the world, we reran the models of Table 3 but instead weighted each observation using by turn the levels of FDI of the parent country (outflows) or of the host country (inflows), using data from UNCTAD. The new estimates are very similar. This suggest that our estimates do not have biases raised from global foreign direct investment patterns. These are available upon request.

As mentioned earlier, the concern about exogenous economic perturbations that simultaneously influence the intangibles of parents and the performance of affiliates may also need a falsification test. Or, for example, a worldwide increase in technology capability in an industry could presumably raise the performance of an affiliate and the intangibles of its parent, in which case imputing causality as per internalization theory, between parent intangible assets and affiliate performance, could be problematic. The idea of a falsification test is to select information from firms that are very similar and therefore would be subject to the same shocks as the matched counterpart. We then took the intangible assets of the matched parent (Intangibles $_{it}^{match-P}$) and used that in the regression in place of the intangibles of the true parent and redid our previous estimations.

If this exercise results in similar or at least significant estimates of our desired internalization effect, i.e., that affiliate performance is linked to parent intangible assets, then we would have to revisit our interpretation of our previous estimates (in Tables 3). On the other hand, if this exercise results in insignificant estimates, then that would be reassuring and consistent with our preferred interpretation of resource internalization. We conduct the falsification test by matching MNE parents to other parents that are very similar in a number of characteristics (available in our data set) in the spirit of a propensity score matching analysis (Rosenbaum & Rubin 1983). We required that each MNE parent and its match (another MNE parent) be located in the same industry and same country. The range of variables initially available for the matching exercise was reasonably large (employment, profit, intangibles, sales, capital, age, number of affiliates, year), and certainly at least comparable to numbers used in other empirical papers. We also considered several transformations of these variables (squares, cubes, interactions of two and three variables) in order to obtain a more precise correspondence between the two, matched parents, along observable dimensions, in the spirit of a propensity score matching exercise.

We started by pooling all parents and affiliates and then estimated a logit model where the dependent variable is a parent dummy (1 if firm is the parent) and the regressors are the variables and polynomials described above. Using these coefficients, we computed the probability that each parent is in fact a parent (the alternative being an affiliate). In the last step of this analysis, we found which parent is the best match for each other parent by comparing their probabilities of parenthood.

Table 4 presents descriptive statistics on the quality of the match obtained. These variables are measured in ratios. We divide the difference of the two figures (true parent and fake parent's value) by the mean of the same two figures). The results indicate a very good quality in the matching, as the average ratios are always low - even if the standard deviations are relatively high. Furthermore, we find that matching also on parent intangibles does not lead to a sizable deterioration of the quality of matching, which is further evidence that our matched parents are similar to the original parents.

------Insert Table 4 about here------

The regression results are presented in Table 5. "Intangibles, matched parents" is the intangible assets of fake parents. Column 2 and 4 weights each observation inversely to the absolute difference in the propensity score of the parent and its match. In other words, these results attach greater importance to parents that are better matched. The first set of estimates (columns 1 to 2), where parent intangible assets are ignored as a matching variable, show that all effect of matched-parent intangibles are insignificant, and the point estimates are negative at the insignificance level. To provide an additional robustness check, we also report results in column 3 and 4 when the match is based on the matched parent's intangibles in addition to the other matching variables (second panel of Table 5). Again, the effect of intangibles disappears. The results of the Falsification Test are reassuring, in that they suggest no evidence for a spurious relationship between parent intangibles and

affiliate performance, and lean in favor of a causal interpretation between the two.

------Insert Table 5 about here------

4.4. Results for the distance variables and affiliate characteristics

Having provided evidence of a causal link between intangible assets and affiliate profitability, we now turn to

the question of how this link (or affiliate profitability) is moderated by "distance" between the nation of MNE

parent and affiliate. These results are presented in Table 6.

------Insert Table 6 about here------

In Models (1) through (5) each distance measure is introduced together with its interaction term with

parent firm intangibles. We find that technology distance positively moderates the relationship between parent

intangibles and subsidiary performance. The results are robust when we use total patent applications, or total

patent applications per million population, or total patent applications per million GDP to measure

technological capability of each nation. Thus, we find support for the alternate counter-hypothesis H1a (ii),

while rejecting H1a (i). Other hypotheses about the moderating effect of distance variables are also supported.

The greater the economic gap between the home and host countries, the weaker the link between parents'

intangibles and affiliate performance. Similarly, the link is weaker when parent and affiliate are in the country

that don't share the same language. IPR and geographic distances have a negative moderating effect as

hypothesized.

