

# The Relation between Intrafirm Distances and Information Opacity: Evidence from Stock Market Liquidity

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**Abstract** We examine the relation between both intrafirm geographic and cultural distance (i.e., the distance between a firm's headquarters location and its investment properties) on the underlying firm's stock market liquidity. More specifically, using a sample of 166 publicly traded REITs and listed property companies across the Asia-Pacific region over the 2000–2013 period, we find strong evidence that firms with increased levels of intrafirm (geographic) distance exhibit wider bid-ask spreads, while firms with greater intrafirm cultural dispersion enjoy narrower spreads. We conclude that intrafirm distance is fundamentally related to a firm's financial market (informational) opacity and offers both costs and benefits to market participants.

**Keywords** liquidity, transparency, bid-ask spreads, geography, cultural distance

Recent empirical evidence suggests both the level of intrafirm physical distance (i.e., the geographic footprint of a firm's operations) and cultural distance (i.e., dissimilarities between the regulatory, operating, and cultural environments across the countries in which the firm operates) exert significant impacts on a firm's cost of capital. While these findings identify important new facets of international operations, much work remains in quantifying the economic impact of increased internationalization on overall firm outcomes. Towards that end, this study represents an important step toward a better understanding of the full economic implications of intrafirm physical and cultural distances.

Specifically, we explore how intrafirm physical and cultural distances affect the stock market liquidity of real estate investment trusts (REITs) and non-REIT listed property companies operating across the Asia-Pacific region. We focus on the Asia-Pacific listed property markets for two primary reasons. First, publicly traded real estate firms tend to invest in easily identifiable tangible assets whose economic viability is highly dependent upon local economic conditions. As such, we can identify each sample firm's geographic dispersion, as well as the various cultural and regulatory environments in which the firm operates. Second, unlike their U.S.-based counterparts, listed property companies throughout the Asia-Pacific region tend to engage in a significant amount of cross-border investing and real property development. Such multinational exposure provides a compelling natural laboratory in which to examine issues related to international operations.

Conceptually, any firm considering investing in a property that is physically, or culturally, distant must weigh the potential benefits and costs associated with increasing its scope of operations. All else equal, increasing the firm's geographic footprint, and thereby diversifying the firm's holdings across multiple economic centers, allows the firm to reduce its exposure to the economic fortunes of any one area. For example, a firm heavily invested in New York City may decide to diversify by investing in Seattle, thereby reducing its exposure to the idiosyncratic fluctuations and vagaries of the New York market. Unfortunately, however, this decision also potentially makes the firm more informationally opaque, as outsiders would need to be familiar with both the New York and Seattle markets to properly evaluate the firm's operations and underlying value. Similarly, these potential benefits and costs are present when the firm is considering investing in a marketplace (i.e., country) that is culturally distant. Differing regulatory regimes and operational standards, as well as commonly accepted practices and customs that govern both interpersonal relations and business activities, add complexity and nuance to the analysis of cross-border activities and the valuation of firms engaged in those behaviors. To the extent that countries behave independently and country-specific risk exposure is systematic in nature, international operations may allow a firm to diversify away the idiosyncratic risk associated with any individual country, and thus reduce the valuation uncertainty of large international organizations. On the other hand, should these valuation difficulties represent non-diversifiable sources of risk, the underlying nature of information externalities accruing to firms with broad operational platforms may well enhance the valuation difficulties of these more disperse firms.

More formally, in this paper we posit that geographic and cultural distances create both information barriers (which enhance firm valuation difficulties) and diversification benefits (which mitigate such concerns). We further assert that the nature of physical and cultural distances imply that the associated costs and benefits differ between the metrics. As such, a local market presence, and the resultant access to property-specific private information and/or local soft information pertaining to local market trends, challenges, and opportunities is

more significant in overcoming geographic, as opposed to cultural, barriers to information diffusion.<sup>1</sup> Conversely, the diversification benefits of disperse operations would appear to accrue to firms along both geographic and cultural dimensions. As such, the net valuation benefits of (or costs to) disperse operations should be more (less) pronounced for cultural, rather than geographic, distances.

We find significant evidence that real estate firms with a larger geographic footprint exhibit wider bid-ask spreads than comparable firms investing in more geographically proximate properties. Conversely, we find that firms with greater cultural dispersion are characterized by narrower bid-ask spreads than firms investing in more culturally homogenous locations. Thus, when investing in physically distant properties, the costs associated with increasing the informational opacity surrounding the firm appear to dominate the potential diversification benefits, while for culturally distant properties the diversification benefits appear to dominate the costs of increased informational opacity. These results are contrary to those presented in the literature, which finds the market responds similarly to physical and cultural distances. Our results indicate the market treats intrafirm physical and cultural distances as separate and distinct constructs, and further, demonstrate the costs and benefits associated with international operations are not as simple as the literature suggests, and highlights the need for additional work in this area.

The remainder of this paper is organized as follows. We review the literature on geographic proximity, cultural distance, and the linkages between investor perceptions, informational transparency, and bid-ask spreads. We next outline the data and methodological approaches we employ to test our hypotheses. We then present the primary results of our empirical analyses. The paper closes with a discussion of our key findings.

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## Literature Review

### Geographic Proximity

Beginning with Coval and Moskowitz (1999, 2001), the literature documents an economic relation between geographic proximity and investment returns. Specifically, Coval and Moskowitz find that investors earn significantly higher returns on investments in “local” firms. Similarly, Ivkovic and Weisbrenner (2005) find that retail investors tend to overweight local firms in their portfolio, and further, these local firm investments generate superior returns. Building upon these foundations, both Malloy (2005) and Bae, Stulz, and Tan (2008) present evidence that local analysts provide more accurate recommendations and forecasts, while Berry and Gamble (2013) document a relation between local retail investors’ trading and the market’s reaction to earnings announcements. Finally, Cashman,

Harrison, Seiler, and Sheng (2019) present evidence that firms with a larger geographic footprint face higher capital acquisition costs. Together, these findings suggest local investors may well possess an informational advantage over their more distant counterparts.<sup>2</sup>

### Cultural Distance

While geographic distance is tangible and easily understood, cultural distance is a more nebulous concept. According to Hofstede (1980), culture is “the collective mental programming of the human mind which distinguishes one group of people from another.” Fundamentally, one can think of culture as defining “the rules of the game” individuals and institutions must follow within a country. As culture influences how individuals treat one another, it is not completely unexpected to find culture materially influences the workings of a country’s economy.<sup>3</sup> Notably, North (1990) goes so far as to suggest culture may play a larger role in influencing interactions than either the legal system or other more formal institutions.

Given the impact culture exerts on the economy, it is not surprising that cultural distance (which measures how dissimilar two cultures are) influences the performance of operations that span differing cultures. For example, both Beugelsdijk and Frijns (2010) and Anderson, Fedenia, Hirschey, and Skiba (2011) find investors are more confident evaluating international investments when the cultural distance between the investor’s country and the investment’s country is lower, while Beracha, Fedenia, and Skiba (2014) find institutional trading frequency is negatively related to cultural distance. Moreover, both Murad, Lin, and Pantzalis (2007) and Cai and Zhu (2015) find investors often penalize firms for investing in countries that are culturally distant with lower valuations.

Interestingly, while the bulk of the literature suggests that cultural distance hinders investment analysis and outcomes, an array of studies (e.g., Mueller, Boney, and Mueller, 2008; Chakrabarti, Gupta-Mukherjee, and Jayaraman, 2009; Brounen, Kok, and Ling, 2012; Zhou, 2012; Zhou and Anderson, 2012; Nahata, Hazarika, and Tandon, 2014; Liow, Zhou, and Ye, 2015) provide evidence suggesting cross-market differences may well enhance the efficiency of investment outcomes. In general, these authors argue that as cultural distance increases, investors are required to perform more exhaustive ex ante screening of potential investments. This enhanced scrutiny, while potentially costly and time consuming to complete, results in superior ex post outcomes.

