The Geography of Real Property Information and Investment: Firm Location, Asset Location, and Institutional Ownership

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Abstract

We improve on existing measures of a firm's geographically-dispersed economic activities by proposing a measure based on the value of its underlying assets in each metropolitan area. Using a sample of Real Estate Investment Trusts (REITs), we then show that institutional investors exploit location-based information asymmetries by overweighting firms headquartered locally and, more importantly, those with greater economic interests in the investor's home MSA. In a difference-in-difference-in-difference analysis of investor headquarters relocations, we find that investors tend to increase their ownership of REITs that have property holdings in the market to which the investor relocates. Moreover, this asset allocation strategy is associated with superior portfolio performance. Overall, our findings highlight the importance of understanding the relation between information advantage and the geography of firm's operations as well as the implications on ownership patterns and optimal portfolio construction.

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1. Introduction

Distance impedes monitoring and access to information. When the assets of a firm are geographically dispersed, value-relevant information about the firm is also geographically distributed. Geographically dispersed firms are not as efficient as concentrated firms in collecting, reporting and aggregating information and are more difficult to monitor (e.g., Aarland et al., 2007; Giroud, 2013). The geographical variation in a firm's economic interests can generate persistent information asymmetry among investors as a result of information immobility (van Nieuwerburgh and Veldkamp, 2009). A growing finance literature is focused on the geography of a firm's investments and the extent to which investors respond to, and can benefit from, geographical variation in the availability of important firm-level or asset level information. For example, a number of recent papers show that investors have a tendency to tilt their portfolios toward "local" assets and companies. This bias shows up as a strong preference for domestic as opposed to foreign stocks (e.g., French and Poterba, 1991; Choi et al. 2017) and as a preference for domestic companies headquartered "close" to the investor (e.g., Coval and Moskowitz, 1999; Grinblatt and Keloharju, 2000).

This article first examines whether firms with more assets in their home MSAs, where it is presumed to have an information advantage, have higher institutional ownership. Second, we examine whether the geographical distribution of value-relevant information about the firm asset is related to ownership patterns. We find that institutional investors overweight firms headquartered in the investors' home market and firms with measurable economic interests in the investors' home market, even if the firm is not headquartered there. Third, using changes in the headquarters locations of a sample of institutional investors as a proxy for shifts in the geography of the information environment, we examine whether institutional investors reallocate their portfolios to firms with an economic presence in the investor's new headquarters location and away from firms headquartered in their previous home market. Finally, we investigate whether tilting their portfolios towards "local" firms affects the risk-return characteristics of investor portfolios.

To address these questions, accurate measurements of the magnitude of a firm's economic interests in a particular location is crucial. Several recent papers have recognized the limitation of using the location of a firm's headquarters as a proxy for the geographic distribution of its economic interests and activities (e.g., Garcia and Norli, 2012; Bernile et al., 2015). These papers

instead employ a text-based approach to infer a firm's geographic footprint by tabulating the number of times a U.S. state's name appears in the firm's 10-K. State counts (citations) implicitly assume states with different sizes and economic relevance are identical. The use of states as the unit of measure for geography also masks the potential variation across metropolitan areas within a state in economic activity, labor markets, and information availability. Moreover, the number of appearance of a particular state's name in a firm's 10-K report may not directly identify the state's economic significance to the firm. For example, consider a situation in which two states are mentioned the same number of times in a firm's 10-K report and are therefore given equal weights as locations of the firm's economic activity. However, if the firm plans to close operations in the first state but expand operations in the second, a 10-K based measure of this firm's economic activity would clearly overweight the economic importance of the first state relative to the second. Thus, state citation measures may be inadequate proxies for cross-sectional variation in the degree of asset allocation and information dispersion.

We improve on the measurement of a firm's geographic footprint by focusing our analysis on publicly-traded equity real estate investment trusts (REITs). A "qualified" REIT may deduct dividends paid from corporate taxable income if they satisfy a set of restrictive conditions on an ongoing basis. For our analysis, the most important of these restrictions is that fully 75% of the value of the REIT's assets must consist of real estate assets, cash, and government securities. Moreover, at least 75% of the REIT's gross income must be derived from real estate assets. These two requirements ensure that REITs invest primarily in real estate. Such tangible real assets are relatively easier to locate and value than intangible assets.

Using SNL's Real Estate Database, we measure a firm's portfolio exposure to each metropolitan statistical area (MSA) at the beginning of each year from 2004 to 2015. For each property held by each REIT, SNL provides information on its property type (e.g., office versus retail), MSA location, and several measures of property value. This information allows us to accurately construct time-varying measures of each REIT's geographic concentration in each MSA.

We first describe the pattern of institutional ownership of REITs over our 2004-2015 sample. Using quarterly cross-sectional regressions, we find greater institutional ownership for REITs with greater portfolio concentrations in the REIT's home MSA. This is consistent with these investors recognizing the potential information advantage REITs have in their local market (Ling et al. 2018b). These findings are robust to the use of ownership data disaggregated by type of institutional investor and to alternative classifications of investor types.

We next examine whether the geographical distribution of a firm's economic interest is related to institutional ownership patterns. A REIT is deemed to have an economic interest in a MSA if it is headquartered there, regardless of property holdings, or if it owns properties in the MSA. Other than headquarters, local channels such as social networks also provide investors with better access to information (e.g., Hong et al. 2005; Cohen et al 2008). To capture this local effect, we follow Bernile et al. (2015) and construct a location-based measure of institutional ownership by mapping the locations of a REIT's economic interest to the locations of its institutional investors. We provide evidence that REITs with greater local economic interests also have greater local institutional ownership, suggesting investors tilt their portfolios toward REITs that are headquartered in the investors' MSA. Moreover, the degree of tilting is positively related to the size (presence) of the REIT's property holdings in the investors' home MSA. We also employ a difference-in-difference-in-difference (DDD) analyses to examine the relation between investor headquarters relocations and changes in the institutional ownership of the firm. Our results suggest that local institutional ownership increases (decreases) for REITs that experience a positive (negative) shock due to the relocation of an institutional investor into (or out of) a MSA in which the REIT has substantial economic interests.

Finally, we provide evidence that overweighting REITs headquartered in the investor's home MSA, or that have a portfolio presence in the investor's home MSA, is associated with higher risk-adjusted portfolio returns. Moreover, this outperformance is not explained by under-diversification.[1] On the contrary, investors appear to reduce the idiosyncratic risk of their REIT portfolios by holding REITs headquartered locally or that have a presence in the investor's home MSA. This finding appears to contradict the results reported by Pool et al. (2012), who find that the idiosyncratic volatility of mutual funds is positively correlated with the extent of their home bias. However, a firm's local presence reduces the cost of information production for the investors and incentivizes them to rely less on public signals and actively engage in private information collection. Private information may allow investors to measure and price risks more accurately and simultaneously reduces adverse selection, leading to both lower idiosyncratic portfolio risk and higher risk-adjusted portfolio returns.

The article most similar to ours is Bernile et al. (2015), who examine the extent to which institutional investors overweight local firms based on a 10-K based measure of firm locations. One of their most striking findings is that local institutional ownership in the HQ state is low if

[1] When investors are anchored by familiarity bias, they tend to under-diversify their portfolios by overweighting local investments.

the 10-K does not mention the state. In contrast, we find institutional investors tend to overweight firms that are headquartered in their home MSAs or that own property in the investors' home MSAs. Unlike Bernile et al. (2015), we control for geographic and property-type diversification in our ownership regressions. These controls are important as we show that the omission of concentration measures produces bias in the coefficient estimates of our measures of the geographic distribution of a firm's economic interests.

For REITs, the most closely related study to ours is Hartzell et al. (2014), who show that the diversification discount is lower for firms with higher institutional ownership, which they attribute to increased monitoring. Several recent papers also examine the impact of the geographic distribution of REITs' underlying assets on firm value and portfolio returns (Wang et al., 2017; Ling et al., 2018a; Ling et al., 2018b).[2] None of these studies directly examines the relation between a firm's geographic footprint and the portfolio decisions of investors. Moreover, to the best of our knowledge, we are the first to examine the link between investor relocations and investor portfolio reallocations. Lastly, our portfolio results on outperformance and diversification benefits are novel in the literature.

The paper proceeds as follows. In Section 2 we describe our data sources and document the patterns of institutional ownership of REITs over our sample period. Section 3 contains our analysis of institutional ownership and the geography of REITs. In Section 4, we provide our analysis of whether local bias affects portfolio risk and returns. Section 5 concludes.

2. Patterns of Institutional Ownership of REITs

REITs have enjoyed increasing attention from institutional investors since their initial appearance into the S&P 500 index in 2001. More recently, the Global Industry Classification Standard (GICS) was revised by S&P Dow Jones to create a separate 11th sector for publicly-traded real-estate companies. By separating real estate companies from the GICS financial sector in September 2016, real estate became the first new S&P 500 sector since the Dot-Com era.[3]

We start with a sample of 257 unique equity REITs obtained from the CRSP Ziman REIT database from 2004 through 2015 and merge these data with the MSA headquarter locations of

[2] Wang et al. (2017) suggest that, holding geographic concentrations constant, shorter distances between a REIT's assets and its headquarters reduces value. Ling et al. (2018a) find that some REIT managers are able to effectively time portfolio acquisitions and dispositions in anticipation of expected performance difference across MSAs. Ling et al. (2018b) find that the returns on REITs with portfolios tiled toward their home MSAs exceed the returns of REITs with low concentrations in their home MSAs.

[3] https://www.wsj.com/articles/real-estate-gets-its-own-home-in-the-s-p-500-1474018202?mg=prod/accounts-wsj

any institutional investor that held REIT shares during the sample period.[4] The information on investor headquarters locations we collect from a SEC EDGAR search begins in 2004Q1 and ends in 2015Q4, which dictates the start and end of our analysis period. We delete REIT observations with missing financial information after merging with CRSP-Compustat. We also delete REIT observations with incomplete information from Compustat Snapshot on historical headquarters locations. These mergers reduce the number of unique equity REITs to 187.

We next merge our firm-level data with ownership data from Thomson Reuters. As in prior research, we define institutional ownership as the fraction of a REIT's shares held by institutional investors. Thomson Reuters provides quarterly reports on the common stock holdings of 13(f) institutions. The SEC Form 13f is a quarterly filing with the Securities and Exchange Commission (SEC) required for all institutional investment managers with over $100 million in qualifying assets. Companies required to file SEC Form 13f include insurance companies, banks, pension funds, investment advisers and broker-dealers. Because of a problem with the Thomson-Reuters Ownership data starting in June 2013, we obtain 13f holdings data for 2013, 2014, and 2015 from the WRDS SEC Analytics Suite.[5] We then sum the institutional ownership percentages for each REIT at the end of each quarter, which are used as our dependent variable in later analyses.

Some of the 13(f) institution types (*typecode* variable) in the Thomson Reuters S34 database are also known to be incorrectly classified. We therefore adopt the reclassification of institution types developed by Agarwal et al. (2013) and categorize institutional owners as either banks (*BANKS*), mutual funds (*MFS*), hedge funds (*HFS*), or other asset management firms (*OAMS*). The remaining institutional investors types are classified as *OTHER*, which includes investment banking and brokerage firms, pension funds, endowments and foundations, non-financial corporations, and all other institutional owners.[6] The reclassification data from Agarwal

[4] Equity REITs own income-producing real estate and obtain most of their revenues from rents. Mortgage REITs invest in mortgages or mortgage-backed securities. According to the FTSE-NAREIT Index, the 182 equity REITs in their index had a total market capitalization of $1.04 trillion as of October 31, 2017; the corresponding market capitalization of the 41 mortgage REITs was $66 billion.

[5] The main data issues include stale and omitted institutional 13F reports and excluded securities. For example, data on the institutional ownership of Blackrock Inc, one of the largest institutional investors in the U.S. equity market, is omitted or is incorrect for several quarters after June 2013. In addition, after June 2013 Thomson-Reuters dropped a sizable number of securities (30% of the overall universe) from their coverage, which represent about 15% of US equity market capitalization. These dropped or excluded securities in recent quarters include all ETFs and about 6% of US common stocks (using CRSP share code 10, 11, and 12), including companies as large as Apple Inc. For more details, please refer to Ben-David et al. (2017).

[6] Agarwal et al. (2013) manually reclassify all 13(f) institutions into ten finer categories, including Banks and Trusts, Insurance Companies, Mutual Funds, Hedge Funds, Other Asset Management Firms, Investment Banking and Brokerage Firms, Pension Funds, Endowment and Foundation, Corporations/Financial Arms of Corporations, and Other. We thank Professor Yuehua Tang and his coauthors for sharing their reclassification data.

et al. (2013) ends in 2014Q4; however, we assume these classifications remain unchanged in 2015. Because Thomson Reuters and the WRDS SEC Analysis Suite do not have ownership data for all CRSP-Ziman REITs, merging our firm-level and ownership datasets further reduces our sample to 156 unique equity REITs and 3,674 firm quarters.

To measure a REIT's time-varying portfolio exposure to each MSA, we collect data from SNL's Real Estate Database, available at the beginning of each year. For each property held by each REIT in our sample, we collect its property type, MSA location, acquisition date, sold date, book value, initial cost, and historic cost. We then combine these data on historical property holdings from SNL with our merged REIT sample. After the deletion of observations with missing data, our final sample contains 131 unique equity REITs and 3,051 firm quarters spanning the 2004-2015 period.[7]

In the top panel of Table 1, we report summary statistics on ownership data for our final sample. The average (median) aggregate institutional ownership is 75.9% (81.3%).[8] As documented by Chan et al. (1998), Below et al. (2000), Wang et al. (1992), and Ling and Ryngaert (1997), REITs attracted little interest from institutional investors prior to the mid-1990s. For example, Wang et al. (1992) report that institutions (filing 13f forms) typically held less than 10% of outstanding REIT shares. Figure 1 displays the variation in average aggregate institutional ownership (as well as by institution type) over our 2004-2015 sample period. Total institutional ownership continued to increase during the early-to-mid 2000s, exceeding 80% by early 2008, decreased to below 70% during the financial crisis, but rebounded to pre-crisis levels by 2011.

Table 1 also reports summary statistics for REIT ownership by banks, mutual funds, hedge funds, other asset management firms, and other investors. The average ownership percentage of banks is 15.6%. The corresponding percentages for mutual funds and hedge funds are 14.1% and 8.3%, respectively. Other asset management firms held 26.0% of a typical REIT's shares, on average.

Several papers also partition institutional investors into groups based on their manifest behavior; in particular, their ability and tendency to monitor (and pressure) managers. For example, Bushee (1998, 2001) classifies institutional investors into three groups based on

[7] Seventy-seven REITs (835 firm quarters) are deleted due to missing SNL data. Compared to our original sample of 257 equity REITs from CRSP-Ziman, our final sample of 131 REITs typically have slightly higher institutional ownership, are larger in size, have more leverage and growth opportunities, spend less on capital expenditures and have higher profitability but less cash. The correlation of institutional ownership between our final sample of 131 REITs and the entire sample is 93%.

[8] Devos et al. (2013) report lower levels of intuitional ownership of REITs. However, the aggregate institutional ownership data they report is based on ownership of the largest 25 institutional investors obtained from Capital IQ. Our use of the Thomson Reuters database guarantees a more comprehensive coverage of institutional owners.

observable patterns in their portfolio turnover, diversification, and momentum trading. These three groups are labeled by Bushee (1998) as "transient," "dedicated," and "quasi-indexer." We classify an institutional owner of REIT *i* as *PASSIVE* if it is a quasi-indexer; *NONPASS* corresponds to ownership by dedicated and transient institutional investors (Bushee, 1998; Bushee, 2001; Bushee and Noe, 2000).[9] Table 1 reveals that passive investors own, on average, 55.1% of the shares of our sample REITs; in contrast, 20.8% of outstanding shares are owned by non-passive investors.