We illustrate the interaction effects in Figure 1, showing a clear and moderating role of distances, and

the directionality of the difference. In Figure 1, we find that parent intangible effects becomes weaker when

the IPR or economic distance moves from zero to a very large positive (i.e. two standard deviation plus the

mean), and this suggests that the internalization effects are smaller when an affiliate is located in a country with

lower IPR, technological capabilities or economic development (Columns 1 and 3 in table 6), relative to its home country. However, internalization effects become stronger when an affiliate is located in countries with higher IPR or economic development. When looking at the moderating role of technological distance, we find that the internalization effect becomes stronger when MNEs invest in countries with lower technological capabilities, while the effect turns to be smaller when host countries have higher technological capabilities than home country (Column 2 in table 6).

------Insert Figure 1 about here------

We now turn to testing whether the link between parents' intangibles and affiliate performance will be moderated by the affiliate ownership and experience in Table 7. First, we split our samples in terms of majority owned versus minority owned controlled affiliates. We find that the relationship between parent intangibles and subsidiary performance is higher (0.764 vs. 0.185) in the subsample of majority owned affiliates, relative to minority owned affiliates. The result is consistent with our Hypothesis 2, suggesting MNC's ownership strategy (majority versus minority control) moderates the internalization effects. Finally, we investigate the role of subsidiary experience by considering a new interaction: the subsidiary's age. Column 3 shows that affiliate age positively moderates the relationship between parent intangibles and subsidiary performance, which is consistent with Hypothesis 3. Our main results presented in tables 3-5 are robust when we use affiliate net profit as the dependent variable. We utilize F test to compare the restricted and unrestricted models and assess if addition of moderating effects improves the overall model fit (Wooldridge 2002). The F statistics in all model comparisons is significant, which suggests that each of the interaction variables significant improve the model fit.

------Insert Table 7 about here------

5. Discussion and Conclusion

In international management, two issues significantly affect global strategy. The first concerns the impact of accumulated intangible assets at the parent firm level on subsidiary profitability. This is a venerable "international theory" question which we test using new accounting data on MNC intangibles. The second and more important question is why different subsidiaries of the same firm, with access to the same intangible resources, exhibit different levels of profitability. This paper seeks an explanation based on how the differences between the parent and subsidiary nations, parent firm's ownership strategy and subsidiary experience affect the link between parent intangibles and the subsidiary's profitability

If *"…international management is management of distance,"* (Zaheer et al., 2012, p. 19; emphasis in original), then the measurement and operationalization of the various aspects of "distance" between countries by International Business scholars appears to need more work. Other than the use of cultural distance as a measure of country differences, the extant empirical work on this issue is relatively sparse. Much effort and talent over a quarter century went into measuring "cultural distance" since Kogut and Singh's (1988) catalyzing paper. Cultural distance is an inescapably important issue in foreign direct investment. However, over the years, contradictory and inconclusive empirical results culminated in a searing critique by Shenkar (2012), who agrees that cultural differences are a very important explanation, but that the methodological and data shortcomings of the cultural distance construct and its various operationalizations have produced only inconclusive results. We contribute to this literature by examining how "distance" or asymmetry as operationalized by variables other than cultural distance, such as economic, legal, linguistic and institutional differences between the nations of MNE parent and its affiliate (H1), as well as entry mode choice (H2) and subsidiary age (H3), moderate (augment or degrade) the expected positive effect of MNE intangible assets on foreign affiliate profitability.

Recently, more detailed data on multinational company parents and affiliates have become available, which enabled us to construct a firm-level panel of more than 2000 multinationals and over 5000 of their overseas affiliates, covering 45 home and host economies. Many of these parent-affiliate pairs are located in different continents and in very different country settings. The data include accounting measures for intangible assets (under International Accounting Standards IAS 38) with which we first check the fundamental postulate of internalization theory (e.g., Buckley & Casson, 1976 or Dunning, 1981) that foreign affiliate performance is positively related to the level of parent MNE intangible assets and the profitability of its foreign affiliates. We do this because newly-available financial measures for intangible assets of MNCs are a far better index than proxies such as marketing or R&D intensity, used in the past.