Importantly, while much of the literature focuses on the distance *between* market participants, we examine the effects of *intrafirm* distances (i.e., the physical distance and cultural differences covered by firm operations) on bid-ask spreads. Following Cashman, Harrison, Seiler, and Sheng (2019), who contend greater intrafirm distance increases informational opacity and drives up funding costs, we explore whether such distances influence a firm’s financial market transparency and liquidity.

## Data and Methodology

### Data

We begin by collecting data on all Asia-Pacific REITs and listed property companies traded on the Australian, Bombay, Hong Kong, Singapore, and Tokyo stock exchanges from 2000 to 2013, which are followed by S&P Global Market Intelligence (formerly SNL Financial). We next match each available firm to Bloomberg, which we utilize to obtain end of day bid- and ask-price quotations.<sup>4</sup> We rely on firm name, ticker, and exchange trading venue to match observations across databases. Observations we are unable to match across databases are removed from the sample.

Our final sample contains 166 real estate firms, headquartered in six countries, investing in 10,089 properties, which are spread across 47 countries. Exhibit 1 provides details on the headquarters locations of our sample firms, as well as the locations of their investment properties. While roughly 60% of our firms are headquartered in Hong Kong and Singapore, less than one-fifth of their investment properties are located within these two countries. Additionally, over 15% of the investment properties are located outside of the six countries in which sample firms are headquartered. As such, these findings once again demonstrate the proclivity of Asia-Pacific real estate firms to participate in international investment activities.

### Measures of Financial Market Opacity

*Bid-Ask Spread.* Operationally, we rely on traditional market microstructure metrics to measure financial market liquidity. The first of these measures is the *Relative Spread*<sub>*i,t*</sub>, which is defined as the monthly average difference between the closing ask and bid prices, divided by the average midpoint of the closing bid and ask prices.

$$Spread_{i,t} = E_t(DailyAsk_i - DailyBid_i). \quad (1)$$

$$Midpoint_{i,t} = \frac{E_t(DailyAsk_i + DailyBid_i)}{2}. \quad (2)$$

$$Relative\ Spread_{i,t} = E_t\left(\frac{Spread_i}{Midpoint_i}\right). \quad (3)$$

To ensure both comparability with the REIT literature and the accuracy of our data, we follow Danielsen, Harrison, Van Ness, and Warr (2009) and impose a number of data restrictions. Specifically, we omit trades and quotes that (1) have

**Exhibit 1** | Geographic Distribution of Sample Companies and Properties

Headquarters Country	# of Real Estate Firms	% of Total Firms	# of Properties	% of Total Properties
Australia	23	13.86%	1,941	19.24%
China	7	4.22%	1,510	14.97%
Hong Kong	50	30.12%	1,174	11.64%
India	8	4.82%	162	1.61%
Japan	29	17.47%	2,760	27.36%
Singapore	49	29.52%	801	7.94%
Other	0	0.00%	1,741	17.26%
Total	166	100%	10,089	100%

Note: This table provides a breakdown of the headquarters locations of the real estate firms in our sample, as well as the geographic location distribution of all properties owned by sample firms.

a bid or ask price less than or equal to zero; (2) report a price or volume of zero; (3) report a negative bid-ask spread; (4) report a relative spread of more than 10%; (5) report a raw spread larger than U.S. \$8 per share or less than U.S. \$0.001 per share; and/or (6) report transactions prices, bid-quotes, or ask-quotes exhibiting greater than a 10% deviation from their previously observed value. This identification strategy results in 16,623 monthly observations.

*Amihud Illiquidity Ratio (Amihud).* Our second measure of financial market liquidity is the Amihud (2002) illiquidity ratio, which is defined as the ratio of the absolute value of the daily return to the total daily dollar volume. Higher (lower) Amihud values indicate lower (higher) liquidity. We measure each firm's Amihud ratio daily, and then average the values across each month to determine a firm's monthly Amihud value. Mathematically,

$$Amihud_{i,t} = E_t \left( \frac{|DailyReturn_i|}{DailyVolume_i \times StockPrice_i} \right), \quad (4)$$

where  $Amihud_{i,t}$  is the illiquidity ratio for firm  $i$  in month  $t$ . Since the raw illiquidity ratio is highly skewed, we use the natural log of this ratio throughout our analyses.

*Idiosyncratic Volatility.* Our third measure of financial market liquidity is idiosyncratic volatility (IV).<sup>5</sup> Following Chaudhry, Maheshwari, and Webb (2004), we define this measure as the standard deviation of the residual from an adjusted

CAPM model. To account for the fact that firms in our sample trade on different stock exchanges, we utilize an exchange-based IV where the market return is based on the real estate returns for a given exchange. Operationally, this IV measure is estimated using daily returns over the past month. Mathematically, this adjusted CAPM model can be expressed as:

$$r_{i,d} - r_{f,d} = \alpha_i + \beta_i r_{e,m,d} + \varepsilon_{r,d}, \tag{5}$$

where  $r_{i,d}$  is the daily return of individual real estate stock  $i$  on day  $d$ ,  $r_{f,d}$  is the risk-free rate, and  $r_{e,m,d}$  is the aggregate real estate market return on day  $d$  for a given exchange  $e$ .<sup>6</sup>

### Distance Metrics

*Physical Geography.* Following the literature, we measure intrafirm geographic distance as the average distance between the firm’s headquarters and its investment properties.<sup>7</sup> Specifically, using the S&P Global Market Intelligence property database, we identify the address of each sample firm’s headquarters and investment property locations. We next translate these addresses into latitude and longitude coordinates, which are then used to calculate the Haversine distance between the firm’s headquarters and each investment property. This procedure is repeated each month to account for property acquisitions, dispositions, and/or development completions.<sup>8</sup> Specifically,

$$\begin{aligned} Avg\_distance_{i,t} = & \frac{1}{m} \sum_p^m \{ 3963.1miles \times \cos^{-1} [ \sin(lat\_P_{i,t,p}) \\ & \times \sin(lat\_H_{i,t}) + \cos(lat\_P_{i,t,p}) \times \cos(lat\_H_{i,t}) \\ & \times \cos(long\_P_{i,t,p} - long\_H_{i,t}) ] \}, \tag{6} \end{aligned}$$

where  $m$  denotes the total number of investment property interests held by firm  $i$  in month  $t$ ;  $lat\_P_{i,t,p}$  denotes the latitude of property  $p$ ’s location for firm  $i$  in month  $t$ ;  $lat\_H_{i,t}$  denotes the latitude of the headquarters location of firm  $i$  in month  $t$ ;  $long\_P_{i,t,p}$  denotes the longitude of property  $p$ ’s location for firm  $i$  in month  $t$ ; and  $long\_H_{i,t}$  denotes the longitude of the headquarters location of firm  $i$  in month  $t$ .

*Cultural Distance Proxies.* To measure cultural distance, we rely on two benchmarks pioneered and commonly used in the social psychology literature, namely Hofstede scores and Global Leadership and Organizational Behavior

Effectiveness (GLOBE) Indices (e.g., Hofstede, 1980, 2001; Franke, Hofstede, and Bond, 1991; House et al., 2004; Minkov, 2007; Anderson, Fedenia, Hirschey, and Skiba, 2011).<sup>9</sup> Hofstede scores examine a country's culture along six dimensions, which are designed to broadly capture a nation's attitude towards: (1) power distance; (2) individualism versus collectivism; (3) masculinity versus femininity; (4) uncertainty avoidance; (5) long-term versus short-term orientation; and (6) indulgence versus restraint.<sup>10</sup> Following the social psychology literature, we combine these six Hofstede characteristics to create two separate indices. The first, the Hofstede 4 Factor Index, follows Kogut and Singh (1988), and relies on the four original dimensions: (1) power distance; (2) individualism versus collectivism; (3) masculinity versus femininity; and (4) uncertainty avoidance. Following Franke, Hofstede, and Bond (1991) and Minkov (2007), we also employ the Hofstede 6 Factor Index, which utilizes all six currently available Hofstede characteristics.