As an alternative classification approach, we divide institutions into "motivated" and "non-motivated" investors based on the magnitude of their stock holdings (Fich et al., 2015; Hardin et al., 2017). Using quarterly 13f filing for each institutional investor, we calculate the total market value of their overall portfolio and the percentage share of each REIT in that portfolio.[10] If REIT *i*'s weight is ranked in the top decile of the institution's overall portfolio, the institution is classified as a motivated investor/holder (*MOTIVATED*) of REIT *i* shares. The sum of the percentages of REIT *i*'s shares owned by motivated investors is REIT *i*'s motivated institutional ownership.[11] The share of non-motivated investors in any quarter (*NONMOTIV*) is equal to aggregated institutional ownership minus *MOTIVATED*. Table 1 reveals that non-motivated investors own, on average, 55.6% of the shares of our sample REITs; in contrast, 20.2% of outstanding shares are owned by motivated investors. These percentages are very similar to our reported *PASSIVE*/*NONPASS* percentages.

Figure 2 presents a heat map of average REIT institutional ownership across MSAs from 2004 through 2015. We observe a significant geographic dispersion in ownership percentages. The ownership pattern of investors is also highly correlated with that of REIT property holdings.[12] In particular, investors headquartered in MSAs with more REIT property holdings also own more REIT shares. This geographic overlap of REIT property holdings and ownership motivates our study of the relation between institutional ownership and the geography of REIT asset allocations.

[9] The classification of quasi-indexers, dedicated, and transient investors can be downloaded from Bushee's website: http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html.

[10] Our portfolios include only publicly-traded securities available from Thomson Reuters.

[11] As noted by Hardin et al. (2017), our calculated portfolio allocations are approximations because the 13F filings only provide stock ownership information if the value of the position exceeds $200,000 or if the institution owns more than 10,000 shares.

[12] http://www.reitsacrossamerica.com/#/map (Last access: February 23, 2018).

3. Institutional Ownership and the Geography of REITs

3.1. Do Investors Prefer REITs that Concentrate Their Portfolios in the REIT's Home Market?

"Home bias" often refers to the preference on the part of professional investment managers and individual investors for local assets in their portfolio holdings.[13] Ling et al. (2018b) find that equity REITs hold, on average, approximately 20 percent of their portfolios in their home MSAs. Similarly, we define firms (portfolios) as "local" if their business activities (economic interests) are concentrated in a few MSAs (e.g., Ling et al., 2018b, Garcia and Norli, 2012, Shi et al., 2015).

The existing literature provides two explanations for the home bias observed across a broad range of market participants. First, geographic proximity to a firm or its assets provides an information advantage to local investors due the cost of acquiring information about new markets (see, for example, Coval and Moskowitz, 1999, 2001; Garmaise and Moskowitz, 2004; Hau, 2001; Grinblatt and Keloharju, 2001; Ivkovic and Weisbenner, 2005; Ivkovic et al., 2008; Teo, 2009; Giroud, 2013). Investors with a local information advantage therefore choose to specialize in the markets in which they possess an information advantage (van Niewerburgh and Veldkamp, 2009). A similar argument holds for lenders who focus on their primary market. Such lenders are less likely to engage in costly private information production and rely more on public signals when lending in new markets (Agarwal and Hauswald, 2010; Loutskina and Strahan, 2011). On the other hand, firms headquartered in areas with higher institutional presence also enjoy higher liquidity, lower information asymmetry, higher valuation, and lower costs of equity capital (Sulaeman and Wei, 2014; Kim et al., 2018). An alternate explanation for locally biased portfolios is that geographic proximity breeds behavioral biases, which can also lead to local investment concentrations and under-diversification (Huberman, 2001; Seasholes and Zhu, 2010; Pool et al., 2012; Strong and Xu, 2003, Cao et al., 2011; Solnik and Zuo, 2017).

Ling et al. (2018b) find that equity REITs hold, on average, approximately 20 percent of their portfolios in their home MSAs. A question not yet examined in the literature is whether institutional investors are attracted to firms that display a home or local bias in the firm's portfolio. For example, do institutional investors tend to overweight Boston-based REITs whose portfolios are also tilted toward Boston? We therefore start our analysis by investigating whether the institutional ownership of REITs is related to the REIT's home or local bias.

[13] For example, evidence of local bias in investment decisions has been documented among individual equity investors (e.g., Ivkovic and Weisbenner, 2005), institutional investors (e.g., Baik et al., 2010), bond underwriters (Butler, 2008), managers of mutual funds (e.g., Coval and Moskowitz, 1999, 2001; Hau, 2001; Pool et al., 2012), hedge fund managers (Teo, 2009), investors in private commercial real estate (CRE) markets (Garmaise and Moskowitz, 2004), and in the origination decisions of lenders (Giannetti and Laeven, 2012).

A well-developed literature has examined the extent to which various firm characteristics help to explain cross-sectional variation in the percentage of a firm's shares owned by institutional investors. For example, evidence exists that institutional investors prefer more liquid stocks with lower return volatility (e.g., Badrinath et al., 1996; Falkenstein, 1996, and Huang, 2015), better managerial performance (e.g., Parrino et al., 2003), better disclosure (e.g., Bushee and Noe, 2000), and better corporate governance (e.g., Bushee et al, 2010; Chung and Zhang, 2011). Other studies show that institutional investors prefer to invest in larger companies (Gompers and Metrick, 2003) and companies that pay larger cash dividends or repurchase shares (Grinstein and Michaely, 2005). Research also suggests institutional ownership shares are related to the past performance of the stock (e.g., Shleifer and Vishny, 1986; Nofsinger and Sias, 1999). Using REIT data, Downs (1998) and Chan et al. (2003) also show that past returns are predictive of institutional ownership levels. We provide new evidence on the behavior of institutional investors by analyzing the relation between the home or local bias of equity REITs and the level of institutional ownership while controlling for related firm characteristics.

Methodology

To examine the relation between institutional ownership levels and the home bias of REIT portfolios, we estimate the following cross-sectional regression model:

$$IO_{i,t} = \alpha + \beta HOMECON_{i,t} + \gamma Controls_{i,t} + \varphi_{ppty} + \varepsilon_{i,t} . \quad (1)$$

$IO_{i,t}$ is the fraction of REIT *i*'s shares held by all, or a particular type of, institutional investor in quarter *t*.[14] $HOMECON_{i,t}$ is the percentage of REIT *i*'s portfolio located in its headquarters MSA in quarter *t*, calculated as:

$$HOMECON_{i,t} = \frac{\sum_{p,i,l=home,t}^{N_{i,l=home,t}} (ADJCOST_{p,i,l,t})}{\sum_{i,l,t}^{N_{i,t}} (\sum_{p,i,l=home,t}^{N_{i,l=home,t}} (ADJCOST_{p,i,l,t}))} . \quad (2)$$

$ADJCOST_{p,i,l,t}$ is the adjusted cost of property *p* held by firm *i* in MSA *l* at the beginning of quarter *t*. The adjusted cost of a property is defined by SNL as the maximum of (1) the reported book value, (2) the initial cost of the property, or (3) the historic cost of the property including capital expenditures and tax depreciation.[15] $N_{i,l,t}$ is the total number of properties held by firm *i* in MSA

[14] We follow the literature (e.g. Chung and Zhang, 2011) and use $IO_{i,t}$ instead of $IO_{i,t+1}$. Our results are qualitatively the same using $IO_{i,t+1}$.

[15] The use of adjusted cost or book value in place of unobservable true market values may understate the (value-weighted) percentage of the REIT portfolio invested in MSAs that have recently experienced a relatively high rate of

l in quarter t. $N_{i,l=home,t}$ is the total number of properties held by REIT i in its home MSA (l = home) in quarter t. The total number of properties held by firm i in quarter t in any location is denoted as $N_{i,t}$. SNL updates its property share data at the end of each calendar year. $HOMECON_{i,t}$, is therefore measured at the beginning of the calendar year in which institutional ownership is measured.

We also calculate $TTLSHARE1_{i,t}$ and $TTLSHARE2_{i,t}$ to capture a REITs' property portfolio concentration in its investors' home MSAs. In particular, $TTLSHARE1_{i,t}$ is calculated as REIT i's share of properties in all the MSAs in which at least one investor is headquartered in quarter t. A larger $TTLSHARE1_{i,t}$ indicates a higher level of geographic overlap between REIT properties and the headquarters of institutional investors, which subsequently lowers the cost of information production. As a robustness check, we calculate $TTLSHARE2_{i,t}$ by summing all REIT property shares in MSAs in which at least two investors are headquartered.[16]

$Controls_{i,t}$ in equation (1) denotes a set of firm-quarter control variables. In selecting these variables, we follow the related finance and real estate literature (e.g., Chung and Zhang, 2011; Bernile et al., 2015; Hartzell et al., 2014; Devos et al., 2013). *UPREIT* is a dummy variable set equal to one if the firm is structured as an Umbrella Partnership REIT or Down-REIT.[17] *MKTCAP* is the natural logarithm of the product of the stock price and common shares outstanding. *VOLATILITY* is the standard deviation of REIT *i*'s daily returns during quarter *t*. *ILLIQUID* captures the stock's illiquidity during the quarter (Amihud, 2002).[18] *LOGPRC* is the natural logarithm of the stock price and *LAG3MREIT* is the stock's total return over quarter *t*. *MB* is the firm's market-to-book ratio, which is set equal to the market value of the firm's assets divided by total book value. *ROA* is the return on assets in quarter *t*, calculated as the ratio of net income to total assets. Finally, *LEVERAGE* is the sum of current liabilities and long-term debt, divided by total assets. Data used to calculate control variables are obtained from CRSP-Compustat merged database. Daily and monthly share price and the number of shares

price appreciation. Conversely, its use may overstate the percentage of the REIT portfolio in MSAs that have experienced relatively low price appreciation.

[16] By design, $TTLSHARE2_{i,t}$ captures more geographic overlap between a REIT's properties and its investors than $TTLSHARE1_{i,t}$. We expect to find a larger coefficient on $TTLSHARE2_{i,t}$.

[17] An umbrella partnership REIT (UPREIT) typically consists of two entities: a REIT and an operating partnership (OP). The REIT issues stocks to the public and uses the funds it raises to purchase properties and a controlling interest in the OP. The operating partners receive OP units for the real estate assets they contribute to the OP and enjoy deferral of capital gains taxation (Ling and Archer, 2016). The DOWNREIT structure is a variation of the UPREIT structure. A DOWNREIT can own multiple partnerships at the same time and may own assets at both the REIT and the partnership levels.

[18] *ILLIQUID* is the ratio of daily absolute stock return to its dollar volume, averaged over quarter *t*. It can be interpreted as the daily price response associated with one dollar of trading volume (Amihud, 2002).

outstanding are obtained from CRSP-Ziman. Appendix 1 contains variable definitions and corresponding data sources.

In addition to these standard control variables, we control for the extent to which the firm's portfolio is concentrated by property type and by MSA. We first classify the holdings of each REIT at the beginning of each calendar year into one of five property type categories: office, multifamily, industrial, retail, and other. We then calculate the firm's property type Herfindahl Index, $PropHHI_{i,t}$, which is defined as $\sum_k p_{k,i,t}^2$, where $p_{k,i,t}$ is the proportion of firm i's assets (based on adjusted cost) invested in property type k in year t. $PropHHI_{i,t}$ can range from zero to one. The greater is the value of $PropHHI_{i,t}$ the more concentrated are the REIT's assets by property type. Similarly, the geographic Herfindahl Index, $GEOHHI_{i,t}$, measures the extent to which a REIT's property portfolio in each quarter is concentrated by MSA.[19] Hartzell et al. (2014) posit that REIT valuations (i.e., Tobin's Q) are positively related to both the property type and geographical concentration of the firm across regions.

Summary statistics for our control variables are provided in the bottom panel of Table 1. The average property type Herfindfahl index is 0.859, which indicates a typical REIT is highly focused by property type. In contrast, the average Herfindfahl index for geographic/MSA focus is 0.158, which reveals that a typical REIT is relatively more diversified across MSAs, consistent with Capozza and Seguin (1990), Hartzell et al. (2014) and Wang et al. (2017). Eighty-three percent of our REIT-quarter observations represent UPREITs. An average REIT in our sample has a market cap of $3.0 billion, a market-to-book ratio of 1.4, a quarterly return on asset of 0.7%, a leverage ratio of 52.3%, price volatility of 7.8%, and a previous three-month stock return of 3.4%.

Results

The determinants of institutional ownership shares are known to vary over time (Devos et al., 2013). We therefore separately estimate equation (1) for each of the 48 quarters in our 2004-2015 sample period. Property-type fixed effects (φ_{ppty}) are included. Our base-line results for aggregate institutional ownership are reported in column (1) of Table 2. The estimated coefficient on *HOMECON* is positive and significant at the 1% level, indicating institutional investors have a relative preference for REITs with high asset allocations in the REIT's home MSA. This is consistent with these investors recognizing the potential information advantage REITs have in their local markets (Ling et al. 2018b).

[19] As a robustness check, we also measure geographic concentration over eight regions, as defined by SNL: Northeast, Mideast, Southeast, East North Central, West North Central, Southwest, Mountain, and Pacific. Results based on this geographic classification remain robust.

Column (2) of Table 2 reports results obtained when *GEOHHI* is added to the cross-sectional regressions. The estimated coefficient on *GEOHHI* is negative and marginally significant. However, the estimated coefficient on *HOMECON* remains positive and increases in magnitude. The magnitude and significance of the control variables are largely unchanged by the addition of *GEOHHI* to the specification. Finally, we add *PropHHI* to the regression specification (column (3)). The estimated coefficient on *PropHHI* is positive and highly significant (t-stat=14.69). The addition of *PropHHI* to the specification further increases the magnitude and statistical significance of the positive coefficient on *HOMECON*, suggesting that the omission of geographic and property type concentrations negatively bias the coefficient of *HOMECON*.[20] The estimated coefficient on *HOMECON* is also economically significant: a 10% increase in *HOMECON* is associated with 2.3% increase in institutional ownership (Model (3)).

The coefficients of our control variables suggest that, relative to non-institutional investors, institutional investors prefer UPREITs, REITs with larger market capitalizations, and REITs with higher stock prices. Consistent with prior studies (e.g., Badrinath et al., 1996; Falkenstein, 1996; Chung and Zhang, 2011), we find that institutional investors have significantly lower holdings of illiquid stocks, stocks with high market-to-book ratios and high ROAs. As expected, aggregate institutional ownership levels are negatively related to firm leverage in models (1) and (2).

Column 4-7 presents results based on the proportion of REIT shares owned by banks and trusts (*BANKS*), mutual funds (*MFS*), hedge funds (*HFS*), and other asset management companies (*OAMS*), respectively. The estimated coefficient on *HOMECON* is positive and significant at the 5% level or better in the bank, mutual fund, and other asset management firm regressions. In addition, the estimated coefficient on *PropHHI* is positive and highly significant in these regressions. We find little evidence that institutional investors pay attention to the MSA focus of REITs. Rather, the focus they respond to is the REIT's concentration in the REIT's home MSA. An interesting result reported in columns (6) is the lack of interest hedge funds display in the home concentration of REITs or in the extent to which REITs are focused by property type.