We build on this to ask a more contemporary question, one of current academic interest: "How does 'distance' between the nation of the parent and that of its subsidiary degrade or augment the link between MNE parent intangibles and affiliate profitability?" Even before the current state of ambiguity about the operationalization of the cultural variable measure, Johanson and Vahlne (1977) suggested that the measurement of distance should include variables besides those tracking cultural traits, to encompass "…*factors preventing the flow of information to and from the (foreign) market. Examples are differences in language, education, business practices, culture and industrial development.*" (parentheses added for clarification). Moreover, the above quote implied that economic, legal, institutional and linguistic differences would have a negative impact. Other things being equal, that distance would negatively affect foreign affiliate profitability. More recently, Ghemawat (2001), Brewer (2007), Berry, Guillen and Zhou (2010), Hakanson and Ambos (2010), and several others have proposed a multi-dimensional or multi-variable operationalization of the distance construct.

In our paper, we use five dimensions for the measurement of distance between MNE parent and its

affiliates, operationalized as the dyadic differences between the nation of the parent and nation of affiliate in terms of (i) Technological capacity, (ii) IP protection regime, (iii) Economic development level, (iv) Common language, and (v) Geographical distance. The results largely support our hypotheses. A greater technology capacity distance suggests a greater impediment and utilization of knowledge (Zaheer, Schomaker & Nachum, 2012; Ambos & Ambos, 2009) when the parent comes from a technologically less developed country. However, when the parents comes from a technologically more advanced nation, technological distance makes the parent intangibles more useful for enhancing subsidiary profitability. A gap in the level of IP enforcement, between parent and subsidiary countries, has three consequences. Weaker enforcement in the subsidiary country lowers returns on intangible assets (Zhao, 2006), dampens innovation (Kanwar & Evenson, 2003), and inhibits the transfer of latest technology (Maskus & Yang, 2004). Such "frictions" to use Shenkar's (2012) term, reduce performance at the affiliate level. On the other hand, a common language in the nations of MNE parent and affiliate makes transfer of intangibles easier, and consequently positively moderates the relationship between intangibles and affiliate profitability. These results reinforce the findings in Hakanson & Ambos (2010) and Brewer (2007) about the effect of a common language.

A significant contribution of this paper is to illustrate how the *directionality* of the difference between MNC home and subsidiary nation matters. Our findings, illustrated in Figure 1, show that the internalization effect (value of MNC intangibles) is weaker when an affiliate is located in a country with lower IPR, or economic development, but stronger when the affiliate is located in country with lower technological capabilities, relative to its home country. By the same token, internalization effects become stronger when an affiliate is located in countries with higher IPR or economic development, but weaker with higher technological capabilities. This adds nuances to the existing literature. For instance, Dow & Karunaratna (2006) suggest that liability of

foreignness increases with economic distance. But here we find that it increases even more when the subsidiary in in a lower per capita economy.

The effect of parent intangibles on performance in majority owned subsidiaries is bigger than in minority owned subsidiaries. This suggests that internal organizational embeddedness matters (Meyer, Mudambi & Narula, 2011; Song et al., 2011). A higher level of internal embeddedness (majority to full equity ownership) facilitates the transfer of parent MNC intangible assets and capabilities to the foreign operation. Equivalently, one can say that the willingness of MNCs to share their proprietary intangible assets is positively correlated to the level of their equity ownership in a foreign affiliate. In retrospect this may appear consistent with received wisdom, but until detailed affiliate profitability data were available for this study, this had not been empirically proven. In addition, we found that subsidiary age positively moderates the relationship between parent intangibles and subsidiary performance. MNC parent and subsidiary managers gain international experience through longer commitment and learning about the overseas market through local networking, resource commitments. Such experience helps in legitimacy improvements and input localization (Luo et al., 2002; Johanson and Vahlne 1977, 2009), and alleviates the problems of liability of foreignness (Mezias 2002).

Our study has some limitations. For instance, while we focus on transfer of intangibles from parent to subsidiaries, there may also be reverse transfer of knowledge from capacity-enhancing affiliates back to MNE parents. But this still occurs in only a decidedly small minority of all cases. However, this alternative model of the MNE is likely to grow more common in the future. Another incipient trend is that corporate knowledge is being increasingly codified. Tacit procedures that were embedded in the experience and routines of engineers or managers are now written down in documents, software, or expert systems, altering at the margin the tacit vs. explicit mix of proprietary corporate knowledge. Future studies could also use more refined measures of

intangible assets, should they become available in secondary databases.