Given the difficulty in precisely measuring and quantifying elements of national culture, as an alternative proxy we also employ the GLOBE indices. First used by House et al. (2004), GLOBE Indices measure societal culture along nine dimensions: (1) performance orientation; (2) uncertainty avoidance; (3) in-group collectivism; (4) power distance; (5) gender egalitarianism; (6) humane orientation; (7) institutional collectivism; (8) future orientation; and (9) assertiveness. As with our aforementioned Hofstede values, we use the individual GLOBE scores to create two broad metrics. First, the GLOBE 9 Factor Index is comprised of all nine characteristics. The second, and more parsimonious, GLOBE 4 Factor Index was proposed by Anderson, Fedenia, Hirschey, and Skiba (2011) and is comprised of only factors (2) uncertainty avoidance; (3) in-group collectivism; (8) future orientation; and (9) assertiveness.<sup>11</sup>

Operationally, in estimating intrafirm cultural distance, we first calculate the percentage of each firm's investment properties located in each country (e.g., Cashman, Harrison, and Sheng, 2015; Cashman, Harrison, and Seiler (2014, 2016); Cashman, Harrison, Seiler, and Sheng, 2019). Next, we multiply these portfolio weights by the absolute value of the difference in our cultural index scores between the country where the firm is headquartered, and the country where each property is located. Specifically:

$$\text{Intrafirm Cultural Distance}_{i,t,p} = \sum_c \left( \frac{NIP_{i,t,c}}{TNIP_{i,t}} \times CD_{i,t,c,d} \right), \quad (7)$$

where  $NIP_{i,t,c}$  denotes the total number of firm  $i$ 's investment properties located in country  $c$ , in month  $t$ ;  $TNIP_{i,t}$  denotes the total number of investment properties held by firm  $i$  in month  $t$ ; and  $CD_{i,t,c,d}$  denotes the level of cultural distance



between firm  $i$ 's headquarters country and properties located in country  $c$  in month  $t$ , along cultural difference dimension  $d$ .

### Standard Control Variables

To effectively isolate the effects of intrafirm distance on financial market liquidity, it is essential to control for any additional factors that may confound this relation. For example, the literature presents strong and compelling evidence that political risk exposure materially influences a firm's informational opacity. As such, we rely on four distinct political risk measures employed in the recent real estate literature. Our political risk controls include: (1) a Disclosure Index; (2) an Operations Risk Index (ORI); (3) a Remittance and Repatriation of Capital (R-Factor) Index; and (4) a Political Rights Index (PRI). Specifically, the World Bank provides a Disclosure Index, which measures the quality and quantity of ownership and financial information firms are required to provide market participants. Business Risk Services provides both an Operations Risk Index (ORI) and the Remittance and Repatriation of Capital (R-Factor) Index. ORI quantifies the pro-business level of the current political and regulatory environment, while the R-Factor measures the difficulty associated with repatriating money out of a country. Our last political risk measure, the Political Rights Index (PRI), is provided by Freedom of the World. This metric is designed to capture the overall efficiency and functionality of the government. All of our political risk controls are measured on a scale from zero to one. We note that higher values on the Disclosure Index and PRI indicate higher risk, while higher values for ORI and R-Factor indicate less risk.<sup>12</sup> Following the literature, we calculate a firm's political risk exposure as the weighted average of these country scores. Mathematically:

$$\begin{aligned}
 & \textit{Political Risk Measure}_{i,t} \\
 &= \sum_c \left( \frac{NIP_{i,t,c}}{TNIP_{i,t}} \times \textit{Country Level Risk Metric}_{t,c} \right), \quad (8)
 \end{aligned}$$

where  $NIP_{i,t,c}$  denotes the total number of firm  $i$ 's investment properties located in country  $c$  in month  $t$ ;  $TNIP_{i,t}$  denotes the total number of investment properties held by firm  $i$  in month  $t$ ; and  $\textit{Country Level Risk Metric}_{t,c}$  refers to one of the three political risk indices outlined above: the ORI, R-Factor, and the PRI.

In addition to these political risk metrics, we also control for an array of firm-specific characteristics and attributes.<sup>13</sup> First, we control for a number of trading environment metrics including short sale constraints, institutional ownership, motivated institutional ownership, the number of institutions, trading volume, volatility, and analyst coverage.<sup>14</sup> Similarly, to ensure our results are not driven by systematic differences in firm characteristics, we also control for firm size

(market capitalization), growth opportunities (market-to-book value of equity ratio), debt utilization (leverage), investment property holdings (# of properties and their geographic distribution), participation in real property development activities, the accounting principles that govern firm-level corporate financial disclosures (GAAP vs. IFRS), the foundational legal tenets (Common Law vs. Civil Law) that govern the firm's operations, as well as the presence of founder CEO.<sup>15</sup> Finally, we also control for characteristics of the firm's investment property portfolio: the number of countries in which the firm invests, whether the firm invests exclusively within a single country, a concentration ratio indicating the percentage of the firm's investment property portfolio located in the country with the most properties, the average exchange rate between the firm's headquarters country and the countries in which it invests, the volatility of the aforementioned exchange rates, and an indicator variable identifying when the firm invests in a new country for the first time.<sup>16</sup>

## Methodology

We first present descriptive statistics and univariate comparisons to provide the groundwork for our multivariate analyses. Throughout the multivariate portion of our analyses, our regression specifications employ the following general form:

$$\begin{aligned}
 \text{Liquidity}_{i,t} = & \alpha_0 + \beta_1 \text{Average Physical Distance}_{i,t} \\
 & + \beta_2 \text{Culture Distance Measure}_{i,t} \\
 & + \beta_{3-6} \text{Political Risk Measures}_{i,t} \\
 & + \beta_{7-12} \text{Trading Environment Metrics}_{i,t} \\
 & + \beta_{13-19} \text{Firm Specific Characteristics}_{i,t} \\
 & + \beta_{20-24} \text{International Portfolio Characteristics}_{i,t} \\
 & + \text{Fixed Effects} + \varepsilon_{i,t}.
 \end{aligned} \tag{9}$$

A significant, negative coefficient on  $\beta_1(\beta_2)$  would be consistent with a firm characterized by greater intrafirm physical (cultural) distance benefiting from diversifying their revenue streams across different economic centers, and thereby reducing valuation uncertainty. Conversely, a significant positive coefficient on  $\beta_1(\beta_2)$  would be consistent with a firm's intrafirm physical (cultural) distance creating information barriers, thereby increasing informational opacity, valuation difficulties, and reduced financial market liquidity for these firms.