[20] The correlation between *HOMECON* and *GEOHHI* is positive while the correlation between *IO* and *GEOHHI* is negative, producing a downward bias. The correlation between *HOMECON* and *PropHHI* is negative while the correlation between *IO* and *PropHHI* is positive, also producing a downward bias. In an unreported analysis, we also included the entrenchment index (E-Index) to control for the potential confounding effects of better corporate governance (Bebchuk et al., 2009; Chung and Zhang, 2011). The E-Index is constructed using Institutional Shareholder Services (ISS) data, which is only available for S&P 1500 companies. Therefore, the inclusion of E-Index into our analysis further reduces our sample size. Nevertheless, we continue to find positive and significant coefficients on *HOMECON*.

We also re-estimate the regressions reported in Table 2 after replacing *HOMECON* with *TTLSHARE1* and *TTLSHARE2*, respectively. The results are reported in column (2) and (3) of Appendix 2, respectively. We include the baseline results using *HOMECON* in column (1) as a reference. The estimated coefficients on *TTLSHARE1* and *TTLSHARE2* are both positive and highly significant and are comparable in magnitude to the coefficient on *HOMECON*. This suggests in the aggregate that institutional investors prefer REITs headquartered in their local MSAs (home bias) as well as REITs that own property in their home MSA (local bias).

The time series variation in ownership levels discussed above suggests that the determinants of institutional ownership have varied over our sample period. To further investigate this question, we divide our sample period into three subsamples: pre-crisis (2004Q1-2006Q4); crisis (2007Q1-2009Q2); and (3) post-crisis (2009Q3-2015Q4). We then re-estimate models (3) through (7) of Table 2 for each subsample. These results are reported in Appendix 3-5. Regarding our variable of primary interest, *HOMECON* is positive and significant at the 1% level in the three sub-periods using data aggregated across all investor types (column 3). However, the estimated coefficient on *HOMECON* varies by investor type across the three subsample periods. For example, the coefficient on *HOMECON* among banks cannot be distinguished from zero in the pre-crisis and crisis periods, but is positive and highly significant in the post-crisis period. As discussed above, hedge fund holdings are unrelated to *HOMECON* when our Fama-MacBeth regressions are estimated over the entire 48 quarter sample period.

Interestingly, the effect of *HOMECON* peaked in magnitude during the crisis period and returned to the average level during the post-crisis period. This effect is partially explained by the fact that mutual funds and hedge funds significantly increased their holdings of home-concentrated REITs during the pre-crisis and crisis periods, and liquidated those shares during the post-crisis period. It is the negative and significant coefficient on *HOMECON* in the post-crisis period that causes the coefficient on *HOMECON* to be insignificant when using the entire sample. These sub-period results reinforce the conclusion that the demand by institutional investors for REIT shares, relative to non-institutional investors, varies over time and by type of institution.

Alternative Classifications of Institutional Investors

Results from previous studies suggest that conventional classifications of institutional investors may not accurately capture the full range of investor influence and characteristics (e.g., Hardin et al., 2017), including their sensitivity to the geography of their investment portfolio. We therefore estimate equation (1) separately for passive and non-passive investors. These results

are reported in columns (2) and (3) of Table 3. For comparison, our base-line results for aggregate institutional ownership (Table 2, column (3)) are reproduced in column (1). To conserve space, the results for the control variables are not tabulated. The estimated coefficient on *HOMECON* for the subset of passive investors is positive and highly significant. In fact, the magnitude of the coefficient is similar to the aggregate ownership result reported in column (1). In sharp contrast, the estimated coefficient on *HOMECON* for the subset of non-passive (dedicated and transient) investors is statistically insignificant. One possible explanation is that non-passive investors, such as hedge funds, are active monitors of REITs, thereby allowing REITs to expand in terms of geographic complexity (Hartzell et al., 2014).

The corresponding results for non-motivated and motivated investors are reported in columns (4) and (5) of Table 3. The estimated coefficient on *HOMECON* for both investor types is positive and significant at the 1% level. Similar to our aggregate results, our four investor subgroups appear to be largely indifferent to geographic concentrations but appear to favor REITs that concentrate their property holdings by property type.

3.2. Do Investors Prefer REITs with Economic Interests in the Investor's Home Market?

The evidence presented above suggests that, relative to retail investors, institutional investors prefer REITs that tilt their portfolios toward the REIT's home market or to the investor's home MSA. We now turn to an examination of whether the geographic distribution of a REIT's economic interests generates information asymmetry among institutional investors and affects their portfolio allocations. In particular, we ask the following question: Do investors prefer REITs with large economic interests in the investor's home market? If the answer is yes, we expect to find a positive relationship between a firm's local economic interest and its "local" institutional ownership.[21]

Methodology

To measure each REIT's economic interests in each MSA, we construct a measure similar to $HOMECON_{i,t}$ in Equation (2). Our test variable, $SHARE_{i,l,t}$, measures REIT i's exposure to MSA l in which the REIT has an economic interest. A REIT is deemed to have an economic interest in

[21] Our analyses in this section are still at the REIT level, consistent with Section 3.1. We do not perform an investor-level analysis for a couple of reasons. First, we do not observe all the assets but only the publicly-traded securities held by investors. Second, results based on an outcome variable at investor-REIT level might be dubious because different investors have different investment objectives, expertise and constraints. In other words, we would also need a relative measure to be constructed at investor-REIT level to de-mean this effect. However, the classifications of investors in the existing literature (discussed in Table 1) provide no clear guidance on investor's preference on REITs. We thank Wayne Archer for his constructive comments on this point.

a MSA if it is headquartered there, regardless of property holdings, or if it owns properties in the MSA. $SHARE_{i,l,t}$ is defined as:

$$SHARE_{i,l,t} = \frac{\sum_{p,i,l,t}^{N_{i,l,t}}(ADJCOST_{p,i,l,t})}{\sum_{i,l,t}^{N_{i,t}}(\sum_{p,i,l,t}^{N_{i,l,t}}(ADJCOST_{p,i,l,t}))} \quad (3)$$

In Equation (3), the numerator is the adjusted cost of properties held by REIT *i* at location *l* at time *t*. The denominator is the adjusted cost of all the properties held by REIT *i* at time *t*.

Our outcome variable is a location-based measure of institutional ownership constructed by mapping the locations of a REIT's economic interest to the locations of its institutional investors. The objective is to see whether REIT *i* with a large proportion of properties in MSA *l* (measured by $SHARE_{i,l,t}$) also has "excessive" investment from investors headquartered in MSA *l*.

We use a web-crawling algorithm to retrieve institutional investors' historical headquarters locations from 13(f) filings stored on the SEC's Electronic Data Gathering (EDGAR) and from a Google search between 2004 and 2015. We then merge historical investor headquarters data with ownership data from Thomson Reuters by institution names. Our data are superior to *Nelson's Directory of Investment Managers* because we are able to precisely identify investor headquarters relocations, which alter each REIT's exposure to the investor's information environment.[22]

We first calculate the number of REIT *i*'s shares at time *t* owned by all institutional investors headquartered in MSA *l*, as a percentage of all shares of REIT *i* owned by institutional investors. More specifically, we define local institutional ownership (*LIO*) as

$$LIO_{i,l,t} = \frac{REITshares_{i,l,t}}{\sum_{i,t}^{l=N} REITshares_{i,l,t}}, \quad (4)$$

where $REITshares_{i,l,t}$ is the total number of shares of REIT *i* held by all institutional investors headquartered in MSA *l* at time *t*. The denominator of equation (4) is the total number of shares of REIT *i* held by all institutional investors at time *t*, regardless of their MSA location. Note that the total institutional ownership of each REIT at time *t* is paired with the REIT's institutional ownership by investors in each of the *N* MSA. Thus, the sum of $LIO_{i,l,t}$ across all MSAs for each REIT at time *t* is equal to one.

[22] We also examine REIT headquarters relocations over our sample period. We obtain historical REIT headquarters locations from the Compustat Snapshot quarterly database. There were only three REIT headquarters relocations over our sample period. Our results are robust to excluding these three REITs.

The institutional investors from certain MSAs tend to invest more in REITs, regardless of whether those REITs have a presence or not in the home MSA of the investor (see Figure 2). Thus, a higher $LIO_{i,l,t}$ might be attributed to a stronger preference for firms in the REIT industry by investors from those MSAs. For example, assume the average ownership percentage across all REITs by institutional investors headquartered in Boston at time t is 10%. The institutional ownership of a particular REIT at time t by investors located in Boston should therefore be considered high or "excessive" only if it exceeds 10%. Said differently, the 10% institutional ownership of an average (representative) REIT by all Boston-based investors at time t should be used to de-mean the ownership percentage of a particular REIT headquartered in Boston at time t by Boston-based investors. In contrast, assume the average ownership percentage across all REITs by investors headquartered in Indianapolis at time t is 3%. The institutional ownership of a particular REIT by investors headquartered in Indianapolis at time t should be considered excessive only if it exceeds 3%.

The relative measure of local institutional ownership used as the dependent variable in our excess ownership regressions, $EO_{i,l,t}$, is therefore defined as

$$EO_{i,l,t} = \quad LIO_{i,l,t} - \overline{LIO_{l,t}} \tag{5}$$

where $\overline{LIO_{l,t}}$ is the average ownership across all REITs of institutionally owned shares by investors headquartered in MSA l. Note that $EO_{i,l,t}$ will be negative if the institutional ownership percentage of REIT i at time t by investors headquartered in MSA l is less than the average ownership percentage of all REITs among investors headquartered in MSA l.

To examine the determinants of excess local institutional ownership, we first estimate the following Fama-MacBeth (1973) regression of MSA-level excess ownership:

$$EO_{i,l,t} = \alpha + \beta_1 HQMSA_{i,l,t} + \gamma Controls_{i,t} + \varphi_l + \varepsilon_{i,l,t}. \tag{6}$$

The primary variable of interest in equation (6) is $HQMSA_{i,l,t}$, which is equal to one if REIT i is headquartered in MSA l in quarter t, and 0 otherwise. A positive coefficient on $HQMSA$ indicates that excess local ownership of REIT i's stock among investors headquartered in MSA l is positively related to whether or not REIT i is also headquartered in MSA l. For example, we are examining whether Boston-based institutional investors tilt their REIT portfolios toward REITs also headquartered in Boston. This is different from Section 3.1 in which we investigate whether the aggregated institutional ownership of REITs is related to the REIT's home concentration of its properties.

$Controls_{i,t}$ denotes a set of firm-level controls that includes those used in our prior analysis: *UPREIT*, *MKTCAP*, *VOLATILITY*, *ILLIQUID, LOGPRC*, and *LEVERAGE*. We also include several new control variables following Bernile et al. (2015). *IDIORISK* is the standard deviation of the firm's return residuals in the current quarter. *CASH* is the sum of cash and equivalents divided by lagged total assets. *LAG6MREIT* is the stock's total return over the prior six months and *SP500* is an indicator variable set equal to one if the stock is included in the S&P 500 index in quarter *t*. Finally, *YOUNG* is an indicator variable set equal to one if the REIT's IPO occurred in the prior five years. φ_l is a vector of MSA fixed effects.

The regression specification depicted by equation (6) captures the average shift in excess institutional ownership that would occur if the REIT is headquartered in the same MSA as the investors. We next examine whether the excess ownership of investors in MSA *l* is marginally related to the percentage of the REIT's portfolio that is invested in MSA *l* by estimating the following augmented Fama-MacBeth (1973) regression model:

$$EO_{i,l,t} = \alpha + \beta_1 HQMSA_{i,l,t} + \beta_3 SHARE_{i,l,t} + \gamma Controls_{i,t} + \varphi_l + \varepsilon_{i,l,t} \ . \qquad (7)$$

The specification in Equation (7) allows us to examine whether, for example, Boston-based institutional investors tilt their REIT portfolios toward a REIT headquartered in Boston and toward a REIT that invest a large proportion of its portfolio invested in Boston, regardless of the REIT's headquarter location.

To allow for a more flexible model specification, we also replace *HQMSA* with *OWNPPTY*, which is a dummy variable set equal to one if a REIT owns any property in the investor's home MSA. This alternative specification allows us to examine the extent to which institutional investors tilt portfolios toward REITs that own any properties in the investors' home MSA, even if the REIT is not headquartered there. The alternative cross-sectional regression of excessive local institutional ownership is:

$$EO_{i,l,t} = \alpha + \beta_2 OWNPPTY_{i,l,t} + \gamma Controls_{i,t} + \varphi_l + \varepsilon_{i,l,t}, \qquad (8)$$

Finally, as a robustness check, we replace *OWNPPTY* with our continuous measure of ownership intensity, *SHARE,* and estimate the following specification:

$$EO_{i,l,t} = \alpha + \beta_3 SHARE_{i,l,t} + \gamma Controls + \varphi_l + \varepsilon_{i,l,t}. \qquad (9)$$

Results

The results from estimating equations (6) through (9) are reported in Table 4. Investor MSA fixed effects (φ_l), which control for the headquarter location of the investors, are included. Except for indicator variables, all firm characteristics are standardized to have a mean of zero and a standard deviation of one. The results from estimating equation (5) are reported in the first column of Table 4. The estimated coefficient on *HQMSA* is positive and highly significant (1.402 with t-stat=28.47), indicating that excess ownership is 1.4% greater when the REIT is headquartered in the home MSA of the investors.

Our results also indicate that excess ownership is positively related to the extent to which the REIT is concentrated by MSA (0.024 with t-stat=3.30). Nevertheless, the geography that appears to matter more to investors is the location of the REIT's headquarters in the investors' home market. Consistent with evidence documented in Bernile et al. (2015), excess local institutional ownership is positively related to the firm's idiosyncratic risk, cash holdings, and illiquidity and negatively related to the firm's equity market capitalization. However, in contrast to Bernile et al. (2015), we find that institutional investors seem to favor younger REITs. One possible explanation is that younger REITs are more likely to be structured as UPREITs, thereby attracting more institutional investors.

The results from estimating equation (6) with cross-sectional regressions are reported in the second column of Table 4. The estimated coefficient on *SHARE* is positive and highly significant (2.842 with t-stat=13.11), indicating that excess ownership is related to how concentrated the REIT's portfolio is in the investors' home market. Moreover, the estimated coefficient on *HQMSA* remains positive and highly significant. These results are economically meaningful. We find that the average *SHARE* in REIT home MSAs is 22.4%. Therefore, all else equal, the incremental effect of *SHARE* on *EO*, from the mean and conditional on when the REIT is headquartered in the home market of the investor, is significant (1.62%=0.983%+22.4%×2.842%). Taken together, the results reported in columns (1) and (2) provide strong evidence that institutional investors tilt portfolios toward REITs that are headquartered in the investors' MSA and that the degree of tilting is positively related to the share of the REIT's portfolio invested in the investors' home MSA.

Evidence regarding the extent to which investors tilt portfolios toward REIT's that own any property in the investor's home MSA, but are headquartered elsewhere, is reported in column (3) of Table 4. The estimated coefficient on *OWNPPTY* is positive and highly significant (0.108 with t-stat=9.18). When the dummy variable *OWNPPTY* is replaced by the continuous variable *SHARE* (see column (4)), the estimated coefficient on *SHARE* is positive and highly significant

(4.033 with t-stat=19.07). Thus, excess local ownership increases as the proportion of the REITs' portfolio in the investor's home MSA increases. This result is consistent with the magnitude of the local investor's information advantage increasing with the size of the REIT's portfolio in the investor's home MSA.