Nevertheless, our study makes several important contributions. With recently available detailed accounting data on the profitability of a large number of MNC affiliates, we confirmed the venerable assumption of international business studies that firm-specific intangible assets contribute positively to subsidiary profitability. Our study then tackled another interesting contemporary research issue – the extent to which different 'distances' between parent and subsidiary nations degrade or augment subsidiary profitability, *ceteris paribus*. In our study, we directly address and remedy the critique of 'distance' studies, or as Shenkar (2012) put it, the "illusion of symmetry" or the fallacy that they are bi-directionally neutral. We hope this study helps to refine and add to the measurement of 'distance' and by applying it to a affiliate performance, it has contributed greater insights on factors that affect foreign subsidiary performance.

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Variable	Mean	Std. Dev.	Obs
Firm characteristics			
Parents			
Profit	922.13	2110.65	21,093
Capital	3038.25	6581.22	21,108
Intangibles	1738.62	3853.00	21,108
Employment	45032.97	66908.59	21,108
Turnover	9722.66	18037.70	21,095
Affiliates			
Return on assets	10.12	10.67	21,108
Capital	66.01	243.95	21,108
Intangibles	20.84	73.65	21,108
Employment	1348.70	3638.57	21,108
Turnover	353.95	743.23	21,108
Leverage	0.75	1.23	21,108
Firm age	29.09	26.63	21,108
Wage bill per worker	43564.15	23369.06	21,108
Majority owned	0.28	0.45	14,448
Survey Year	2002.46	2.57	21,108
Country variables			
GDP per capita, host country	26514.34	10418.19	21,108
GDP per capita, home country	33330.98	9024.60	21,108
Dyadic Distance variables			
IPR regimes	0.10	0.30	20,934
Technological capability (patents/population)	247.94	577.02	17,931
Economic Distance	6816.64	10937.00	21,108
Common language	0.20	0.40	21,091
Geographic	2828.38	3056.93	21,091

Notes: All monetary firm-level variables (apart from wage bill per worker) are in millions of Euros. Turnover, for parents (or affiliates) is their total sales. Capital, for parents (or affiliates) is measured as capital in total. Intangibles for parents (or affiliates) are accounting measures as per International Accounting Standards (IAS 38). is intangibles assets of multinational parents (affiliates). Employment is the number of employees in each case. Leverage, for affiliates is measured as the ratio of debt to equity. Firm age, for affiliates is measured as the actual duration of firms since the starting year of their business. Wage bill per worker, for affiliates is measured as wage bill per worker. IPR Regime distance is the difference between the parent and the affiliate country of the IPR index in Park (2008). Technology capability distance between the parent and affiliate country is measured by the difference in the resident patent applications per one million population:

$$(Patent_{HomeCountry}^{residents} / Population_{HomeCountry}) - (Patent_{HostCountry}^{residents} / Population_{HostCountry})$$

GDP per capita is in US dollars. Economic development distance is measured as the difference between the parent and affiliate countries' GDP per capita. Common language is a dummy equal to one if the parent and affiliate country have common official of primary language, otherwise it is zero. `Geographic distance' is great circle distance between capitals of the parent and affiliate country as per the CEPII dataset

Table 2: Correlation Table

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Intangible, parent	1												
2	Intangibles, affiliate	0.058***	1											
		(0.000)												
3	Leverage, affiliate	0.006	0.076***	1										
		(0.422)	(0.000)											
4	Firm age, affiliate	0.038***	0.015**	-0.004	1									
		(0.000)	(0.028)	(0.548)										
5	Wage, affiliate	0.087***	0.018**	0.064***	0.095***	1								
		(0.000)	(0.010)	(0.000)	(0.000)									
6	Capital, affiliate	0.046***	0.059***	0.061***	0.033***	0.100***	1							
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)								
7	GDP, host country	-0.025***	0.072***	0.067***	0.090***	0.444***	-0.012*	1						
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.072)							
8	GDP, home country	0.084***	0.009	0.030***	0.009	0.193***	-0.050***	0.374***	1					
		(0.000)	(0.177)	(0.000)	(0.219)	(0.000)	(0.000)	(0.000)						
9	Technology dist.	0.006	-0.023***	-0.053***	-0.055***	0.052***	-0.038***	-0.043***	0.047***	1				
		(0.455)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
10	IPR distance	0.071***	0.014**	-0.009	-0.079***	-0.227***	0.010	-0.286***	-0.014*	0.186***	1			
		(0.000)	(0.040)	(0.192)	(0.000)	(0.000)	(0.134)	(0.000)	(0.050)	(0.000)				
11	Economic dist.	0.093***	-0.061***	-0.039***	-0.078***	-0.264***	-0.029***	-0.644***	0.469***	0.079***	0.264***	1		
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
12	Common language	-0.017**	0.089***	0.046***	0.04***	0.035***	0.010	0.169***	0.139***	-0.153***	-0.084***	-0.049***	1	
		0.013	(0.000)	(0.000)	(0.000)	(0.000)	(0.144)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
13	Geographic dist.	0.087	0.036***	-0.011	-0.061***	0.033***	-0.054***	-0.045***	0.156***	0.431***	0.382***	0.171***	-0.167***	1
		(0.000)	(0.000)	(0.108)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Notes: See notes to Table 1 and data section for details of each variable. Values in parentheses are p values. Significance levels: *: 0.10; **: 0.05; ***: 0.01.