## Empirical Results

### *Descriptive Statistics*

Exhibit 2 presents the descriptive statistics. The average bid-ask spread is slightly under \$0.31, corresponding to a relative spread of approximately 1.1%. Each of these results appears to be economically reasonable, and in line with both the literature and ex ante expectations. While the raw values of Amihud illiquidity and idiosyncratic volatility are largely irrelevant, they are provided for both completeness and to illustrate the variation of these metrics. With respect to intrafirm physical distance, we find that sample REITs tend to invest across a relatively large geographic area. Specifically, the average distance between a company's headquarters and its investment properties is nearly 1,000 miles. The potential for vast dispersion is perhaps best exemplified by Federation Centres, whose average physical distance between its Australian headquarters and its 458 investment properties was over 9,000 miles as of October 2007.<sup>17</sup> Turning to cultural distance, as with our Amihud and IV metrics, we are less concerned with the absolute level than with the relative levels. Fortunately, the results in Exhibit 2 show considerable variation across all four measures of sample firm cultural distance.<sup>18</sup>

Similarly, we are relatively unconcerned with the absolute levels of the political risk metrics, and again note considerable variation across these measures. With respect to our trading environment attributes, we observe wide disparities in transaction volumes across sample firms, ranging from the very thinly traded shares of India-based Lancor Holdings Limited to the high volume exhibited by China's Evergrande Real Estate Group Limited. Further, we find that over 87% of sample firms have analyst coverage, and approximately two-thirds are traded on exchanges allowing short selling.<sup>19</sup> Interestingly, institutional ownership averages less than 20% of shares outstanding, which is substantially lower than the 48.5% reported for U.S.-based REITs reported by Hardin, Nagel, Roskelley, and Seagraves (2017). Moreover, we find the average level (0.2%) of motivated institutional ownership is also significantly lower among Asia-Pacific real estate firms than the 9.4% reported by Hardin, Nagel, Roskelley, and Seagraves (2017) for U.S. REITs.

With respect to firm-specific characteristics, we find the average firm in our sample has a market capitalization of just over \$3 billion, which is slightly larger than publicly traded U.S. real estate firms. This differential is driven by the presence of a handful of very large Asian firms. For example, Sun Hung Kai Properties Limited is the largest firm in our sample, with a market capitalization of over \$52 billion (as of January 2008). The median market capitalization of \$1 billion is in line with figures reported and observed in the U.S. during this period. Moreover, the average market-to-book ratio (1.2) and debt ratio (41.5%) across our sample

**Exhibit 2** | Descriptive Statistics

Dependent Variables	Mean	Median	Std. Dev.	Min.	Max.
<b>Panel A: Liquidity metrics</b>					
Raw Spread	0.308	0.010	1.186	0.001	7.993
Relative Spread	0.011	0.007	0.010	0.001	0.088
Amihud	2.601	2.308	2.580	-3.037	16.34
IV	0.020	0.017	0.013	0.000	0.261
<b>Panel B: Distance metrics</b>					
Geographic Distance					
Physical Distance (in 1,000 miles)	0.976	0.421	1.418	0	9.110
Cultural Distance Indices					
Hofstede 4 Factor Index	0.347	0.058	0.756	0	5.288
Hofstede 6 Factor Index	0.336	0.076	0.619	0	3.590
GLOBE 4 Factor Index	0.991	0.281	1.412	0	5.932
GLOBE 9 Factor Index	0.984	0.313	1.336	0	6.631
<b>Panel C: Control variables</b>					
Political Risk					
Disclosure	0.815	0.808	0.105	0.50	1
Operations Risk (ORI)	0.617	0.634	0.069	0.38	0.757
R-Factor	0.696	0.725	0.161	0.381	0.97
Political Rights (PRI)	0.554	0.560	0.115	0.350	0.76
Trading Environment Metrics					
Short Sales Allowed	0.669	1	0.471	0	1
Motivated IO (%)	0.002	0	0.114	0	8.333
Inst. Ownership	0.190	0.145	0.175	0	0.755
Number of Institutions	66.641	35	74.087	0	408
Trading Volume (in ,000s)	3660.95	1310.40	7102.01	0.062	175137.54
Std. Dev. of Quote Midpoint	0.039	0.029	0.035	0	0.643
Analyst Coverage (yes=1)	0.871	1	0.336	0	1
Firm-Specific Characteristics					
Market Cap (\$ Millions)	3240.67	1040.61	5574.41	2.918	52644.31
MtoB	1.174	0.921	1.140	0.120	8.552
Leverage	0.710	0.547	0.665	0	4.235
# of Properties	49.864	30	53.823	1	458
Development	0.522	1	0.500	0	1
UK Law	0.728	0.917	0.346	0	1
GAAP	0.283	0	0.450	0	1
Founder CEO	0.289	0	0.453	0	1

**Exhibit 2** | (continued)

Descriptive Statistics

Dependent Variables	Mean	Median	Std. Dev.	Min.	Max.
# of Countries	2.952	2	3.191	1	18
Single Country	0.447	0	0.497	0	1
% Properties in Primary Country	0.824	0.952	0.229	0.125	1.000
Exchange Rate	996.8	31.97	8,570	1.000	220765
Exchange Rate Volatility	0.004	0	0.050	-0.296	1
New Investment Country	0.048	0	0.215	0	1

*Notes:* This table provides basic descriptive statistics (sample size, mean, median, standard deviation, minimum, and maximum) for the variables. Appendix A provides a detailed description for each variable. There are 16,623 observations.

firms are quite comparable to those observed within the U.S. REIT market.<sup>20</sup> While firms exhibit considerable variation in the number of properties they hold, the average firm has an ownership stake in approximately 50 different properties. Consistent with the findings of Chiang, DeWitt, Folkman, David, and Jia (2018), who find 31% of firms in their sample of U.S. based equity REITs are founder lead, we find that 28.9% of firms in our sample have a founder CEO.

Our sample also includes regulatory characteristics based exclusively on the firm’s headquarters location. We choose to measure these attributes based on the location of the firm’s headquarters, as a firm is most likely to be impacted by the legal, reporting, and accounting environment of the jurisdiction in which they are headquartered. Examining these attributes, we find that roughly 73% of firms operate under legal systems based on British Common Law (as opposed to French Civil Law), while only 28.3% reports accounting disclosures according to Generally Accepted Accounting Principles (GAAP) as opposed to International Financial Reporting Standards (IFRS). Once again, both of these numbers are entirely consistent with figures reported in the literature.

Examining investment portfolios, the typical listed Asia-Pacific real estate firm (at least partially) owns properties in three countries. Although nearly 45% of firms limit their investments to a single country, roughly 20% invest in five or more countries. In general, while these numbers reflect broad, cross-border investment proclivities, our concentration ratio metric reveals that over 80% of a firm’s properties are typically located within a single country.<sup>21</sup>

Univariate Comparisons

Exhibit 3 presents the results of our univariate analysis. For each month, we split firms into high and low groupings based on the median values of intrafirm

**Exhibit 3** | Univariate Comparisons of Relative Spreads

Variable	High Distance		Low Distance		T-test of Difference
	Obs.	Mean	Obs.	Mean	
Panel A: Relative spreads (sorted by each distance measure)					
Geographic Distance					
Physical Distance	8,299	0.0117	8,324	0.0097	0.0020***
Cultural Distance					
Hofstede 4 Factor Index	8,311	0.0098	8,312	0.0116	-0.0018***
Hofstede 6 Factor Index	8,343	0.0099	8,280	0.0115	-0.0016***
GLOBE 4 Factor Index	8,314	0.0094	8,309	0.0121	-0.0027***
GLOBE 9 Factor Index	8,312	0.0095	8,311	0.0119	-0.0024***
Panel B: Amihud illiquidity (sorted by each distance measure)					
Geographic Distance					
Physical Distance	8,299	2.6469	8,324	2.5549	0.0920**
Cultural Distance					
Hofstede 4 Factor Index	8,311	2.4403	8,312	2.7613	-0.3210***
Hofstede 6 Factor Index	8,343	2.4834	8,280	2.7192	-0.2358***
GLOBE 4 Factor Index	8,314	2.4180	8,309	2.7838	-0.3657***
GLOBE 9 Factor Index	8,312	2.4377	8,311	2.7640	-0.3263***
Panel C: Idiosyncratic volatility (sorted by each distance measure)					
Geographic Distance					
Physical Distance	8,299	0.0206	8,324	0.0200	0.0007***
Cultural Distance					
Hofstede 4 Factor Index	8,311	0.0204	8,312	0.0202	0.0002
Hofstede 6 Factor Index	8,343	0.0203	8,280	0.0202	0.0001
GLOBE 4 Factor Index	8,314	0.0200	8,309	0.0205	-0.0005**
GLOBE 9 Factor Index	8,312	0.0202	8,311	0.0204	-0.0002
Notes: This table presents univariate tests of differences in mean relative spreads for firms with headquarters locations that are geographically and/or culturally proximate versus distant from their investment property holdings. ** Statistically significant at the 5% level. *** Statistically significant at the 1% level.					