In Table 5, we re-estimate equations (5), (6), (8), and (9) in a panel regression framework with firm and year-quarter fixed effects. Standard errors are clustered at MSA level. The magnitude of the coefficient estimates on our main test variables, including *HQMSA*, *OWNPPTY*, and *SHARE,* are very similar to those estimated using Fama-MacBeth regressions, although t-statistics are generally smaller.[23]

In robustness tests, we add property type dummies to the regression models and find our results (summarized in Panel A of Appendix 6) are highly consistent. To check the heterogeneity among property types, we further interact our variables of interests, *HQMSA*, *OWNPPTY*, and *SHARE,* with the five property dummies. Results in Panel B of Appendix 6 suggest a larger correlation, in terms of statistical and economic significance, between the geography measures and excess ownership among retail and multifamily REITs.

Difference-in-difference-difference (DDD) analysis based on investor relocations

Our empirical approach relies on the assumption that investor relocation affects outcomes for identifiable subjects who are otherwise indistinguishable from those not directly affected by the relocation.[24] This might be a plausible assumption because an investor's relocation decision is not likely affected by its holdings of a specific REIT. REIT shares constitute a small percentage of the typical investors' entire portfolio. This feature allows us to use relocation decisions as proxies for a shift in the exposure of REITs to the local information environment of investors.

We identify 73 investor headquarters relocations during our sample period. About 69 (73) different MSAs had at least one investor move in (out), affecting 5,292 REIT-MSA-Quarters (5,123 REIT-MSA-quarters). We place an excess ownership observation (i.e., a REIT-MSA-quarter) into the move-in sample if any investor moved into a MSA during our sample period.[25]

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[23] We also conduct sensitivity analysis by including (1) only year-quarter fixed effects; (2) firm fixed effects; (3) firm and year-quarter fixed effects; and (4) MSA and year-quarter fixed effects. For each specification, we cluster standard errors in different ways, including, firm-level, MSA-level and firm-MSA level. The results are very similar; however, when we cluster at the firm-level, the t-statistics of *HQMSA* (columns (1) and (2)) and *OWNPPTY* (column (3)) increases, and that of *SHARE* (columns (2) and (4)) decrease. Results are available upon request.

[24] Our assumption is similar to Bodnaruk (2009), who argues that when individual investors change the location of their personal residence, they are nearer some companies (in their new home) and farther away from others, which has implications for portfolio choice.

[25] In our sample of investor relocations, the top-three MSAs that investors moved in include New York-Northern New Jersey-Long Island, NY-NJ-PA MSA (11 move-ins), Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA (6 move-ins), Bridgeport-Stamford-Norwalk, CT MSA (4 move-ins) and Chicago-Naperville-Joliet, IL-IN-WI MSA (4 move-ins). the top-three MSAs that investors moved in include New York-Northern New Jersey-Long Island, NY-NJ-PA MSA (14

For example, if an investor relocated to Boston during our sample period, we classify all REITs headquartered in Boston (i.e., REIT *i*–MSA *I*=Boston–quarter *t*) as belonging to the move-in sample. We have 33,510 excess ownership observations that involved an investor move-in during our sample period. Next, we split the move-in-sample into pre- and post-move-in subsamples. For example, if an investor relocated to Boston in 2005Q1, excess ownership observations on the REIT portfolio holdings of all Boston-based investors prior to 2005Q1 are placed in the pre-move-in subsample; observations after 2005Q1 are classified as post-move-in. [26] The pre-move-in subsample contains 11,733 observations; the post move-in subsample of excess local institutional ownership observations totals 21,777.

As an initial exercise, Table 6 further separates the excess local institutional ownership of REITs by all investors in a MSA (*EO*) into four categories corresponding to the pre- and post-relocation period as well as the high- and low-property-share group. In Panel A we focus on the move-in results. Excess local institutional ownership observations in the move-in sample are placed in the *lowSHARE* (*highSHARE*) group if the percentage of the REIT's portfolio invested in a MSA in quarter *t*—i.e., *SHARE*--is below (above) the median REIT percentage ownership in the MSA immediately prior to the relocation of an investor to the MSA. This standard difference-in-difference (DD) setting allows us to examine the effects of treatment (i.e., relocation of an investor into a REIT's home MSA)) on a REIT's excess local institutional ownership by comparing two groups (treatment and control) before and after treatment, conditional on different levels of property shares to account for unobservable factors that drive investment decisions.[27]

The excess local institutional ownership of both the pre move-in and post move-in samples among *lowSHARE* REITs is negative. This is consistent with our previous findings of a positive relation between excess local institutional ownership and property share (see Table 4 and 5). The difference between the excess local institutional ownership of the pre-move-in-*lowSHARE* group (-0.258) and the post-move-in-*lowSHARE* group (-0.216) is 0.042, which, although not reported in Table 6, is statistically insignificant. This can be interpreted as the relation between moving-in and excess local institutional ownership, conditional on a low-property *SHARE*. The excess local institutional ownership of both the pre move-in and post move-in samples among *highSHARE* REITs is positive, which is again consistent with a positive relation between excess local

move-outs), Boston-Cambridge-Newton, MA-NH MSA (6 move-outs), Los Angeles-Long Beach-Santa Ana, CA MSA (5 move-ins), San Francisco-Oakland-Fremont, CA MSA (5 move-outs) and Washington-Arlington-Alexandria, DC-VA-MD-WV MSA (5 move-outs).

[26] Results are robust if we impose a 1-, 2-, 3-, or 4-quarter lag between pre- and post-period.

[27] For example, if an investor's incentive to invest in a particular MSA is low for some unobserved reasons, relocation would not affect her holding of REITs that have property portfolio in that MSA.

institutional ownership and property share. The difference between the excess local institutional ownership of the pre-move-in, *highSHARE* group (0.150) and the post-move-in-*highSHARE* group (0.296) is 0.146, which is statistically significant at the 1% level. This can be interpreted as the relation between moving-in and excess local institutional ownership, conditional on a high-property *SHARE*.

The *highSHARE* minus the *lowSHARE* differences in excess local institutional ownership are 0.408 in the pre-move subsample and 0.513 in the post-move subsample. These differences are statistically significant (t-stats of 10.31 and 17.70, respectively). The DD estimator is 0.105 (t-stat=2.14), suggesting that the difference in excess local institutional ownership between the low and high property share groups becomes larger in the post-move-in period. In other words, the increase in excess local institutional ownership associated with moving in to a MSA is larger among REITs that have high local property shares.

In Panel B of Table 6, we examine the effects of investors leaving their HQ MSAs. Consistent with results in Panel A, firms with high property shares experience a larger decrease in excess local institutional ownership compared to firms with low property shares.[28]

To examine the impact of the proximity between firm headquarters and asset locations on excess local institutional ownership in a conditional framework, we estimate the following triple-difference models:

$$EO_{i,l,t} = \theta^{I} MOVEIN_{l} POST^{I}_{l,t} SHARE_{i,l,t} + \sigma^{I} MOVEIN_{l} POST^{I}_{l,t} + \psi^{I} SHARE_{i,l,t} + \gamma Controls_{i,t} + \varphi_{l} + \varphi_{t} + \varepsilon_{i,l,t} \quad (10)$$

$$EO_{i,l,t} = \theta^{O} MOVEOUT_{l} POST^{O}_{l,t} SHARE_{i,l,t} + \sigma^{O} MOVEOUT_{l} POST^{O}_{l,t} + \psi^{O} SHARE_{i,l,t} + \gamma Controls_{i,t} + \varphi_{l} + \varphi_{t} + \varepsilon_{i,l,t} \quad (11)$$

The definition of $EO_{i,l,t}$ and $SHARE_{i,l,t}$ are the same as in Equation (5)-(9).$MOVEIN_{l}$ ($MOVEOUT_{l}$) is a dummy variable that indicates if at least one investor moved into (or out of) MSA *l*, $POST^{I}_{l,t}$ ($POST^{O}_{l,t}$) is a dummy variable equal to one for the post move-in (move-out) period and zero otherwise. $MOVEIN_{l} POST_{l,t} SHARE_{i,l,t}$ (in Eq. 10) and $MOVEOUT_{l} POST_{l,t} SHARE_{i,l,t}$ (in Eq. 11) are interactions among a relocation dummy, a post-relocation dummy, and property shares.

[28] In this analysis, we calculate the cut-off based on the entire sample excluding the move-in sample. Therefore, we have a smaller sample compared with in Panel A. When we include move-ins (results unreported) we do not find any differences in excess local institutional ownership before and after move-out. This is likely due to the slow decay in the information advantage investors enjoy about their prior MSA, even after relocation to a new MSA. Another possible explanation is that the move-in MSAs overlap to some extent with the move-out MSAs and our results are contaminated by both effects.

$Controls_{i,t}$ are the time-varying controls used in Equation (3)-(6). φ_t are year-quarter fixed effects, and φ_l are location (MSA) fixed effects.

The key coefficients of interest are θ^I in equation (10) and θ^O in Equation (11), respectively. The expected sign of θ^I (θ^O) is positive (negative). That is, we expect the excess ownership of investors located in MSA l in a particular REIT will increase (decrease) if at least one investor moves to a MSA in which the REIT has economic interests. Under the assumption that, conditional on the other controls, the interaction terms are uncorrelated with ε_{ilt}, the θ coefficients identify the association between investor relocations and *EO*.

The results from estimating equation (10) and (11) are reported in Table 7. We perform this analysis without control variables (Column 1 and 3) as well as with the same set of control variables (Column 2 and 4) used in our excess local institutional ownership regressions (results reported in Tables 4 and 5). The number of excess local institutional ownership observations are identical to those reported in Table 4 and 5. All the model specifications have quarter and investor MSA fixed effects. Standard errors are clustered at firm-MSA level.

The setting is the following. Suppose investors tend to increase their holdings in REITs with more local exposure in a particular MSA to which the investor relocates. Allowing for differences between pre- and post-relocations (through $MOVEIN_l POST_{l,t}$ and $MOVEOUT_l POST_{l,t}$) and in property shares (through $SHARE_{i,l,t}$), as well as controlling for the heterogeneity across MSAs (through the MSA fixed effects), time periods (through the quarter fixed effects) and time-vary firm characteristics (through control variables), we answer the following question: do investors adjust their ownership of REITs that have high property shares more than they adjust their ownership of REITs with low property shares in markets to which the investor relocates?

The results in Table 7 suggest that, consistent with the univariate analysis in Table 6, we observe an increase in local bias towards REITs with high local exposure after relocation in the move-in sample. However, no effect is observed in the move-out subsample.[29]

Although investors' relocation decisions are not likely driven by their REIT holdings, there are still concerns that economic conditions in some MSAs during certain period of time might correlate with investors' relocation decisions and, at the same time, correlate with excess local institutional ownership.[30] For example, investors might decide to relocate from MSAs that have

[29] We repeat the test using a restricted sample in which there is no overlap between move-in and move-out MSAs and find positive move-in effects and negative move-out effects, although the move-in effects are not significant. It is possibly due to the reduced sample size as most of the MSAs experienced move-in also had move-out. The results are un-tabulated and available upon request.

[30] We thank Garry Twite and Yuehua Tang for this helpful comment.

performed poorly after the recent financial crisis, and at the same time, excess local institutional ownership in these MSA-years might decrease. We do not find any significant differences in the economic performance of MSAs that experienced move-outs and those that experienced move-ins. Nevertheless, we conduct additional robustness by including MSA-year dummies that control for both spatial *and* time-varying heterogeneity. Untabulated results show that the coefficient estimate of *MOVEIN × POST × SHARE* in Model (2) of Table 7 is 1.315 (t-stat = 2.16) when we control for MSA-year fixed effects and 1.307 (t-stat = 2.16) when we control for MSA-subperiod (i.e., pre-crisis, crisis and post-crisis period) fixed effects. These findings suggest that our results are not likely driven by the differences in local economic conditions.

Another potential concern is that the *expected* economic performance of a MSA is an omitted variable that correlates with both relocation and institutional holdings. We attempt to mitigate this concern in two ways. First, we add MSA-specific time trends to account for MSA specific changes that could bias our DDD estimates. Second, we manually search news articles for explanations of the headquarters relocation decisions of the institutional investors in our relocation subsample. (see Appendix 7). Although we cannot find definitive reasons for all the relocation cases, most stated reasons, such as the CEO's desire to move the investor's headquarters to his home town, are not related to the expected future economic performance of the MSA. Nevertheless, we re-run our tests after deleting relocations with a stated reason that could be related to the future economic performance of the MSA to which the investor was moving, such as a friendly business environment.

We find that our DDD coefficient estimate (Model (2) of Table 7) is 1.311 (t-stat = 2.19) after adding MSA-specific time trends and 1.330 (t-stat=2.25) after deleting relocations associated with expectations of future MSA economic performance. If our results are driven by unobserved MSA performance expectations, we should expect a smaller DDD coefficient after adding MSA time trends and by (partially) controlling for stated relocation motives. However, we estimate a larger DDD coefficient compared to Model (2) of Table 7 (=1.307), which suggests our results are not driven by unobserved MSA expectations.

4. Does Local Bias Affect Portfolio Risk and Return?

The previous sections demonstrate that institutional investors allocate significantly more of their portfolios to REITs headquartered in their home MSAs (i.e., home bias) and to REITs that own property in the investors' home MSAs (i.e., local bias). In this section, we examine whether the previously documented home and local bias enhance investors' portfolio performance.

There are several competing hypotheses on whether a home or local bias is value-enhancing or value-destroying. There may be an informational advantage associated with investing in nearby assets and firms (see, for example, Coval and Moskowitz, 1999, 2001; Garmaise and Moskowitz, 2004; Hau, 2001; Grinblatt and Keloharju, 2001; Ivkovic and Weisbenner, 2005; Ivkovic et al., 2008; Teo, 2009; Giroud, 2013). This information advantage should produce higher risk-adjusted returns. However, if investors allocate capital locally based on familiarity with the assets or the firm, but do not have a true information advantage, the biased investments may result in reduced portfolio performance (Huberman, 2001; Pool et al., 2012; Ben-David et al., 2017). Alternatively, agents might be overly optimistic (or overly pessimistic) about the prospects of familiar (unfamiliar) assets (Strong and Xu, 2003, Cao et al., 2011). Typically, local investors tend to be more bullish about their home markets than about distant markets, which may produce lower risk-adjusted returns. Solnik and Zuo (2017) refer to this as "relative optimism."

From a risk perspective, modern portfolio theory suggests that idiosyncratic portfolio volatility should increase as the number of stocks included in the portfolio decreases. Moreover, firms with concentrated portfolios may have to offer higher ex ante returns to compensate investors for insufficient diversification or a lack of investor recognition (Merton, 1987). In addition, Pirinsky and Wang (2006) show that the returns of stocks headquartered in the same area tend to exhibit substantial comovement because of correlated fundamentals. On the other hand, Loutskina and Strahan (2011) find that concentrated mortgage lenders invest more in private information and thus measure and price risks more accurately than their diversified peers. Thus, they earn higher profits than diversified lenders with less variability despite a concentrated portfolio.

These hypotheses can be formalized as follows in the context of this study: First, if local investors truly possess an information advantage relative to their non-local counterparts when investing in REITs headquartered in their home MSAs or in REITs with property holdings in their MSA, they should enjoy superior performance. On the other hand, if investors are acting on a behavioral bias, they are unlikely to benefit from excessive holdings of home or local REITs. Under-diversification and local comovement may further undermine the performance of their portfolios.