Table 3: Dependent variable: Return on Assets of multinational affiliates

	(1)	(2)	(3)	(4)	(5)
Intangible Assets, parents		0.321***	0.843**	0.906**	0.855**
		(0.088)	(0.416)	(0.423)	(0.422)
Intangible Assets, affiliates	0.371***	0.364***	0.310***	0.304***	0.311***
	(0.065)	(0.064)	(0.101)	(0.102)	(0.101)
Leverage, affiliates	-0.651***	-0.653***	-0.713***	-0.719***	-0.711***
	(0.071)	(0.071)	(0.154)	(0.154)	(0.154)
Firm age, affiliates	1.336***	1.309***	2.859**	3.103**	2.845**
	(0.483)	(0.480)	(1.227)	(1.230)	(1.226)
Wage bill per worker, affiliates	1.540***	1.543***	1.726***	1.546***	1.698***
	(0.393)	(0.393)	(0.559)	(0.561)	(0.559)
Capital, affiliates	-0.132	-0.150	-0.444	-0.418	-0.429
	(0.198)	(0.198)	(0.283)	(0.285)	(0.283)
GDP per capita, host country	19.600***	19.633***	28.161***	29.212***	28.080***
	(2.118)	(2.118)	(2.443)	(2.471)	(2.456)
GDP per capita, home country	1.115	0.758	-1.020	-1.106	-0.986
	(0.901)	(0.907)	(1.651)	(1.661)	(1.649)
First stages					
Intangibles per worker, parents (one lag)			0.514***	0.513***	0.513***
			(0.017)	(0.017)	(0.017)
Intangibles per worker, parents (two lags)			-0.107***	-0.109***	-0.104***
			(0.016)	(0.016)	(0.016)
No. observation	21,108	21,108	6,770	6,764	6,764
F statistics	65.994	62.701	40.227	39.985	39.808
R-squared	0.132	0.133	0.121	0.121	0.12
Under-identification test			839.539	821.905	816.222
P-value			0.000	0.000	0.000
Weak identification test			503.851	491.234	487.203
Over-identification test-Hansen			0.722	0.851	0.798
P-value			0.395	0.356	0.372

Notes: Dependent variable: return on assets. All columns include affiliate firm fixed effects and business cycle fixed effects. Column 4 has weights based on foreign direct investment outflows of parent country, and column 5 uses weights based on foreign direct investment inflows of affiliate country. Values in parentheses are robust standard errors. Significance levels: *: 0.10; **: 0.05; ***: 0.01.

Table 4: Descriptive statistics - quality of parent matches

Variable	Mean	Std. Dev.	Obs
Panel A: benchmark			
Intangible asset difference	-0.00759	1.371459	1,199
Employee difference	-0.01841	1.009657	1,199
Capital (per worker) difference	0.008898	0.998258	1,199
Profit (per worker) difference	-0.0031	1.069608	1,199
Sales difference	-0.01142	1.018195	1,199
Age difference	-0.00691	1.01976	1,197
Subsidiary difference	-0.01792	0.656169	1,199
Same sector	1	0	1,199
Same Country	1	0	1,199
Same year	0.332777	0.471404	1,199
Probability difference	-0.00061	0.028871	1,199
Panel B: matching also on parent intangibles			
Intangible asset difference	-0.07122	1.331916	1,203
Employee difference	-0.06587	1.013187	1,203
Capital (per worker) difference	-0.03236	1.006765	1,203
Profit (per worker) difference	0.007666	1.067135	1,203
Sales difference	-0.07444	1.050364	1,203
Age difference	-0.00599	1.030458	1,202
Subsidiary difference	-0.04491	0.703237	1,203
Same sector	1	0	1,203
Same Country	1	0	1,203
Same year	0.33749	0.47305	1,203
Probability difference	-0.00046	0.029266	1,203