geographic and cultural distance. We then compare the mean relative spreads (Panel A), Amihud values (Panel B), and idiosyncratic volatility (Panel C) across these two groupings. Panel A shows that higher levels of intrafirm physical distance are associated with significantly wider relative spreads, while higher levels of intrafirm cultural distance are associated with lower relative spreads. We observe this pattern again with respect to Amihud values (Panel B). The same

general pattern also persists with respect to idiosyncratic volatility (Panel C), although these results with respect to cultural distance are somewhat less robust.

The results in Exhibit 3 are quite intriguing as they suggest the market views intrafirm physical and cultural distance as materially different constructs, while the literature reports these metrics exert similar influences (e.g., Cashman, Harrison, Seiler, and Sheng, 2019). Thus, before drawing definitive conclusions regarding these differences, we acknowledge that market makers and long-term capital providers may well care about systematically different aspects of the firm. Additionally, we caution these results are simply univariate comparisons, and we do not control for other potentially important firm attributes and characteristics. For example, firms with international operations are generally larger than their purely domestic counterparts, and failure to control for firm size could easily result in misleading conclusions.

### *Determinants of Financial Market Liquidity*

Exhibit 4 presents the results of our multivariate analysis. The dependent variable in all four model specifications is the natural log of the firm's monthly relative bid-ask spread. Exhibit 5 presents the results from parallel analyses using Amihud illiquidity and idiosyncratic volatility. All model specifications, across both tables, include controls for political risk, trading environment, firm-specific characteristics, and international portfolio characteristics, as well as exchange, property type, and time fixed effects.<sup>22</sup> While each model includes intrafirm physical distance, we examine each of our four intrafirm cultural distance measures individually.

Exhibit 4 presents strong and consistent evidence that as intrafirm physical distance increases, firms become more informationally opaque. Specifically, intrafirm physical distance is positive and (highly) statistically significant across all four specifications, indicating firms that are more geographically dispersed are characterized by wider relative spreads and reduced financial market transparency/liquidity. In terms of economic magnitude, a one standard deviation increase in intrafirm physical distance is associated with an approximately 2.0% (one-way) increase in the transaction costs associated with trading the firm's shares.<sup>23</sup> Conversely, greater intrafirm cultural distance is associated with decreased relative spreads. In terms of economic significance, a one standard deviation increase in intrafirm cultural distance is associated with a 2.8% to 7.2% (one-way) decrease in the transaction costs associated with trading the firm's shares, depending on the metric employed.

Turning to the control variables, they generally conform to expectations. Consistent with the findings of Cashman, Harrison, and Sheng (2015), political risk affects spreads as evidenced by both our Disclosure and R-Factor metrics. With respect to each firm's trading environment, we find increased trading volume and the presence of analyst coverage to be consistently associated with reductions

**Exhibit 4** | The Effects of Intrafirm Distance on Relative Spreads

	(1)	(2)	(3)	(4)
Geographic Distance				
Physical Distance	0.013*** (3.33)	0.013*** (3.26)	0.017*** (4.37)	0.014*** (3.62)
Cultural Distance				
Hofstede 4 Factor Index	-0.046*** (-4.91)			
Hofstede 6 Factor Index		-0.046*** (-4.15)		
GLOBE 4 Factor Index			-0.051*** (-7.77)	
GLOBE 9 Factor Index				-0.041*** (-6.54)
Political Risk				
Disclosure	1.321*** (8.41)	1.249*** (8.07)	0.833*** (5.76)	1.085*** (7.49)
Operations Risk (ORI)	0.500** (2.01)	0.321 (1.34)	0.064 (0.32)	-0.350* (-1.73)
R-Factor	-0.843*** (-5.09)	-0.738*** (-4.59)	-0.730*** (-5.14)	-0.663*** (-4.66)
Political Rights (PRI)	-0.095 (-1.49)	-0.049 (-0.80)	-0.241*** (-3.47)	-0.154** (-2.34)
Trading Environment				
Short Sales Allowed	0.322*** (18.79)	0.333*** (19.42)	0.366*** (20.78)	0.360*** (20.40)
Motivated IO	-2.720* (-1.91)	-2.701* (-1.90)	-2.698* (-1.89)	-2.658* (-1.87)
Inst. Ownership (%)	0.052* (1.84)	0.057** (2.01)	0.059** (2.09)	0.057** (2.02)
# of Institutional Investors	-0.000 (-0.31)	-0.000 (-0.41)	-0.000 (-0.26)	-0.000 (-0.30)
Ln(Volume)	-0.051*** (-15.64)	-0.052*** (-15.72)	-0.051*** (-15.70)	-0.051*** (-15.58)
Std. Dev. of Quote Midpoint	1.171*** (7.61)	1.182*** (7.67)	1.151*** (7.52)	1.155*** (7.53)
Analyst Coverage (yes=1)	-0.288*** (-17.08)	-0.286*** (-16.95)	-0.281*** (-16.58)	-0.284*** (-16.79)



**Exhibit 4** | (continued)  
 The Effects of Intrafirm Distance on Relative Spreads

	(1)	(2)	(3)	(4)
<b>Firm-Specific Characteristics</b>				
Ln(Mkt Cap)	-0.263*** (-42.97)	-0.263*** (-42.75)	-0.266*** (-42.62)	-0.264*** (-42.36)
MtoB	0.018*** (3.96)	0.018*** (3.88)	0.018*** (3.80)	0.018*** (3.88)
Leverage	0.077*** (10.13)	0.079*** (10.27)	0.074*** (9.64)	0.074*** (9.53)
# of Properties	-0.000** (-2.10)	-0.000** (-2.38)	-0.000 (-0.97)	-0.000 (-1.62)
Development	0.067*** (8.25)	0.068*** (8.41)	0.073*** (8.92)	0.073*** (8.93)
UK Law	-0.781*** (-7.51)	-0.706*** (-7.02)	-0.616*** (-7.52)	-0.595*** (-7.24)
GAAP	-0.031*** (-2.89)	-0.031*** (-2.91)	-0.032*** (-2.98)	-0.033*** (-3.08)
Founder CEO	-0.055*** (-6.97)	-0.052*** (-6.68)	-0.050*** (-6.38)	-0.050*** (-6.45)
<b>International Portfolio Characteristics</b>				
# of Countries	0.243*** (7.43)	0.232*** (7.12)	0.267*** (8.10)	0.243*** (7.42)
Single Country	-0.136*** (-11.63)	-0.132*** (-11.45)	-0.131*** (-11.53)	-0.129*** (-11.30)
% Properties in Primary Country	0.001 (0.25)	0.001 (0.39)	0.002 (1.18)	0.001 (0.56)
Exchange Rate	0.000 (0.26)	0.000 (0.73)	0.000 (0.41)	0.000 (0.72)
Exchange Rate Volatility	-0.137* (-1.93)	-0.136* (-1.93)	-0.134* (-1.91)	-0.132* (-1.89)
New Investment Country	-0.125*** (-2.63)	-0.126*** (-2.65)	-0.119** (-2.52)	-0.121** (-2.55)
Intercept	-2.403*** (-18.49)	-2.386*** (-18.37)	-1.924*** (-13.70)	-1.933*** (-13.27)
Exchange FE	Yes	Yes	Yes	Yes
Property Type FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Adj. R <sup>2</sup>	0.682	0.682	0.683	0.683

**Exhibit 4** | (continued)

The Effects of Intrafirm Distance on Relative Spreads

Notes: This table presents the results of four regressions investigating the determinants of the relative spreads of Asia-Pacific REITs and listed property companies. The dependent variable across all four model specifications is the natural log of the firm's average monthly percentage bid-ask spread. The *t*-tests reported in parentheses are based on standard errors clustered by both firm and time. There are 16,623 observations.