Methodology

To investigate whether investing in local REITs increases performance, we first estimate a Fama-French four-factor model for each REIT in month t using return data from months t-60

to t and save the loadings on each systematic risk factor. We then use the estimated firm-level coefficients to calculate the risk-adjusted excess return (alpha), $\alpha_{i,q+1,t}$, for each REIT in month t +1. This process is repeated for each month of the sample period, producing a time series of alphas for each REIT.

Using these estimated firm-level alphas, we next calculate the alpha earned by each investor on its REIT portfolio in each month based on their REIT portfolio holdings at the beginning of the quarter. Quarterly rebalancing is dictated by the reporting frequency of 13f forms. This process of value-weighting the alphas of the individual REITs owned by the investor produces a monthly time series of alphas for each investor's REIT portfolio.

The next step is to divide investors (and their REIT portfolio alphas) into two subsets in each month based on the geographic characteristics of their REIT portfolio. The first geographic characteristic used to sort investors each month is whether or not any REIT in which the investor owns shares is headquartered in the same MSA as the investor. For example, if a Boston-based investor owns shares in at least one equity REITs based in Boston in that month, we assign her REIT portfolio alpha to the *home* portfolio. The alphas of Boston investors who do not own shares in any REIT headquartered in Boston are assigned to the *non-home* portfolio in that month. Although investor alphas vary by month, the assignment of their portfolio alpha to either the *home* or *non-home* portfolio remains fixed for each quarter.

To calculate the alpha for the *home* (*non-home*) portfolio in month *t*, we take the arithmetic mean of the alphas of all investors assigned to the *home* (*non-home*) portfolio in month *t*. This gives us a monthly time series of alphas for both the *home* and *non-home* portfolios. These monthly alphas are then used to calculate (equally-weighted) average alphas for the *home* and *none-home* portfolios over our sample period.

The second geographic characteristic we considered is whether or not any REIT in which the investor holds shares owns property in the MSA in which the investor is headquartered. For example, if a Boston-based investor owns shares in an equity REIT that is based in Chicago but owns property in Boston, we assign her REIT portfolio to the *local* portfolio. Boston investors who do not own stock in any REIT that owns property in Boston is assigned to the *non-local* portfolio.[31] We then follow the steps used to calculate portfolio alphas for the *home* and *non-home* portfolios to calculate the average monthly alphas for both the *local* and *non-local* portfolios.

[31] *Home* and *local* portfolios are not mutually exclusive. As a robustness check, we perform similar analysis on three alternative mutually-exclusive portfolios, including (i) local-non-home vs. non-local-non-home, (ii) top-3 vs. non-top-3, and (iii) top-3-non-home vs. non-top-3-non-home portfolios. The results are similar and will be provided upon request.

A home or local bias may be associated with greater idiosyncratic volatility. Daily returns obtained from CRSP for each REIT are used to calculate the returns earned by each investor on its REIT portfolio on each day in each quarter based on her REIT portfolio holdings at the beginning of the quarter *q*. We then regress daily value-weighted REIT portfolio returns in excess of 30-day Treasury bill rate for each investor against the daily Fama-French Momentum four factors during quarter *q* and save the loadings on each systematic risk factor. The estimated investor-level coefficients are then used to calculate fitted values for daily excess returns for each investor in quarter *q*+1. Residuals for each investor's REIT portfolio in quarter *q*+1 are calculated as the difference between realized and predicted excess daily returns.

Next, we estimate each investor's portfolio risk in quarter *q*+1 as the standard deviation of the daily residuals in quarter *q*+1. This process produces a quarterly time series of portfolio risk for each investor. Finally, to calculate the portfolio risk for the *home* (*non-home*) portfolio in quarter *t*+1, we take the arithmetic mean of the portfolio risk of all investors assigned to the *home* (*non-home*) portfolio in quarter *t*+1. This gives us a quarterly time series of portfolio risk for both the *home* and *non-home* investor portfolios. These quarterly idiosyncratic risk measures are used to calculate the (equally-weighted) average portfolio risk for the *home* and *none-home* portfolios. A similar procedure is used to calculate the idiosyncratic risk of the *local* and *non-local* investor portfolios.

Portfolio Results

The monthly average of investors' portfolio alphas and the quarterly average of portfolio risk for the *home* and *non-home* portfolios and for the *local* and *non-local* portfolios are reported in columns (1) and (2) of Table 8. Differences between the mutually-exclusive subgroups are reported in column (3). The FFM 4-factor alphas for *home* portfolios averaged 67 basis point per month. The corresponding monthly alpha for the *non-home* portfolio is 61 basis points. The six basis point difference is highly significant (t-stat=15.97) and consistent with an information advantage for home investors. Bernile et al. (2015) also find that the 4-factor alphas of *home* portfolios of common stocks outperform *non-home* portfolios by roughly seven basis points. Importantly, while Bernile et al. (2015) did not explicitly examine the potential diversification benefits or costs of including *home* stocks, we find that the idiosyncratic risk of the home portfolio is significantly less than the risk of the non-home portfolio (t-stat =-6.49).

Portfolio alphas for *local* portfolios averaged 64 basis point per month; the corresponding monthly alpha for the *non-local* portfolio is 59 basis points. The five basis point difference is highly significant (t-stat=12.49) and consistent with an information advantage for investors who

overweight their portfolios toward REITs that own properties in the investor's headquarters MSA. Moreover, the idiosyncratic risk of the *local* portfolio is significantly less than the risk of the *non-local* portfolio (t-stat =-14.93).

We conduct a number of additional tests. First, we separate investors by type: "passive" v.s. "non-passive" and "motivated" v.s. "non-motivated"). For each sort our base-line results still hold: *home* and *local* portfolios have higher alphas and less risk. Second, we investigate whether *home/local* portfolios include more REITs, either in number or in dollar allocations. Institutional investors who have little information on CRE or specific REITs are more likely to have relatively low REIT holdings; i.e., they simply include REITs as portfolio diversifiers. In contrast, investors with more CRE or REIT specific information may have larger REIT allocations.

Similarly, we posit that a familiarity bias is more likely to be present when a REIT is headquartered in the same MSA as the investor (i.e., in the *home* portfolio). Thus, the inclusion in any month of an investor's REIT portfolio in the *home* portfolio could be the result of a familiarity bias instead of, or in addition to, an information advantage. The presence of a familiarity bias during asset selection may reduce returns on the *home* portfolio, relative to the *non-home* portfolio, and/or increase portfolio risk. In contrast, an informed investor will tend to overweight REITs that own properties in the investor's home MSA only when the investor feels she has superior local information; that is, a familiarity bias is less likely to be present if the REIT is not headquartered in the investor's home MSA. The absence of a familiarity bias during asset selection is more likely to increase returns on the *local* portfolio, relative to the *non-local* portfolio, and decrease portfolio risk.

To examine this issue, we sort REIT portfolios each period by the number of REITs owned (or by the total capitalization of the investor's REIT portfolio) and classify each portfolio into high/low REIT holdings and then into *home*/*non-home* (or *local*/*non-local*). This double sort allows us to condition our portfolio results on the size of the investors' REIT portfolios. We find that *local* portfolios have higher alphas and less portfolio risk than *non-local* portfolios, for both low and high REIT holdings subgroups. However, among the low REIT holding investors (who may have less of an information advantage), we continue to observe significantly higher alphas on the *home* portfolio relative to the non-home portfolio but also greater portfolio risk. These conditional portfolio results suggest that home-biased portfolio decisions--in the absence of superior local information--are not always value enhancing. This portfolio risk finding is consistent with the results reported by Pool et al. (2012), who find that the idiosyncratic volatility of mutual funds is positively correlated with the extent of their home bias.

Taken together, these results provide evidence that titling portfolios toward REITs that are headquartered locally, or that have a portfolio presence in the investor's home MSA, is associated with higher risk-adjusted portfolio returns. However, investment decisions based on the familiarity that results simply from a REIT being headquartered in the investor's home MSA, may also increase the idiosyncratic volatility of the investor's portfolio. In contrast, investors with a local information advantage appear to be able to generate higher portfolio alphas and lower idiosyncratic portfolio volatility.

5. Conclusion

In this study, we investigate the home (local) bias of institutional ownership within the context of REITs and its effects on the return performance of institutional investor portfolios. Focusing on the ownership patterns of REITs allows us to directly and precisely measure the geographic distribution of a firm's economic interests and investigate its relation to institutional ownership and to the performance of institutional portfolios. Since property markets are characterized by significant segmentation, localization, and illiquidity, proximity to REIT management teams and their property holdings is likely to provide valuable private information to institutional investors.

We find a strong relationship between the degree of institutional ownership and the geography of REIT property holdings. In particular, institutional investors prefer REITs that tilt their portfolios toward properties in the REIT's home market. Institutional investors also tend to prefer REITs that hold properties in the investor's home MSA. Our findings are robust to different model specifications, different measures of the geographic distribution of REITs' economic interests, and to types of institutional investors. We also use data on the relocation of investors' headquarters MSAs as a proxy for a shift in the information environment. A difference-in-difference-in-difference analysis indicates that investors tend to increase their ownership of REITs which have relatively large property allocations in the market to which the investor relocates. Institutional investors also tend to reduce their exposure to REITs located in the MSA in which they were headquartered prior to relocation.

In our portfolio analysis, we find that tilting portfolios toward REITs that are headquartered locally or that have a portfolio presence in the investor's home MSA is associated with higher returns on their REIT portfolio. Moreover, this outperformance does not appear to be ex ante compensation to investors for holding a less diversified portfolio. On the contrary,

investors appear to enjoy diversification benefits (i.e., lower idiosyncratic portfolio volatility) by holding REITs with economic interests in the investors' home MSAs.

Overall, our findings highlight the importance of understanding the relation between the geography of firm's operations and its implications for ownership patterns and optimal portfolio construction. Our value-based measure of geographic concentration accurately captures the magnitude of a REIT's local operations, generates novel results, and should benefit future research on the importance of local information generation.

Reference

Agarwal, Sumit, and Robert Hauswald, 2010, Distance and Private Information in Lending, *Review of Financial Studies* 23, 2757–2788.

Agarwal, Vikas, Wei Jiang, Yuehua Tang, and Baozhong Yang, 2013, Uncovering hedge fund skill from the portfolio holdings they hide, *Journal of Finance* 68, 739–783.

Amihud, Yakov, 2002, Illiquidity and stock returns: Cross-section and time-series effects, *Journal of Financial Markets* 5, 31–56.

An, Heng, Hu Qun, and Zhang Ting, 2016, REIT Liquidity Management and Institutional Investors, *Journal of Real Estate Research* 38, 539–567.

Badrinath, S G, J R Kale, and H E Ryan, 1996, Characteristics of common stock holdings of insurance companies, *Journal of Risk and Insurance* 63, 49–76.

Baik, Bok, Jun Koo Kang, and Jin Mo Kim, 2010, Local institutional investors, information asymmetries, and equity returns, *Journal of Financial Economics* 97, 81–106.

Bebchuk, Lucian, Alma Cohen, Allen Ferrell, 2009, What Matters in Corporate Governance? *Review of Financial Studies* 22, 783–827.

Below, Scott D, and Stanley R Stansell, 2000, The Determinants of REIT Institutional Ownership: Tests of the CAPM, *Journal of Real Estate Finance & Economics* 21, 263.

Ben-David, Itzhak, Francesco A. Franzoni, Rabih Moussawi, and John Sedunov, 2017, The Granular Nature of Large Institutional Investors, *Working Paper*.

Bernile, Gennaro, Alok Kumar, and Johan Sulaeman, 2015, Home away from Home: Geography of Information and Local Investors, *Review of Financial Studies* 28, 2009–2049.

Bernile, Gennaro, Alok Kumar, Johan Sulaeman, and Qin Wang, 2016, Has Local Informational Advantage Disappeared? *Working Paper*.

Bodnaruk, Andriy, 2009, Proximity Always Matters: Local Bias When the Set of Local Companies Changes, *Review of Finance* 13, 629–656.

Bushee, Brian J., 1998, The Influence of Institutional Investors on Myopic R & D Investment Behavior, *Accounting Review* 73, 305–333.

Bushee, Brian J., 2001, Do Institutional Investors Prefer Near-Term Earnings over Long-Run Value? *Contemporary Accounting Research* 18, 207–246.

Bushee, Brian J., Mary Ellen Carter, and Joseph Gerakos, 2014, Institutional Investor Preferences for Corporate Governance Mechanisms, *Journal of Management Accounting Research* 26, 123–149.

Bushee, Brian J, and Christopher F Noe, 2000, Corporate Disclosure Practices, Institutional Investors, and Stock Return Volatility, *Journal of Accounting Research* 38, 171–202.

Butler, Alexander W., 2008, Distance still matters: Evidence from municipal bond underwriting, *Review of Financial Studies* 21, 763–784.

Cao, H. Henry, Bing Han, David Hirshleifer, and Harold H. Zhang, 2011, Fear of the unknown: Familiarity and economic decisions, *Review of Finance* 15, 173–206.

Chan, John Erickson, and Ko Wang, 2003, *Real Estate Investment Trusts: Structure, Performance, and Investment Opportunities*. Ed. Oxford University Press.

Choi, Nicole, Mark Fedenia, Hilla Skiba, and Tatyana Sokolyk, 2017, Portfolio concentration and performance of institutional investors worldwide, *Journal of Financial Economics* 123, 189–208.

Chung, Kee H., and Hao Zhang, 2011, Corporate governance and institutional ownership, *Journal of Financial and Quantitative Analysis* 46, 247–273.

Chung, Richard, Scott Fung, and Szu Yin Kathy Hung, 2012, Institutional Investors and Firm Efficiency of Real Estate Investment Trusts, *Journal of Real Estate Finance and Economics* 45, 171–211.

Coval, Joshua D., and Tobias J. Moskowitz, 1999, Home Bias at Home: Local Equity Preference in Domestic Portfolios, *Journal of Finance* 54, 2045–2073.

Coval, Joshua D., and Tobias J. Moskowitz, 2001, The Geography of Investment: Informed Trading and Asset Prices, *Journal of Political Economy* 109, 811–841.

Cronqvist, Henrik, Peter Hogfeldt, and Mattias Nilsson, 2001, Why Agency Costs Explain Diversification Discounts, *Real Estate Economics* 29, 85-126.

Devos, Erik, Seow Eng Ong, Andrew C. Spieler, and Desmond Tsang, 2013, REIT Institutional Ownership Dynamics and the Financial Crisis, *Journal of Real Estate Finance and Economics* 47, 266–288.

Downs, David H., 1998, The Value in Targeting Institutional Investors: Evidence from the Five-or-Fewer Rule Change, *Real Estate Economics* 26, 613–649.

Falkenstein, Eric G., 1996, Preferences for stock characteristics as revealed by mutual fund portfolio holdings, *Journal of Finance* 51, 111–135.

Fama, Eugene F., and James D. MacBeth, 1973, Risk, Return, and Equilibrium: Empirical Tests, *Journal of Political Economy* 81, 607–636.

Feng, Zhilan, Chinmoy Ghosh, Fan He, and C. F. Sirmans, 2010, Institutional monitoring and REIT CEO compensation, *Journal of Real Estate Finance and Economics* 40, 446–479.

Fich, Eliezer M., Jarrad Harford, and Anh L. Tran, 2015, Motivated monitors: The importance of institutional investors' portfolio weights, *Journal of Financial Economics* 118, 21–48.

French, Kr, and Jm Poterba, 1991, Investor diversification and international equity markets, *American Economic Review* 81, 222–226.

García, Diego, and Øyvind Norli, 2012, Geographic dispersion and stock returns, *Journal of Financial Economics* 106, 547–565.