Notes: The "difference" variables are measured in terms of the difference between the value of the variable for the original parent and the matched parent, over the mean of the two values. Difference in sales, profit per worker, employees, capital per worker, intangibles, firm age and subsidiary are denominated in thousands. The `same' variables (sector, country, year) are dummies equal to one if the variable takes the same value in the original and matched parents. Probability difference is the difference between the probabilities of being a parent of the original and matched counterpart.

Table 5: Falsification test: Internalisation of Resource based on matched parents pairs

	Benchmark		matching also on parent intangibles	
intangibles, 'matched parent'	-0.086	-0.095	-0.061	-0.056
	(0.112)	(0.113)	(0.115)	(0.116)
Intangible Assets, affiliates	0.513***	0.524***	0.541***	0.546***
	(0.095)	(0.094)	(0.100)	(0.100)
Leverage, affiliates	-0.837***	-0.854***	-0.652***	-0.649***
	(0.142)	(0.143)	(0.144)	(0.144)
Firm age, affiliates	2.930***	3.165***	2.063***	2.262***
	(0.672)	(0.673)	(0.762)	(0.763)
Wage bill per worker, affiliates	2.897***	2.991***	2.476***	2.588***
	(0.486)	(0.489)	(0.501)	(0.504)
Capital, affiliates	0.248	0.269	0.234	0.227
	(0.260)	(0.261)	(0.277)	(0.279)
GDP per capita, host country	16.612***	16.900***	24.653***	24.794***
	(1.557)	(1.567)	(2.127)	(2.136)
GDP per capita, home country	-12.124***	-12.773***	3.445	3.117
	(1.674)	(1.692)	(2.449)	(2.487)
No. parents	919	919	903	903
No. affiliates	2,361	2,361	2,306	2,306
Adjusted R-squared	0.139	0.142	0.151	0.152
No. observation	7031	7031	6909	6909
F statistics	94.334	96.737	45.225	45.593

Notes: Dependent variable: Return on Assets of multinational affiliate profits. Intangibles, 'matched parents' is intangibles of matched parents. All columns include affiliate firm fixed effects and business cycle fixed effects. Values in parentheses are robust standard errors. Significance levels: *: 0.10; **: 0.05; ***: 0.01.

Table 6: Effects of the "Distance" Variables on the Intangible Asset-Affiliate Profitability link

	(1)	(2)	(3)	(4)	(5)
Intangibles*IPR Dist.	-0.028***				
	(0.010)				
IPR distance	-0.041***				
	(0.015)				
Intangibles*Technology Dist.		0.047**			
		(0.020)			
Technology distance		-0.120**			
		(0.052)			
Intangibles*Economic Dist.			-0.026***		
			(0.006)		
Economic distance			-0.483***		
			(0.055)		
Intangibles*Com. Language				0.063**	
				(0.027)	
Common Language				0.097	
				(0.069)	
Intangibles*Geographic Dist.					-0.018*
					(0.010)
Geography distance					-0.043***
					(0.016)
Intangible Assets, parents	0.078***	0.125***	0.082***	0.019*	0.035***
	(0.018)	(0.020)	(0.018)	(0.011)	(0.011)
Intangible Assets, affiliates	0.091***	0.096***	0.089***	0.087***	0.088***
	(0.013)	(0.014)	(0.013)	(0.012)	(0.012)
Leverage, affiliates	-0.073***	-0.082***	-0.074***	-0.076***	-0.076***
	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)
Wage bill per worker, affiliates	0.095***	0.171***	0.094***	0.100***	0.100***
	(0.017)	(0.019)	(0.017)	(0.017)	(0.017)
Capital, affiliates	-0.015	0.031	-0.021	-0.021	-0.022
	(0.017)	(0.020)	(0.017)	(0.017)	(0.017)
GDP per capita, host country	1.017***	0.485***	0.605***	1.083***	1.080***
	(0.067)	(0.038)	(0.082)	(0.058)	(0.058)
GDP per capita, home country	0.022	-0.076***	0.129***	0.004	0.008
	(0.025)	(0.024)	(0.027)	(0.016)	(0.016)
No. observation	20,934	17,931	21,108	21,091	21,091
F statistics	108.414	197.811	121.656	115.336	115.522
Adjusted R-squared	0.131	0.136	0.138	0.104	0.104

Notes: Dependent variable: multinational affiliate return on assets. All variables (apart from common language) are standardized by subtracting the mean of each variable (across all non-missing observations) and then dividing by the standard deviation of the variable across all non-missing observations. Values in parentheses are robust standard errors. Significance levels: *: 0.10; **: 0.05; ***: 0.01.