\* Statistically significant at the 10% level.

\*\* Statistically significant at the 5% level.

\*\*\* Statistically significant at the 1% level.

in firm spreads, while increased volatility (as measured by the monthly standard deviation of the quote mid-point) and the presence of more informed traders (as proxied by the absence of short sale constraints) are associated with higher observable spreads.<sup>24</sup> With respect to institutional ownership, consistent with the findings of Hardin, Nagel, Roskelley, and Seagraves (2017), we observe that the effects of motivated institutions differ from those of institutions in general. Specifically, we find that while institutional ownership in general increases bid-ask spreads, motivated institutional ownership reduces spreads. Once again, this finding is consistent with the notion that motivated institutions have an increased incentive to monitor these firms. Additionally, we find that REITs with a founder CEO have lower bid-ask spreads, which is consistent with the governance benefits associated with entrepreneurial ownership found by Chiang, DeWitt, Folkman, and Jiao (2018).

Furthermore, we find that the larger firms in our sample are more informationally transparent, while those with greater leverage, higher market-to-book ratios, and/or active real property development pipelines experience enhanced valuation uncertainty. Our results suggest that GAAP-based accounting disclosures and Common Law-based legal systems are associated with enhanced informational transparency.<sup>25</sup> We also observe that firms focusing their investment activities within a single country (or limited number of countries) enjoy reduced valuation uncertainty. Along this same dimension, and consistent with the findings of Liu and Mei (1998), increased exchange rate risk is associated with increased diversification, and hence reduced spreads. Finally, firms entering a new market, as proxied by our new country indicator variable, also enjoy a reduction in spreads. At first glance, this is somewhat surprising, but upon reflection is consistent with the notion that only larger more established firms have the ability to enter a new country.<sup>26</sup>

Consistent with our focal bid-ask spread results, Panel A of Exhibit 5 (Amihud illiquidity measure) reports firms with greater intrafirm physical distance confront

**Exhibit 5** | The Effects of Intrafirm Distance on the Amihud Illiquidity Ratio and Idiosyncratic Volatility

	(1)	(2)	(3)	(4)
<b>Panel A: Amihud illiquidity</b>				
Geographic Distance				
Physical Distance	0.039*** -5.34	0.042*** -5.59	0.035*** -4.44	0.031*** -4.19
Cultural Distance				
Hofstede 4 Factor Index	-0.237*** (-11.99)			
Hofstede 6 Factor Index		-0.250*** (-10.54)		
GLOBE 4 Factor Index			-0.144*** (-9.12)	
GLOBE 9 Factor Index				-0.150*** (-10.64)
All Previous Controls	Yes	Yes	Yes	Yes
All Previous Fixed Effects	Yes	Yes	Yes	Yes
Adj. R <sup>2</sup>	0.884	0.884	0.884	0.884
<b>Panel B: Idiosyncratic volatility</b>				
Geographic Distance				
Physical Distance	0.001*** -8.36	0.001*** -8.12	0.001*** -10.44	0.001*** -10.54
Cultural Distance				
Hofstede 4 Factor Index	-0.001*** (-5.66)			
Hofstede 6 Factor Index		-0.002*** (-5.15)		
GLOBE 4 Factor Index			-0.002*** (-11.59)	
GLOBE 9 Factor Index				-0.002*** (-13.33)
All Previous Controls	Yes	Yes	Yes	Yes
All Previous Fixed Effects	Yes	Yes	Yes	Yes
Adj. R <sup>2</sup>	0.456	0.455	0.458	0.46
<p>Notes: This table presents the results of eight regressions investigating the importance of intrafirm geographic and cultural distance on financial market outcomes for Asia-Pacific REITs and listed property companies. The dependent variable across all four model specifications in Panel A is the Amihud (2002) Illiquidity measure. The dependent variable across all four model specifications in Panel B is the firm's observed level of Idiosyncratic Volatility. The <i>t</i>-tests reported in parentheses are based on standard errors clustered by both firm and time. There are 16,623 observations.</p> <p>*Statistically significant at the 10% level.  **Statistically significant at the 5% level.  ***Statistically significant at the 1% level.</p>				

increased illiquidity, while firms with greater intrafirm cultural distance enjoy enhanced liquidity. While our (unreported) control variables are broadly consistent with those found in Exhibit 4, we identify one notable difference as motivated institutional ownership is positively related to the Amihud illiquidity metric. While somewhat surprising given the previous bid-ask spread results, this finding is potentially explained by the fact that Amihud illiquidity is based on daily trading volumes, and motivated institutions are likely able to exert their influence outside of formalized trading venues. This assertion is further supported by untabulated analyses, where we find that motivated institutional ownership is inversely related to trading volume.

Similarly, Panel B of Exhibit 5 presents the results from our analysis of idiosyncratic volatility. Consistent with our earlier findings, firms with larger geographic footprints are characterized by higher levels of idiosyncratic volatility, while firms with higher levels of intrafirm cultural distance exhibit lower levels of idiosyncratic volatility. These results, once again, suggest the market views intrafirm physical and cultural distance as substantively different constructs. In sum, across each of our multivariate specifications, intrafirm physical distance is repeatedly shown to increase the valuation uncertainty surrounding a company (perhaps due to non-diversifiable monitoring and/or coordination concerns), thereby reducing its level of financial market liquidity. Conversely, intrafirm cultural distance consistently appears to offer a means of diversifying a firm's level of location-specific risk, thereby reducing the uncertainty surrounding the firm's future cash flows.

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## Conclusion

Using a sample of 166 publicly listed real estate companies across the Asia-Pacific region, which hold 10,089 distinct investment property assets, we explore how a firm's decision to invest in geographically and/or culturally distant assets influences its financial market liquidity. We find that firms with greater intrafirm physical distance are less liquid than their more geographically focused counterparts, suggesting that as intrafirm distance increases, outsiders find the firm both harder to value and more informationally opaque. Conversely, firms with greater levels of intrafirm cultural distance are more liquid. Diversification across culturally distinct countries appears to mitigate cash flow volatility, hence reducing valuation uncertainty, and thereby increasing the firm's financial market liquidity. Thus, our results suggest the market views intrafirm physical distance differently than it views intrafirm cultural distance. Specifically, an increase in intrafirm physical distance reduces firm liquidity, while an increase in intrafirm cultural distance increases firm liquidity. While our findings suggest the market views physical and cultural distance differently, they do indicate both metrics represent value-relevant components of a firm's information environment, and as such, should be strategically managed to enhance shareholder utility.