Garmaise, Mark J., and Tobias J. Moskowitz, 2004, Confronting information asymmetries: Evidence from real estate markets, *Review of Financial Studies* 17, 405–437.

Giannetti, Mariassunta, and Luc Laeven, 2012, The flight home effect: Evidence from the syndicated loan market during financial crises, *Journal of Financial Economics* 104, 23–43.

Giroud, Xavier, 2013, Proximity and Investment: Evidence from Plant-Level Data, *The Quarterly Journal of Economics* 128, 861–915.

Gompers, Paul A., Joy L. Ishii, and Andrew Metrick, 2003, Corporate Governance and Equity Prices, *Quarterly Journal of Economics* 118, 107–155.

Grinblatt, Mark, and Matti Keloharju, 2001, How Distance, Language, and Culture Influence Stockholdings and Trades, *Journal of Finance* 56, 1053–1073.

Grinstein, Yaniv, and Roni Michaely, 2005, Institutional holdings and payout policy, *Journal of Finance* 60, 1389–1426.

Hardin III, William G., Gregory L. Nagel, Kenneth D. Roskelley, and Philip A. Seagraves, 2017, Institutional Monitoring, Motivated Investors, and Firm Performance, *Journal of Real Estate Research* 39, 401–439.

Hartzell, Jay C., Libo Sun, and Sheridan Titman, 2014, Institutional investors as monitors of corporate diversification decisions: Evidence from real estate investment trusts, *Journal of Corporate Finance* 25, 61–72.

Hau, Harald, 2001, Location matters: An examination of trading profits, *Journal of Finance* 56, 1959–1983.

Huang, Jiekun, 2015, Dynamic Liquidity Preferences of Mutual Funds, *Working Paper*.
Huberman, Gur, 2001, Familiarity Breeds Investment, *Review of Financial Studies* 14, 659–680.

Ivković, Zoran, Clemens Sialm, and Scott Weisbenner, 2008, Portfolio concentration and the performance of individual investors, *Journal of Financial and Quantitative Analysis* 43, 613–655.

Ivkovic, Zoran, and Scott Weisbenner, 2005, Local Does as Local Is: Information Content of the Geography of Individual Investors' Stock Investments, *The Journal of Finance* 60, 267–306.

Kim, Donghyun, Qinghai Wang, and Xiaoqiong Wang, 2018, Geographic Clustering of Institutional Investors, *Working Paper*.

Kumar, Nitish, Kevin Mullally, Sugata Ray, and Yuehua Tang, 2018, Prime (Information) Brokerage, *Working Paper*.

Ling, David C., Andy Naranjo, and Benjamin Scheick, 2018a, Asset Location, Timing Ability, and the Cross-Section of Commercial Real Estate Returns, *Working Paper.*

Ling, David C, Andy Naranjo, and Benjamin Scheick, 2018b, There's No Place Like Home: Local Asset Concentration, Information Asymmetries and Commercial Real Estate Returns, *Working Paper*.

Ling, David C., and Michael Ryngaert, 1997, Valuation uncertainty, institutional involvement, and the underpricing of IPOs: The case of REITs, *Journal of Financial Economics* 43, 433–456.

Loutskina, Elena, and Philip E. Strahan, 2011, Informed and Uninformed Investment in Housing: The Downside of Diversification, *Review of Financial Studies* 24, 1447–1480.

Nofsinger, John R., and Richard W. Sias, 1999, Herding and feedback trading by institutional and individual investors, *Journal of Finance* 54, 2263–2295.

Parrino, Robert, Richard W. Sias, and Laura T. Starks, 2003, Voting with their feet: Institutional ownership changes around forced CEO turnover, *Journal of Financial Economics*.

Pool, Veronika K., Noah Stoffman, and Scott E. Yonker, 2012, No place like home: Familiarity in mutual fund manager portfolio choice, *Review of Financial Studies* 25, 2563–2599.

Seasholes, Mark S., and Ning Zhu, 2010, Individual investors and local bias, *Journal of Finance* 65, 1987–2010.

Shi, Guifeng, Jianfei Sun, and Rui Luo, 2015, Geographic dispersion and earnings management, *Journal of Accounting and Public Policy* 34, 490–508.

Shleifer, Andrei, and Robert W Vishny, 1986, Large Shareholders and Corporate Control, *Journal of Political Economy* 94, 461–488.

Solnik, Bruno, and Luo Zuo, 2017, Relative optimism and the home bias puzzle, *Review of Finance* 21, 2045–2074.

Strong, Norman, and Xinzhong Xu, 2003, Understanding the Equity Home Bias: Evidence from Survey Data, *Review of Economics and Statistics* 85, 307–312.

Sulaeman, Johan, and Chishen Wei, 2014, Institution Presence, *Working Paper*.

Teo, Melvyn, 2009, The geography of hedge funds, *Review of Financial Studies* 22, 3531–3561.

van Nieuwerburgh, Stijn, and Laura Veldkamp, 2009, Information immobility and the home bias puzzle, *Journal of Finance* 64, 1187–1215.

Wang, Chongyu, and Tingyu Zhou, 2017, The Cost of Staying Close to Home: Evidence from Asset Sell-offs by Real Estate Investment Trusts. *Working Paper*.

Wang, Ko, Su Han Chan, and George W. Gau, 1992, Initial public offerings of equity securities. Anomalous evidence using REITs, *Journal of Financial Economics* 31, 381–410.

Figure 1: Institutional Ownership by Investor Type

This figure shows the time-series trends in REIT institutional ownership of major institutional investors, including banks and trusts, mutual funds, hedge funds, and other asset management firms, for the period from 2004Q1 through 2015Q4. The classification of institutional investors is based on Agarwal, Jiang, Tang, and Yang (2013). See Table A1 for variable descriptions.

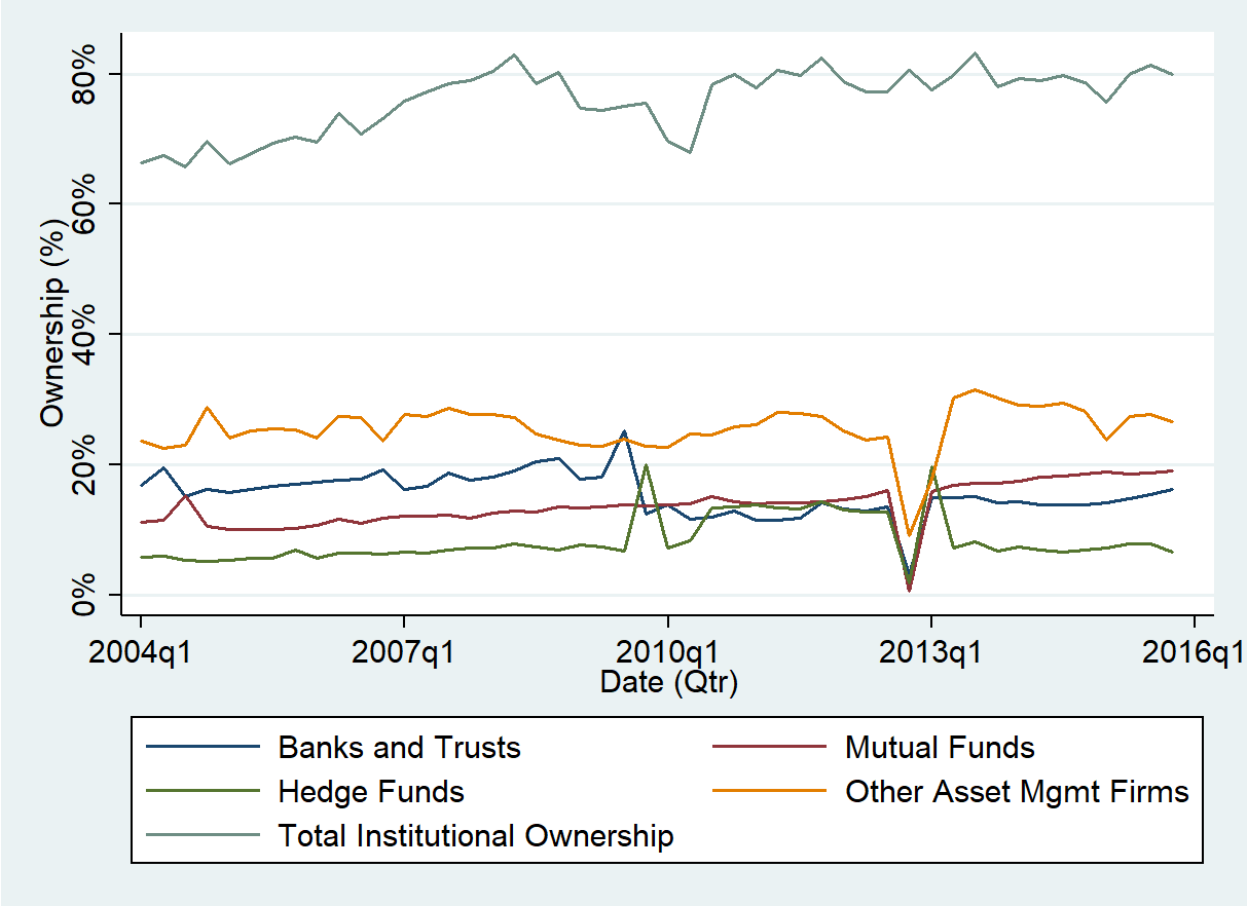

Figure 2: Geographic Distribution of REIT Ownership

This figure shows the geographic distribution of 13(f) institutions' preference for U.S. equity REITs as of 2015Q4, the ending quarter of our sample. We divide our sample into four quartiles based on the percentage of all shares of a representative U.S. REIT owned by institutional investors from a particular MSA (*LIO*).

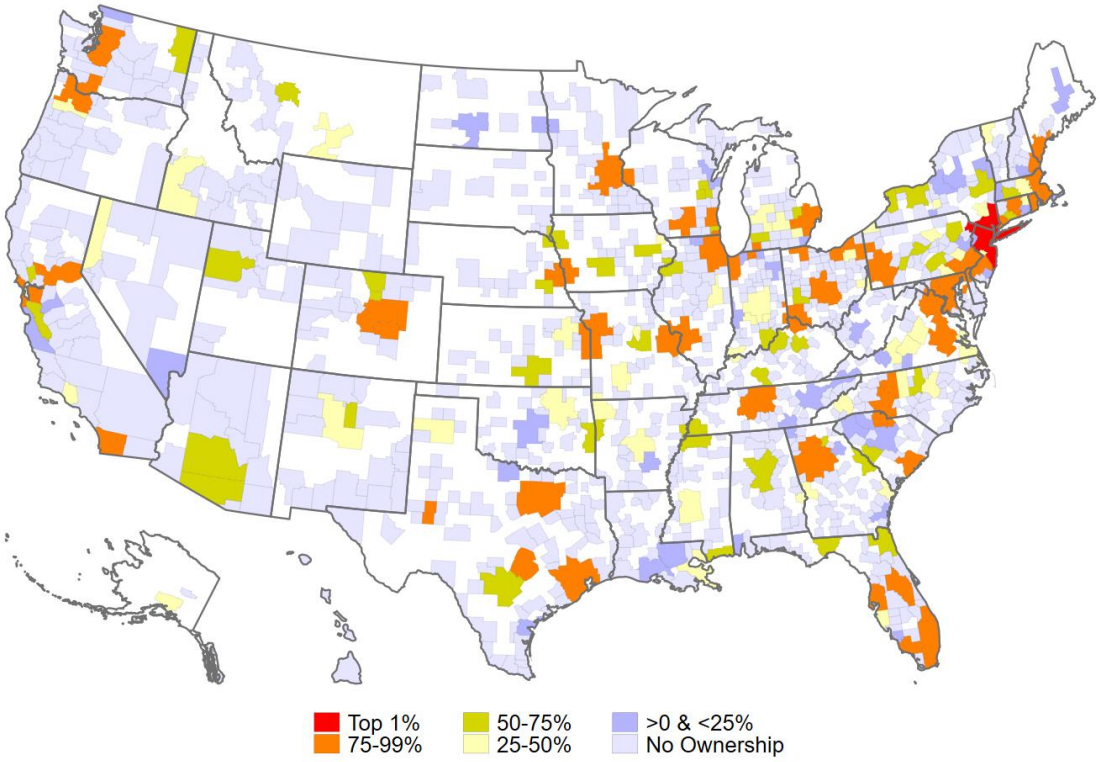

Table 1: Summary Statistics of Institutional Ownership and Home Concentration of REITs

This table shows descriptive statistics (mean, standard deviation (SD), and median) for a sample of 3,051 firm-quarter observations from 2004Q1-2015Q4. See Table A1 for variable descriptions.

	Mean	Std. Dev.	Median
Dependent Variables			
IO	0.759	0.210	0.813
Classifications based Agarwal, Jiang, Tang, and Yang (2013)			
BANKS	0.156	0.066	0.152
MFS	0.141	0.057	0.143
HFS	0.083	0.061	0.067
OAMS	0.259	0.109	0.266
OTHER	0.120	0.096	0.109
Classifications based on Bushee (2001)			
PASSIVE	0.551	0.164	0.583
NONPASS	0.208	0.100	0.204
Classifications based on Fich, Harford, and Tran (2015)			
NONMOTIV	0.556	0.204	0.575
MOTIVATED	0.202	0.206	0.136
Test Variables			
HOMECON	0.195	0.237	0.091
Control Variables			
PropHHI	0.859	0.214	0.982
GEOHHI	0.158	0.195	0.088
UPREIT	0.830	0.376	1
MKTCAP	7.516	1.181	7.526
VOLATILITY	0.078	0.056	0.061
IDIORISK	0.014	0.010	0.011
ILLIQUID	0.006	0.028	0.001
LOGPRC	3.322	0.748	3.362
LAG3MRET	0.034	0.172	0.035
LAG6MRET	0.075	0.277	0.065
MB	1.401	0.339	1.338
ROA	0.007	0.010	0.006
LEVERAGE	0.523	0.133	0.521
CASH	0.034	0.093	0.016
SP500	0.115	0.319	0