Table 7: Internalization effect – Further test

|	Embeddedness		Experience
	Major Owned	Minority Owned	Firm Age
Intangible, parents * Firm age			0.093***
			(0.016)
Intangible Assets, parents	0.764***	0.185**	0.227***
	(0.189)	(0.092)	(0.085)
Intangible Assets, affiliates	0.349***	0.564***	0.416***
	(0.109)	(0.072)	(0.050)
Leverage, affiliates	-0.651***	-0.667***	-0.672***
	(0.147)	(0.103)	(0.070)
Firm age, affiliates	1.131	0.960*	0.430
	(0.783)	(0.522)	(0.456)
Wage bill per worker, affiliates	1.602***	1.096***	2.183***
	(0.602)	(0.363)	(0.268)
Capital, affiliates	-0.448	-0.501***	-0.042
	(0.318)	(0.191)	(0.141)
GDP per capita, host country	13.975***	19.065***	8.527***
	(2.555)	(1.442)	(0.652)
GDP per capita, home country	4.126**	-1.561	-2.683***
	(1.883)	(1.360)	(0.749)
No. observation	4,090	10,358	21,108
F statistics	22.085	74.538	229.285
Adjusted R-squared	0.117	0.161	0.12

Notes: Dependent variable: multinational affiliate return on assets. All columns control for affiliate firm fixed effect and business cycle effect. Column 1 includes majority owned affiliates only. Column 2 includes minority owned affiliates only. Values in parentheses are robust standard errors. Significance levels: *: 0.10; **: 0.05; ***: 0.01.

Appendix A -- **Table A**: Number of firms and key variables per economy

Economy	N	ROA	Leverage	Age	Wage	Intangibles	N	Intangibles
				Parent				Affiliate
Australia	14	9.88	0.55	25.57	46.3	134	18	294.53
Austria	62	9.52	1.26	35.72	54.62	21.46	29	93.01
Belgium	278	8.88	0.94	33.65	59.49	14.21	126	418.29
Brazil	0						1	1.68
Bulgaria	35	11.4	0.61	25.31	5.76	4.42	0	
Canada	0						3	128.81
China	9	8.99	0.18	11.25	7.01	21.14	1	25.09
Czech Republic	171	11.91	0.49	12.37	13.71	1.6	1	233
Denmark	129	10.26	0.82	26.72	47.97	26.54	65	281.54
Estonia	55	14.99	0.78	11.17	9.62	0.8	1	0.13
Finland	131	13.48	0.63	25.5	41.67	6.88	69	257.48
France	1,096	9.43	0.5	30	52	12.18	250	1203.23
Germany	442	11.99	1.65	41.7	59.99	24.26	199	1010.4
Greece	2	11.02	0.55	39.67	37.51	26.08	15	291.61
Hong Kong, China	6	5.14	0.94	72.36	14.47	15.61	3	108.01
Hungary	27	20.56	0.57	14.88	19.25	7.77	4	49.15
Iceland	0						5	70.77
Indonesia	2	30.67	0.03	30.67	5.87	0.1	0	
Ireland	5	12.79	1.49	21.89	43	164.39	21	299.08
Italy	598	9.37	0.77	26.2	43.95	11.11	127	636.63
Japan	17	11.89	0.61	27.62	30.97	73.08	127	284.43
Latvia	3	9.35	0.5	11.33	9.04	0.13	0	
Liechtenstein	0						1	33.76
Lithuania	1	5.39	0.47	11	7.6	5.3	2	2.32
Luxembourg	10	9.29	0.59	47.52	34.49	3.28	14	701.25
Malaysia	11	16.45	0.37	31.74	11.99	56.52	8	28.74
Mexico	0						1	2395.33
The Netherlands	151	9.62	1.02	32.39	53.68	50.09	219	455.67
Norway	107	12.52	0.76	12.67	57.13	11.64	30	291.68
Philippines	3	6.2	0.29	48	9.13	9.1	0	
Poland	151	12.82	0.47	24.92	11.24	14	6	29.51
Portugal	109	9.56	0.59	32.1	25.19	42.34	11	229.01
Romania	109	17.46	0.56	7.82	7.39	1.65	3	1
Russia	1	19.61	0.11	15	9.25	2.31	5	119.54
Singapore	17	11.54	0.27	23.1	18.42	11.53	13	520.9
Slovenia	1	10.98	0	131	19.42	0.06	1	0.01
South Africa	5	12.57	0.58	46.9	13.34	169.49	5	83.03
South Korea	31	11.5	0.35	15.31	17.85	5.28	2	1.19
Spain	297	9.79	0.57	34.61	41.56	18.7	89	322.47
Sweden	168	9.16	1.07	38.42	29.48	25.45	163	231.34
Switzerland	21	7.33	1.08	64.7	44.1	55.47	70	839.2
Thailand	23	9.72	0.41	31.07	6.11	21.17	1	7.92
Turkey	3	13.43	0.15	29.33	18.41	8	3	163.73
UK	709	9.25	0.76	27.77	38.43	50.15	168	899.19
US	0						421	1494.43