## Appendix A

### Variable Definitions

Variable	Definition
Liquidity Metrics	
Raw Spread	Raw spread equals the average difference in the daily closing ask price and bid price for each firm <i>i</i> , each day in month <i>t</i> .
Relative Spread	Relative spread equals the monthly average quoted spread divided by the midpoint of the quoted spread.
Amihud Illiquidity	The ratio of the absolute value of the daily return to total daily dollar volume.
Idiosyncratic Volatility (IV)	The standard deviation of the residual from an adjusted CAPM model, where the market return is based on the real estate returns for a given exchange. Operationally, this IV measure is estimated using daily returns over the past month.
Geographic and Cultural Distance Metrics	
Physical Distance	The average geographic distance between each firm's headquarters and its investment property locations, measured in thousands of miles.
Hofstede 4 Factor Index	The property weighted average of the firm's cultural distance using four of Hofstede's culture dimensions: Power Distance Index, Individualism versus Collectivism, Masculinity versus Femininity, and Uncertainty Avoidance Index.
Hofstede 6 Factor Index	The property weighted average of the firm's cultural distance using all of Hofstede's six culture dimensions.
GLOBE 4 Factor Index	The property weighted average of the firm's cultural distance using four of GLOBE's culture dimensions: Future Orientation, Assertiveness, In-Group Collectivism, and Uncertainty Avoidance.
GLOBE 9 Factor Index	The property weighted average of the firm's cultural distance using all nine of GLOBE's culture dimensions.
Political Risk Metrics	
Disclosure	The property weighted average of the Business Extent of Disclosure Index, as reported by the World Bank. Higher values indicate investors are protected through more disclosure of ownership and financial information.
Operations Risk (ORI)	The property weighted average of the Operations Risk Index (ORI), as reported by Business Risk Services. Higher values indicate less operational risk.

Variable	Definition
R-Factor	The property weighted average of the Business Risk Service remittances and repatriation of capital factor. Higher values indicate it is relatively easier to repatriate profits.
Political Rights (PRI)	The property weighted average of the Freedom of the World Political Rights Index (PRI). Higher values indicate a government that is less functional.
Trading Environment Metrics	
Short Sales Allowed	An indicator for whether a headquarter country exchange allows short sales. It equals 1 if the country allows short sales, and zero otherwise.
Motivated IO	Motivated Institutional Ownership, defined as in Hardin, Nagel, Roskelley, and Seagraves (2017). It equals the fraction of a firm's shares owned by institutional investors if the firm's portfolio weight in each institution's portfolio allocation is ranked in the top decile, and zero otherwise.
Inst. Ownership (%)	Institutional ownership equals the percentage of shares outstanding held by institutions.
# of Institutions	The number of institutions holding a firm's shares.
Ln(Volume)	Equals the log transformation of trading volume measured in thousands of shares.
Std. Dev. of Quote Midpoint	Equals the monthly standard deviation of the quote midpoint divided by the monthly quote midpoint.
Analyst Coverage	A dummy variable set equal to one if there is at least one analyst (as reported by Bloomberg) making recommendations about the firm within a quarter, and zero otherwise.
Firm-Specific Characteristics	
Ln(Mkt Cap)	Equals the log transformation of the firm's total equity market capitalization (in millions of dollars), as reported by Bloomberg.
MtoB	The market-to-book value of equity ratio, as reported by Bloomberg.
Leverage	The firm's total debt (short-term plus long-term debt) divided by total common equity ratio for firm $i$ in month $t$ , as reported by Bloomberg.
# of Properties	The total number of investment properties owned by each firm, each year and month.
Development	An indicator variable set equal to one if the firm engages in investment property development, construction programs, or has an active property development pipeline, and zero otherwise.

Variable	Definition
UK Law	The property weighted average of the percentage of a real estate company's properties located in countries with a (United Kingdom) Common Law based foundational legal system.
GAAP	An indicator variable which equals one if the firm uses GAAP accounting principles for its corporate financial disclosures, and zero otherwise.
Founder CEO	An indicator variable set equal to one if the current CEO's term started on or before the firm's IPO date, and zero otherwise. If the IPO year is missing, we use the first year in which total assets are reported by S&P Global Market Intelligence.
International Portfolio Characteristics	
# of Countries	The total number of different countries in which the firm owns investment properties during a given month.
Single Country	An indicator variable set equal to one if the firm is invested in only one country during a given month, and zero otherwise.
% Properties in Primary Country	The percentage of the firm's portfolio invested in the country that houses the largest number of the firm's properties.
Exchange Rate	Property weighted headquarter and property country currency exchange rate. The historical daily headquarters and property country's currency exchange rates against dollars are downloaded from the following two websites: <a href="https://www.investing.com/">https://www.investing.com/</a> and <a href="https://www.federalreserve.gov/releases/h10/hist/default.htm">https://www.federalreserve.gov/releases/h10/hist/default.htm</a> . We first calculate the daily exchange rate between each firm's headquarters country and the country for each property the firm owns, and then calculate the property weighted average currency exchange rate between the headquarters country and property country by multiplying the property weights, where the headquarter country currency is the numerator and the property country currency is the denominator.
Exchange Rate Volatility	The change in the property weighted headquarter and property country currency exchange rate.
New Investment Market	An indicator variable set equal to 1 if a new property market is entered during a given month, zero otherwise.

## Appendix B

**Exhibit B1** | Average Intrafirm Physical and Cultural Distance by Headquarters

Headquarter Country	Physical Distance	Hofstede 4 Factor	Hofstede 6 Factor	GLOBE 4 Factor	GLOBE 9 Factor
Australia	2.0928	0.1389	0.1671	0.1566	0.2394
China*	0.2505	0.0000	0.0000	0.0000	0.0000
Hong Kong	0.5812	0.2016	0.2699	0.9584	1.0167
India	0.2036	0.0000	0.0000	0.0000	0.0000
Japan	0.1483	0.0377	0.0333	0.0243	0.0236
Singapore	1.3971	0.9628	0.7946	2.3706	2.4731

\* All sample firms headquartered in China trade on the Hong Kong Stock Exchange.

**Exhibit B2** | Average Intrafirm Physical and Cultural Distance by Exchanges

Exchange	Physical Distance	Hofstede 4 Factor	Hofstede 6 Factor	GLOBE 4 Factor	GLOBE 9 Factor
Australia	2.0928	0.1389	0.1671	0.1566	0.2394
India	0.2036	0.0000	0.0000	0.0000	0.0000
Hong Kong	0.4750	0.1580	0.2168	0.8331	0.8879
Singapore	1.4552	0.9482	0.8043	2.3471	2.4454
Japan	0.1483	0.0377	0.0333	0.0243	0.0236

**Exhibit B3** | Real Estate Firm Spreads and Non-Real Estate Firm Spreads by Exchanges

Exchange	Avg. Min. Tick Size (Local Currency)	Avg. Min. Tick Size (U.S. Dollars)	R.E. Relative Spread	Non-R.E. Relative Spread	Relative Spread Difference
Australia	0.0100	0.0081	0.0163	0.0306	-0.0143***
India	0.0100	0.0002	0.0195	0.0211	-0.0016
Hong Kong	0.0220	0.0028	0.0091	0.0120	-0.0029***
Singapore	0.0060	0.0046	0.0100	0.0173	-0.0073***
Japan	259.05	2.7088	0.0053	0.0090	-0.0037***

\*\*\* Statistically significant at the 1% level.