Table 2: Regression Results on Institutional Ownership and Home Concentration of REITs This table gives the Fama-MacBeth (1973) regression results on the relationship between institutional ownership and REIT home concentration in 2004Q1-2015Q4. The dependent variable, $IO_{i,t}$, is the ratio of the number of shares held by institutional investors to the total number of shares outstanding of firm i in quarter t. $HOMECON_{i,t}$ is the percentage of a firm i's total property portfolio located in the headquarter market in quarter t. Columns 1-3 give the results based on all the institutional investors. Column 5-7 presents the results based on proportional of REIT owned by banks and trusts (BANKS), mutual funds (MFS), hedge funds (HFS), and other asset management companies (OAMS), respectively. The classification of institutional investors is based on Agarwal, Jiang, Tang, and Yang (2013). See Table A1 for variable descriptions. Numbers in parentheses are t-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		IO		*BANKS*	*MFS*	*HFS*	*OAMS*
HOMECON	0.064***	0.170***	0.230***	0.037**	0.047***	0.006	0.073**
	(3.67)	(3.73)	(5.34)	(2.66)	(4.76)	(0.45)	(2.52)
GEOHHI		-0.113*	-0.095	-0.018	0.001	-0.016*	-0.002
		(-1.85)	(-1.68)	(-0.78)	(0.07)	(-1.72)	(-0.06)
PropHHI			0.203***	0.039***	0.024***	-0.007	0.099***
			(14.69)	(5.55)	(6.29)	(-1.67)	(8.18)
UPREIT	0.130***	0.121***	0.112***	0.003	0.014***	0.038***	0.038***
	(13.96)	(12.36)	(12.81)	(0.59)	(4.25)	(8.61)	(6.05)
MKTCAP	0.038***	0.040***	0.044***	0.014***	0.006	-0.002	0.004
	(5.12)	(5.19)	(5.79)	(9.66)	(1.56)	(-0.98)	(0.51)
VOLATILITY	0.278	0.352	0.089	0.172*	-0.096	0.378***	-0.351
	(0.85)	(1.14)	(0.30)	(1.91)	(-1.28)	(3.16)	(-1.67)
ILLIQUID	-13.220***	-13.123***	-11.827***	-2.046***	-2.953***	-0.016	-5.533**
	(-2.85)	(-2.84)	(-2.74)	(-3.33)	(-2.75)	(-0.07)	(-2.43)
LOGPRC	0.034**	0.036**	0.040***	0.005	0.006	-0.009	0.021**
	(2.54)	(2.60)	(2.71)	(1.26)	(1.50)	(-1.56)	(2.17)
LAG3MRET	0.104*	0.108*	0.106*	0.021	-0.011	0.041**	0.013
	(1.69)	(1.74)	(1.86)	(0.83)	(-1.00)	(2.17)	(0.50)
MB	-0.083***	-0.087***	-0.113***	-0.033***	-0.010*	0.005	-0.046***
	(-5.89)	(-5.35)	(-5.60)	(-4.15)	(-1.75)	(0.83)	(-3.83)
ROA	-2.717***	-2.736***	-2.528***	-0.319*	-0.233	-0.625***	-0.757*
	(-4.00)	(-4.01)	(-3.88)	(-1.97)	(-1.60)	(-4.82)	(-2.00)
LEVERAGE	-0.100***	-0.085***	-0.051	0.006	-0.008	-0.012	0.018
	(-3.58)	(-2.99)	(-1.52)	(0.55)	(-0.72)	(-0.89)	(0.72)
CONSTANT	0.440***	0.420***	0.238***	0.039*	0.066*	0.089***	0.122***
	(5.50)	(5.55)	(3.39)	(1.99)	(1.72)	(6.26)	(3.64)
Prop FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average R-squared	0.565	0.575	0.610	0.412	0.505	0.400	0.473
# Obs	3,051	3,051	3,051	3,051	3,051	3,051	3,051

Table 3: Regression Results on Institutional Ownership and Home Concentration of REITs by Investor Type

This table gives the Fama-MacBeth (1973) regression results on the relationship between institutional ownership and REIT home concentration in 2004Q1-2015Q4. The dependent variable, $IO_{i,t}$, is the ratio of the number of shares held by institutional investors to the total number of shares outstanding of firm i in quarter t. $HOMECON_{i,t}$ is the percentage of a firm i's total property portfolio located in the headquarter market in quarter t. Columns 1 give the results based on all the institutional investors. Column 2 and 3 present the results based on proportional of REIT owned by passive (quasi-indexers) and non-passive (dedicated and transient) investors, respectively. The classification of passive and non-passive investor is based on Bushee (2001). Column 4 and 5 present the results based on proportional of REIT owned by motivated and non-motivated investors, respectively. The classification of motivated and non-motivated investor is based on Fich, Harford, and Tran (2015). Controls are the same as in Table 2 and not tabulated. See Table A1 for variable descriptions. Numbers in parentheses are t-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	IO	*PASSIVE*	*NONPASS*	*NONMOTIV*	*MOTIVATED*
HOMECON	0.230***	0.187***	0.042	0.140***	0.087***
	(5.34)	(3.74)	(1.53)	(3.22)	(3.28)
GEOHHI	-0.095	-0.064	-0.027	-0.033	-0.058
	(-1.68)	(-1.01)	(-1.10)	(-0.68)	(-1.49)
PropHHI	0.203***	0.146***	0.059***	0.116***	0.086***
	(14.69)	(10.00)	(7.15)	(8.35)	(10.95)
CONSTANT	0.238***	0.113*	0.123***	1.705***	-1.475***
	(3.39)	(1.69)	(4.83)	(18.84)	(-33.71)
Control in Table 2	Yes	Yes	Yes	Yes	Yes
Prop FE	Yes	Yes	Yes	Yes	Yes
Average R-squared	0.610	0.613	0.410	0.608	0.792
# Obs	3,051	3,051	3,051	3,051	3,051

Table 4: Cross-Sectional Regressions of Excess Local Institutional Ownership on the Geography of REITs

This table gives the Fama-MacBeth (1973) regression results on the relationship between excess local institutional ownership and the geographical distribution of economic interest by REITs. The dependent variable, $EO_{i,l,t}$, is $LIO_{i,l,t}$ (MSA-level ownership of firm *i*, calculated as aggregate ownership share of institutional investors headquartered in MSA *l* as a fraction of total institutional ownership share in firm *i* in quarter *t*) minus the average ownership share of institutions in MSA *l* across all REITs in quarter *t*. $HQMSA_{i,l,t}$ is a dummy variable equals 1 if firm *i* headquartered in MSA *l* in quarter *t*. $OWNPPTY_{i,l,t}$ is a dummy variable equal to 1 if firm *i* holds any properties in MSA *l* in quarter *t*. $SHARE_{i,l,t}$ is the percentage share of properties (based on total adjusted cost) held by firm *i* in MSA *l* in quarter *t*. See Table A1 for variable descriptions. Numbers in parentheses are *t*-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	EO	*EO*	*EO*	*EO*
HQMSA	1.402***	0.983***		
	(28.47)	(20.31)		
OWNPPTY			0.108***	
			(9.18)	
SHARE		2.842***		4.033***
		(13.11)		(19.07)
GEOHHI	0.024***	0.019***	0.036***	0.018**
	(3.30)	(2.73)	(5.14)	(2.58)
PropHHI	-0.018***	-0.022***	-0.022***	-0.024***
	(-2.88)	(-3.64)	(-3.86)	(-4.07)
IDIORISK	0.228***	0.231***	0.235***	0.233***
	(6.37)	(6.50)	(6.73)	(6.72)
ROA	-0.001	-0.001	-0.001	-0.001
	(-0.05)	(-0.11)	(-0.08)	(-0.11)
CASH	0.110***	0.107***	0.115***	0.107***
	(7.57)	(7.39)	(7.65)	(7.40)
LOGPRC	-0.018	-0.025**	-0.013	-0.027**
	(-1.64)	(-2.25)	(-1.22)	(-2.46)
ILLIQUID	7.890***	7.910***	7.879***	7.919***
	(3.44)	(3.44)	(3.45)	(3.43)
MB	-0.016	-0.013	-0.010	-0.011
	(-0.74)	(-0.58)	(-0.46)	(-0.50)
MKTCAP	-0.279***	-0.278***	-0.289***	-0.279***
	(-3.85)	(-3.83)	(-3.99)	(-3.85)
LAG6MRET	0.010	0.011	0.004	0.011
	(0.55)	(0.60)	(0.24)	(0.60)
SP500	-0.019	-0.019	-0.029	-0.020
	(-0.40)	(-0.38)	(-0.58)	(-0.41)
YOUNG	0.152***	0.150***	0.161***	0.148***
	(4.58)	(4.57)	(4.77)	(4.53)
CONSTANT	0.416***	0.431***	0.425***	0.449***
	(5.32)	(5.67)	(5.01)	(5.81)
MSA FE	Yes	Yes	Yes	Yes
Average R-squared	0.270	0.278	0.255	0.271
# Obs	197,656	197,656	197,656	197,656

Table 5: Panel Regressions of Excess Local Institutional Ownership

This table shows panel regression results on the relationship between excess local institutional ownership and the geographical distribution of economic interest by REITs with firm and quarter fixed effects. The dependent variable, $EO_{i,l,t}$, is $LIO_{i,l,t}$ (MSA-level ownership of firm *i*, calculated as aggregate ownership share of institutional investors headquartered in MSA *l* as a fraction of total institutional ownership share in firm *i* in quarter *t*) minus the aggregate ownership share of institutions in MSA *l* across all firms in quarter *t*.$HQMSA_{i,l,t}$ is a dummy variable equals 1 if firm *i* headquartered in MSA *l* in quarter *t*. $OWNPPTY_{i,l,t}$ is a dummy variable equals 1 if firm *i* hold any properties in MSA *l* in quarter *t*. $SHARE_{i,l,t}$ is the percentage share of properties (based on total adjusted cost) held by firm *i* in MSA *l* in quarter *t*. See Table A1 for variable descriptions. Standard errors are clustered at MSA level. Numbers in parentheses are *t*-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	EO	*EO*	*EO*	*EO*
HQMSA	1.230***	0.877***		
	(3.67)	(3.21)		
OWNPPTY			0.093*	
			(1.84)	
SHARE		2.237***		3.318***
		(7.00)		(7.30)
GEOHHI	-0.009	-0.009	-0.009	-0.009
	(-1.13)	(-1.09)	(-1.05)	(-1.08)
PropHHI	0.020	0.014	0.019	0.010
	(1.52)	(1.01)	(1.36)	(0.81)
IDIORISK	0.048**	0.048**	0.049**	0.048**
	(2.37)	(2.34)	(2.35)	(2.33)
ROA	-0.029**	-0.029**	-0.029**	-0.029**
	(-2.18)	(-2.19)	(-2.18)	(-2.20)
CASH	0.098	0.099	0.099	0.099
	(1.07)	(1.07)	(1.07)	(1.07)
LOGPRC	-0.104	-0.103	-0.107	-0.104
	(-1.61)	(-1.62)	(-1.62)	(-1.63)
ILLIQUID	-0.017	-0.017	-0.016	-0.017
	(-0.50)	(-0.51)	(-0.49)	(-0.51)
MB	0.005	0.005	0.009	0.006
	(0.27)	(0.29)	(0.53)	(0.33)
MKTCAP	0.064	0.063	0.062	0.063
	(1.37)	(1.37)	(1.31)	(1.36)
LAG6MRET	-0.002	-0.002	-0.002	-0.002
	(-0.33)	(-0.33)	(-0.36)	(-0.33)
SP500	0.023	0.022	0.017	0.022
	(0.54)	(0.55)	(0.40)	(0.54)
YOUNG	0.099**	0.097**	0.102**	0.096**
	(2.13)	(2.09)	(2.28)	(2.09)
CONSTANT	-0.014	-0.037	-0.009	-0.031
	(-0.40)	(-0.98)	(-0.28)	(-0.87)
FIRM & Qtr FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.328	0.332	0.317	0.327
# Obs	197,656	197,656	197,656	197,656

Table 6: Difference-in-difference (DD) Tests based on Investor Relocations

This table shows univariate statistics on difference-in-difference (DD) tests based on investor relocations. Panel A compares the differences in excess local institutional ownership between firm-quarter observations with high property shares (*highSHARE*) and those with low property shares (*lowSHARE*) in the pre-move-in group and the differences in the post-move-in group. *highSHARE* (*lowSHARE*) is a dummy variable set equal to one if *SHARE* for REIT *i* is above (below) the median in the move-in sample prior to relocation. In Panel B, the treatment group are REITs that had an institutional investor move out. See Table A1 for variable descriptions.

Panel A

	N	EO	SE	t-stat	p-value
Pre-move-in					
lowSHARE	6,317	-0.258			
highSHARE	5,416	0.150			
Diff (high-low)		0.408	0.040	10.31	0.000***
Post-move-in					
lowSHARE	10,450	-0.216			
highSHARE	11,327	0.296			
Diff (high-low)		0.513	0.029	17.70	0.000***
Diff-in-Diff	33,510	0.105	0.049	2.14	0.032**

Panel B

	N	EO	SE	t-stat	p-value
Pre-move-out					
lowSHARE	2,742	-0.102			
highSHARE	1,174	0.221			
Diff (high-low)		0.323	0.027	11.89	0.000***
Post-move-out					
lowSHARE	1,964	-0.076			
highSHARE	875	0.114			
Diff (high-low)		0.190	0.032	6.00	0.000***
Diff-in-Diff	6,755	-0.133	0.042	-3.19	0.001***

Table 7: Regression Results on Difference-in-difference-in-differences (DDD) Tests based on Investor Relocations

This table shows regression results on difference-in-difference-in-differences (DDD) tests based on investor relocations. Column 1 and 2 (3 and 4) shows results based on investors moved in to (moved out from) a particular MSA. $EO_{i,l,t}$ is excess local institutional ownership of REIT *i,* MSA *l* and year-quarter *t*. $MOVEIN_j$ ($MOVEOUT_j$) indicates investor relocation to (from) MSA *j*, $POST_{j,t}$ is a dummy equals one if the investor *j* move in or move out in year *t*. $SHARE_{i,l,t}$ is the share of underlying properties (in terms of value) held by REIT *i* in location *l* in year-quarter *t*. Standard errors are clustered by MSA-quarter. See Table A1 for variable descriptions.

	(1)	(2)	(3)	(4)
	EO	*EO*	*EO*	*EO*
MOVEIN × POST	-0.027	-0.023		
	(-0.61)	(-0.55)		
MOVEIN × POST × SHARE	1.614**	1.307**		
	(2.42)	(2.19)		
MOVEOUT × POST			-0.028	-0.019
			(-0.61)	(-0.43)
MOVEOUT × POST × SHARE			0.968	0.787
			(1.26)	(1.07)
SHARE	2.883**	1.831	3.456**	2.336
	(2.30)	(1.27)	(2.26)	(1.41)
CONSTANT	-0.038	0.065	-0.047	0.147**
	(-0.93)	(1.36)	(-1.12)	(2.23)
Controls in Table 6	No	Yes	No	Yes
Qtr FE	Yes	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.014	0.083	0.014	0.084
# Obs	197,656	197,656	197,656	197,656

Table 8: Portfolio Analysis

This table reports the monthly average of investors' portfolio risk-adjusted excess returns (alphas) and quarterly average of investors' idiosyncratic portfolio risk (based on Fama-French Momentum 4-factor model) for *home*, *non-home*, *local*, and *non-local* investor portfolios of REIT holdings for 13(f) institutions. If an investor's portfolio contains any REIT that is headquartered in the same MSA as the investor, its alpha and portfolio risk are assigned to the *home* portfolio. The alphas and portfolio risk of investors who do not own shares in any REIT headquartered in the investor's home MSA are assigned to the *non-home* portfolio. Although investor alphas vary by month, the assignment of their portfolio alpha to either the *home* or *non-home* portfolio remains fixed for each quarter. If any REIT in which the investor holds shares owns (does not own) property in the MSA in which the investor is headquartered, the investor's portfolio alpha and risk are assigned to the *local* (*non-local*) portfolio. The reported statistics in columns (1) and (2) are equally weighted averages across all investors in each subgroup. Columns (3) and (4) report the difference between values in Columns (1) and (2) and its statistical significance. See Table A1 for descriptions of portfolio construction.