Notes: The above table contains 2,301 multinational parents and 5,010 overseas affiliates. Intangibles variables are in millions of Euros, and wage bill per worker variable is in thousands of Euros.

Figure 1: Impact of MNC Intangible Assets on Subsidiary Profitability (ROA) Depending on Whether the Subsidiary is in a Superior or Inferior Country Location Compared to the Host FDI Investor Nation
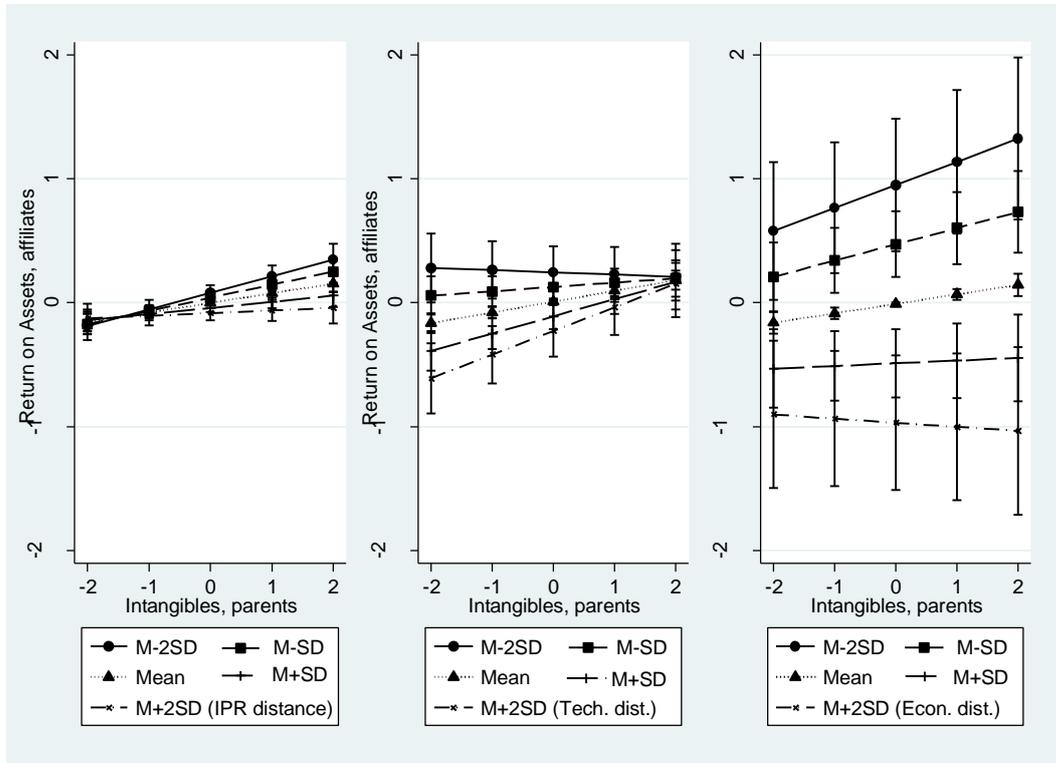
Notes: In order to compare the relative effects the distance variables, we standardize them by subtracting the mean of each variable (across all non-missing observations) and then dividing by the standard deviation of the variable across all non-missing observations.