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## Endnotes

- <sup>1</sup> Stein (2002) uses the term “soft information” to refer to any information that is difficult for an agent to communicate to a distant counterpart.
- <sup>2</sup> Conversely, Chen, Gompers, Kovner, and Lerner (2010) find that venture capital investments in “distant” companies outperform investments in local companies, and contend venture capitalists enforce more rigorous ex ante screening on distant companies that are more difficult to monitor. Consistent with our analysis, these results reinforce the complex nature of distance-performance relations.
- <sup>3</sup> Guiso, Sapienza, and Zingales (2006, 2009), Aggarwal and Goodell (2009a, 2009b, 2010), Chui, Titman, and Wei (2010), and Zheng, Ghoul, Guedhami, and Kwok (2012) all present evidence that a country’s culture influences its economy.
- <sup>4</sup> As Cannon and Cole (2011) conclude that end of day quotations contain the majority of information available in intra-day REIT prices, for simplicity, we utilize end of day bid-ask spreads. While beyond the scope of the this investigation, both Jain, Sunderman, and Westby-Gibson (2017) and Liow and Ye (2017) also suggest REIT market quality (as measured by enhanced liquidity and reduced spillover risk) increased after the global financial crisis.
- <sup>5</sup> Chen, Huang, and Jha (2012) present evidence that a firm’s level of idiosyncratic volatility is related to its operating environment.
- <sup>6</sup> Our results are robust to alternative IV estimation methodologies. Specifically, we find similar results when the market returns are based on the aggregate real estate returns across all exchanges. Moreover, using the methodology of Ooi, Wang, and Webb (2009), which relies on the Fama and French (1993) multi-factor model, yields similar results.
- <sup>7</sup> For examples of alternative methods of measuring intrafirm distance in real estate markets see Wang, Cohen, and Glascock (2018), Cashman, Harrison, Seiler, and Sheng (2019), Ling, Naranjo, and Schieck (2019), and Ling, Wang, and Zhou (2019).
- <sup>8</sup> To ensure the robustness of our results is not driven by the sticky nature of the investment portfolio composition of our sample firms, in untabulated analyses we limit our sample to December observations and rerun our core model specifications on this reduced sample. Not surprisingly, this alternative estimation approach provides results that are qualitatively similar, although not quite as statistically significant, as those using our full sample.
- <sup>9</sup> We collect Hofstede scores directly from Geert Hofstede’s website ([www.geert-hofstede.com/](http://www.geert-hofstede.com/)).
- <sup>10</sup> If a country is missing an individual Hofstede or GLOBE attribute, we replace the missing value with the average characteristic score from all available countries for the given time period. We obtain qualitatively similar results when we exclude observations from the roughly 1% of our sample that has a missing Hofstede or GLOBE score.
- <sup>11</sup> While ideally this country weighting procedure would be based on the market values of the individual properties, data limitations preclude such an analysis. As such, we readily acknowledge our weighting scheme is imperfect and introduces noise into the analysis. Reassuringly, any potential mismeasurement along this dimension should bias against finding support for our proffered relations, and thus, our results may be viewed as a conservative estimate of the importance of such factors to market participants.
- <sup>12</sup> We acknowledge that there are a large number of alternative political risk proxies available. Therefore, our selection procedure identified four measures appearing in the

recent literature, which are all designed to measure and capture different aspects of political risk. Consistent with these selection criteria, we note that the average (absolute value) Pearson correlation coefficient estimates among our political risk measures is below 0.3.

- <sup>13</sup> Cashman, Harrison, and Seiler (2014) note that Asia Pacific real estate firms often hire external third-party advisors to facilitate portfolio management when they are investing in geographically distant properties or when their property holdings are located in politically unstable countries. Unfortunately, due to its high correlation with key firm characteristics, we are unable to include an external advisor indicator variable in our multivariate specifications. However, in untabulated analyses, we match each externally advised firm to an internally advised firm based on their intrafirm distance, and find no evidence of a significant difference between relative spreads, Amihud illiquidity, or IV levels across these samples.
- <sup>14</sup> In a slightly different context, Mauck and Price (2018) show that corporate governance metrics are (negatively) related to foreign property investment activities by real estate firms. Soyeh and Wiley (2019) provide further evidence that corporate governance mechanisms materially impact REIT firm performance and operations. Motivated IO was introduced by Hardin, Nagel, Roskelley, and Seagraves (2017), who argue that institutions are motivated to more actively monitor firms in which they have larger holdings. This metric requires institutional holdings data, which we obtain from FactSet. The specific disclosure documents utilized in constructing this measure include both 13-F and N-CSR filings, along with their local country equivalents.
- <sup>15</sup> To minimize the effect of outliers on our dataset, we also winsorize both the market-to-book and leverage ratios at the 1% and 99% levels. While the majority of these controls have been used in the literature, founder CEO has not. Our inclusion of founder CEO is based on Chiang, DeWitt, Folkman, and Jiao (2018), who present evidence that ownership by the initial entrepreneur can be an effective corporate governance mechanism.
- <sup>16</sup> We control for exchange rate and exchange rate volatility, as Liu and Mei (1998) find the diversification benefit offered by international real estate is partially driven by exchange rate risk.
- <sup>17</sup> Federation Centres subsequently and dramatically reduced both its number of investment property holdings, as well as the geographic footprint of those holdings.
- <sup>18</sup> Not surprisingly, in untabulated correlation analyses, we find the two Hofstede Indices are highly correlated ( $\rho = 0.972$ ) with one another, as are the two GLOBE Indices ( $\rho = 0.964$ ). Similarly, cross-cultural index correlations are also positive (ranging from  $\rho = 0.641$  to  $0.683$ ), as are correlations between our physical and cultural distance metrics ( $\rho = 0.398$  to  $0.583$ ). Furthermore, Appendix B provides descriptive statistics of intrafirm distances by headquarter country, as well as comparisons of key firm attributes and operational parameters across exchange trading venues. There is considerable variation in the average level of intrafirm distances across exchanges, and firms in India and China hold properties exclusively within those countries. Our focal results are qualitatively robust to the exclusion of the 15 firms located within these two countries.
- <sup>19</sup> The ability to short securities should enhance the price discovery process, as informed traders may capitalize on privately held information regardless of the directionality of the (perceived) mispricing. As such, one might expect the ability to short securities to be associated with reduced spreads in the marketplace. On the other hand, the increased

presence of these opportunistic informed traders poses a risk to market makers, who may well rationally respond by widening posted bid-ask spreads.

- <sup>20</sup> The market-to-book value of equity ratios of firms in the real estate industry are driven towards 1.0 by the mandated payout requirements for firms electing REIT status. Similarly, Feng, Ghosh, and Sirmans (2007), Boudry, Kallberg, and Liu (2010), Harrison, Panasian, and Seiler (2011), and Cashman, Harrison, and Seiler (2016) all report average debt ratios in the 40%–50% range for publicly traded real estate firms.
- <sup>21</sup> Thus, even multi-national real estate firms appear to cluster their investment activities. If we exclude firms investing in only a single country, this number falls to 68% (75% median).
- <sup>22</sup> Given the general consistency of these controls, coefficient estimates for these variables have been suppressed across Exhibit 5 to enhance readability and streamline the presentation of results. Full results are available from the authors upon request.
- <sup>23</sup> The 2.0% increase is calculated as the difference between the estimated one-way transaction cost for a firm with the mean intrafirm physical distance and the one-way transaction costs of a firm with an intrafirm physical distance that is one standard deviation higher than the mean. These differences are then averaged across the four specifications.
- <sup>24</sup> Higher institutional ownership levels should further enhance short sale implications, as these institutions often provide the supply of shares necessary for informed traders to act on their informational advantage.
- <sup>25</sup> A broad literature exists across the accounting, finance, economics, and real estate disciplines regarding the efficiency and importance of alternative legal and accounting systems. In general, GAAP accounting follows a more formalized rules-based structure than principle-based IFRS, while dispute resolution under Civil Law-based enforcement systems tends to be governed by the written text of the contracting document as opposed to the prevailing traditions and customs of the society. For additional discussion of the importance of these metrics with respect to international real estate markets see, among others, Cashman, Harrison, and Seiler (2014, 2016) and Cashman, Harrison, and Sheng (2015).
- <sup>26</sup> In untabulated analyses, we compare firm spreads pre and post investing in a new market (country). While the results are directionally consistent with those presented, they are statistically insignificant. This is likely due (at least in part) to the limited size of the sample.

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