	(1)	(2)	(3) = (1) – (2)	t-statistic
	home	*non-home*	Diff	
Portfolio Alpha	0.67	0.61	0.06***	15.97
Portfolio Risk	1.09	1.15	-0.06***	-6.49
	local	*non-local*	Diff	
Portfolio Alpha	0.64	0.59	0.05***	12.49
Portfolio Risk	1.09	1.23	-0.14***	-14.93

The Geography of Information and Investment: Firm Location, Asset Location, and Institutional Ownership

Online Appendices

David C. Ling, Chongyu Wang, Tingyu Zhou

Appendix 1: Variable Definitions

Variable	Source	Definition
Dependent Variables		
$IO_{i,t}$	Thomson Reuters	The ratio of the number of shares held by institutional investors to the total number of shares outstanding of firm *i* in quarter *t* An investor is categorized as a passive (non-passive) investor if it is a quasi-indexer (dedicated or transient investor). Bushee (1998, 2001) An investor is categorized as a motivated investor of firm *i* if the firm belongs to the top-decile of the investor's portfolio. Fich, Harford, and Tran (2015)
$LIO_{i,l,t}$	Thomson Reuters, SEC	MSA-level ownership of firm *i*, calculated as aggregate ownership share of institutional investors headquartered in MSA *l* as a fraction of total institutional ownership share in firm *i* in quarter *t*
$EO_{i,l,t}$	Thomson Reuters, SEC	$LIO_{i,l,t}$ minus the aggregate ownership share of institutions in MSA *l* across all firms in quarter *t*
Geography Variables		
$HOMECON_{i,t}$	SNL	The percentage of a firm *i*'s total property portfolio located in the headquarter market in quarter *t*
$TTLSHARE1_{i,t}$	SNL	The percentage of a firm *i*'s total property portfolio located in MSAs with at least one investor headquarters in quarter *t*
$TTLSHARE2_{i,t}$	SNL	The percentage of a firm *i*'s total property portfolio located in MSAs with at least two investor headquarters in quarter *t*
$HQMSA_{i,l,t}$	SNL	A dummy variable equals 1 if firm *i* headquartered in MSA *l* in quarter *t*
$OWNPPTY_{i,l,t}$	SNL	A dummy variable equals 1 if firm *i* hold any properties in MSA *l* in quarter *t*
$SHARE_{i,l,t}$	SNL	Percentage share of properties (based on total adjusted cost) held by firm *i* in MSA *l* in quarter *t*
$SHARE\_PPTY_{i,k,l,t}$	SNL	Percentage share of properties (based on total adjusted cost) of type *k* held by firm *i* in MSA *l* in quarter *t*
$LOWSHARE_{i,l,t}$	SNL	A dummy variable equals 1 if $SHARE_{i,l,t}$ is below the sample median
$HIGHSHARE_{i,l,t}$	SNL	A dummy variable equals 1 if $SHARE_{i,l,t}$ is above the sample median
$GEOHHI_{i,t}$	SNL	Herfindahl Indexes of firm *i*'s property weights across MSAs in quarter *t*
$PropHHI_{i,t}$	SNL	Herfindahl Indexes of firm *i*'s portfolio weights in across property types in quarter *t*
$MOVEIN_{l,t}$	SEC	A dummy variable equals 1 if there is any institutional investors relocated to MSA *l* in quarter *t*
$MOVEOUT_{l,t}$	SEC	A dummy variable equals 1 if there is any institutional investors relocated away from MSA *l* in quarter *t*
Control Variables		
$UPREIT_{i,t}$	SNL	A dummy variable equals 1 if a REIT is an UPREIT or DownREIT
$MKTCAP_{i,t}$	COMPUSTAT	Stock price multiplied by the number of shares outstanding

$VOLATILITY_{i,t}$	CRSP	Standard deviation of firm i's daily returns over quarter t
$ILLIQUID_{i,t}$	CRSP	Average Amihud (2002) daily volume price impact firm i during quarter t.
$LOGPRC_{i,t}$	CSRP	Log of annual stock price
$LAG3MRET_{i,t}$	CSRP	Stock returns in the past three months
$MB_{i,t}$	COMPUSTAT	Market-to-book ratio
$ROA_{i,t}$	COMPUSTAT	The ratio of net income to book value of total assets
$LEVERAGE_{i,t}$	COMPUSTAT	Sum of total long-term debt and debt in current liabilities divided by total assets
$IDIORISK_{i,t}$	CRSP	The standard deviation of residuals of monthly Fama-French 3-factor-model regressions of daily stock returns
$CASH_{i,t}$	COMPUSTAT	The proportion of cash and equivalents to the firm i's lagged total assets in quarter t
$SP500_{i,t}$	CRSP	A dummy variable equals 1 if the firm is included in the S&P 500 index, and 0 otherwise
$YOUNG_{i,t}$	CRSP	A dummy variation equals 1 if the stock whose IPO occurred in the prior five years, and 0 otherwise
φ_{ppty}		Property-type fixed effects
φ_i		Firm fixed effects
φ_l		MSA fixed effects
φ_t		Year-quarter fixed effects

Portfolio Construction

Home versus Non-home	Home (non-home) portfolio consists of the set of firms that are (not) headquartered in institutional investor's home MSA
Local versus Non-local	Local (non-local) portfolio consists of the set of firms that operate (outside) in institutional investor's home MSA

Appendix 2: Regression Results on Institutional Ownership and Alternative Concentration Measures of REITs

This table gives the Fama-MacBeth (1973) regression results on the relationship between institutional ownership and three REIT concentration measures. The dependent variable, $IO_{i,t}$, is the ratio of the number of shares held by institutional investors to the total number of shares outstanding of firm i in quarter t. $HOMECON_{i,t}$ is the percentage of a firm i's total property portfolio located in the headquarter market in quarter t. Columns 1 give the results based on $HOMECON_{i,t}$. Column 2 and 3 present the results based on the total percentage share of properties (based on total adjusted cost) held by firm i in MSAs with at least one (two) investor headquarters, respectively. See Table A1 for variable descriptions. Numbers in parentheses are t-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	IO	*IO*	*IO*
HOMECON	0.230***		
	(5.34)		
TTLSHARE1		0.206***	
		(6.35)	
TTLSHARE2			0.217***
			(6.64)
GEOHHI	-0.095	-0.002	-0.028
	(-1.68)	(-0.05)	(-0.59)
PropHHI	0.203***	0.215***	0.221***
	(14.69)	(16.73)	(16.04)
UPREIT	0.112***	0.095***	0.101***
	(12.81)	(10.11)	(11.10)
MKTCAP	0.044***	0.021***	0.016**
	(5.79)	(3.66)	(2.49)
VOLATILITY	0.089	0.187	0.182
	(0.30)	(0.62)	(0.61)
ILLIQUID	-11.827***	-12.044***	-11.899***
	(-2.74)	(-2.90)	(-2.94)
LOGPRC	0.040***	0.058***	0.058***
	(2.71)	(3.58)	(3.39)
LAG3MRET	0.106*	0.090	0.089
	(1.86)	(1.66)	(1.66)
MB	-0.113***	-0.122***	-0.134***
	(-5.60)	(-5.44)	(-5.31)
ROA	-2.528***	-2.700***	-2.566***
	(-3.88)	(-3.98)	(-4.01)
LEVERAGE	-0.051	0.004	-0.001
	(-1.52)	(0.11)	(-0.04)
CONSTANT	0.238***	0.247***	0.316***
	(3.39)	(3.87)	(5.00)
Prop FE	Yes	Yes	Yes
Average R-squared	0.610	0.619	0.628
# Obs	3,051	3,051	3,051

Appendix 3: Regression Results on Institutional Ownership and Home Concentration of REITs (Pre-crisis)

This table gives the Fama-MacBeth (1973) regression results on the relationship between institutional ownership and REIT home concentration from 2004Q1 through 2007Q2. The dependent variable, $IO_{i,t}$, is the ratio of the number of shares held by institutional investors to the total number of shares outstanding of firm i in quarter t. $HOMECON_{i,t}$ is the percentage of a firm i's total property portfolio located in the headquarter market in quarter t. Columns 1-3 give the results based on all the institutional investors. Column 5-7 presents the results based on proportional of REIT owned by banks and trusts (*BANKS*), mutual funds (*MFS*), hedge funds (*HFS*), and other asset management companies (*OAMS*), respectively. The classification of institutional investors is based on Agarwal, Jiang, Tang, and Yang (2013). See Table A1 for variable descriptions. Numbers in parentheses are *t*-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		IO		*BANKS*	*MFS*	*HFS*	*OAMS*
HOMECON	0.103**	0.085	0.191***	0.010	0.049**	0.042***	0.010
	(2.68)	(1.30)	(3.43)	(0.41)	(2.56)	(4.66)	(0.31)
GEOHHI		0.017	0.016	0.070	-0.011	-0.056***	0.085
		(0.15)	(0.18)	(1.53)	(-0.35)	(-4.33)	(1.31)
PropHHI			0.241***	0.068***	0.037***	-0.002	0.097***
			(12.29)	(8.78)	(4.51)	(-0.29)	(4.87)
UPREIT	0.173***	0.170***	0.156***	0.017**	0.012	0.037***	0.071***
	(19.68)	(19.45)	(20.72)	(2.91)	(1.00)	(6.11)	(7.64)
MKTCAP	0.021***	0.021***	0.029***	0.016***	0.023***	0.005***	-0.031***
	(5.40)	(4.12)	(5.91)	(7.36)	(48.81)	(4.22)	(-4.13)
VOLATILITY	1.627***	1.612***	1.404**	0.352**	-0.028	0.179	0.532
	(3.33)	(3.29)	(3.03)	(2.65)	(-0.30)	(1.33)	(1.65)
ILLIQUID	-4.281***	-4.288***	-4.037***	-1.359***	0.036	-0.274	-3.322***
	(-5.87)	(-5.95)	(-5.87)	(-3.78)	(0.27)	(-1.49)	(-4.81)
LOGPRC	0.089***	0.089***	0.097***	0.020**	0.004	-0.025***	0.057***
	(7.46)	(7.34)	(9.19)	(2.39)	(0.51)	(-11.13)	(4.78)
LAG3MRET	0.186***	0.214***	0.212***	0.008	-0.035	0.100***	0.032
	(3.56)	(3.62)	(3.42)	(0.14)	(-1.34)	(4.72)	(1.08)
MB	-0.100***	-0.099***	-0.142***	-0.061***	-0.003	0.025***	-0.080***
	(-6.26)	(-6.03)	(-6.85)	(-11.29)	(-0.75)	(5.96)	(-6.19)
ROA	-3.044***	-3.161***	-2.493*	-0.335	-0.202	-0.323	-0.637
	(-3.41)	(-3.34)	(-2.18)	(-0.70)	(-1.34)	(-1.36)	(-1.01)
LEVERAGE	-0.019	-0.022	0.022	0.020***	0.016	-0.007	0.044
	(-0.28)	(-0.36)	(0.35)	(3.59)	(0.54)	(-0.58)	(1.74)
CONSTANT	0.181	0.188	-0.049	-0.016	-0.108**	0.039	0.202***
	(1.55)	(1.63)	(-0.57)	(-0.78)	(-2.97)	(1.69)	(4.34)
Prop FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average R-squared	0.547	0.552	0.585	0.436	0.465	0.331	0.485
# Obs	802	802	802	802	802	802	802

Appendix 4: Regression Results on Institutional Ownership and Home Concentration of REITs (Crisis)

This table gives the Fama-MacBeth (1973) regression results on the relationship between institutional ownership and REIT home concentration from 2007Q3 through 2009Q2. The dependent variable, $IO_{i,t}$, is the ratio of the number of shares held by institutional investors to the total number of shares outstanding of firm i in quarter t. $HOMECON_{i,t}$ is the percentage of a firm i's total property portfolio located in the headquarter market in quarter t. Columns 1-3 give the results based on all the institutional investors. Column 5-7 presents the results based on proportional of REIT owned by banks and trusts (*BANKS*), mutual funds (*MFS*), hedge funds (*HFS*), and other asset management companies (*OAMS*), respectively. The classification of institutional investors is based on Agarwal, Jiang, Tang, and Yang (2013). See Table A1 for variable descriptions. Numbers in parentheses are *t*-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		IO		*BANKS*	*MFS*	*HFS*	*OAMS*
HOMECON	0.026*	0.239***	0.299***	0.010	0.080***	0.060***	0.007
	(1.85)	(7.49)	(11.52)	(0.37)	(3.61)	(8.27)	(0.41)
GEOHHI		-0.273***	-0.247***	-0.029	-0.044	-0.037***	0.013
		(-8.73)	(-10.11)	(-1.48)	(-1.52)	(-3.73)	(0.56)
PropHHI			0.181***	0.042***	0.016*	-0.016***	0.073***
			(18.70)	(5.03)	(1.95)	(-3.32)	(5.56)
UPREIT	0.134***	0.119***	0.105***	-0.028***	0.008	0.055***	0.044***
	(10.61)	(10.18)	(11.22)	(-5.43)	(1.80)	(7.61)	(7.35)
MKTCAP	0.053***	0.057***	0.060***	0.016***	0.012*	0.006**	0.003
	(7.04)	(8.79)	(9.48)	(11.11)	(1.99)	(2.67)	(0.33)
VOLATILITY	-0.297	-0.203	-0.407	0.186	0.061	-0.047	-0.139
	(-1.04)	(-0.62)	(-1.07)	(0.99)	(0.56)	(-0.42)	(-0.54)
ILLIQUID	-2.262***	-2.165***	-2.185***	-0.701***	-0.472***	0.179***	-0.949***
	(-4.35)	(-4.37)	(-4.36)	(-4.28)	(-4.33)	(4.04)	(-3.44)
LOGPRC	0.037***	0.042***	0.048***	-0.001	0.006	-0.023**	0.042**
	(3.51)	(4.10)	(4.46)	(-0.13)	(0.62)	(-2.45)	(2.74)
LAG3MRET	-0.038	-0.018	0.023	-0.050	-0.018	0.037	0.070
	(-0.33)	(-0.13)	(0.18)	(-1.05)	(-1.21)	(0.92)	(1.02)
MB	-0.105***	-0.115***	-0.158***	-0.059***	-0.029	0.007	-0.035
	(-6.77)	(-6.68)	(-9.14)	(-9.06)	(-1.71)	(0.77)	(-1.48)
ROA	-2.023***	-2.072***	-2.251***	-0.149	-0.077	-0.725**	-0.386
	(-3.89)	(-3.88)	(-4.83)	(-0.37)	(-0.39)	(-2.27)	(-0.82)
LEVERAGE	-0.061	-0.031	-0.016	0.034	0.020**	-0.067***	0.087***
	(-1.61)	(-0.93)	(-0.50)	(1.13)	(2.80)	(-4.19)	(6.16)
CONSTANT	0.376***	0.339***	0.217***	0.118***	0.025	0.091***	0.014
	(4.28)	(4.63)	(3.31)	(6.86)	(0.68)	(7.14)	(0.23)
Prop FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average R-squared	0.574	0.582	0.604	0.423	0.574	0.390	0.408
# Obs	592	592	592	592	592	592	592

Appendix 5: Regression Results on Institutional Ownership and Home Concentration of REITs (Post-crisis)

This table gives the Fama-MacBeth (1973) regression results on the relationship between institutional ownership and REIT home concentration from 2009Q3 through 2015Q4. The dependent variable, $IO_{i,t}$, is the ratio of the number of shares held by institutional investors to the total number of shares outstanding of firm i in quarter t. $HOMECON_{i,t}$ is the percentage of a firm i's total property portfolio located in the headquarter market in quarter t. Columns 1-3 give the results based on all the institutional investors. Column 5-7 presents the results based on proportional of REIT owned by banks and trusts (*BANKS*), mutual funds (*MFS*), hedge funds (*HFS*), and other asset management companies (*OAMS*), respectively. The classification of institutional investors is based on Agarwal, Jiang, Tang, and Yang (2013). See Table A1 for variable descriptions. Numbers in parentheses are *t*-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		IO		*BANKS*	*MFS*	*HFS*	*OAMS*
HOMECON	0.060**	0.180**	0.222***	0.060***	0.031***	-0.031***	0.127***
	(2.60)	(2.49)	(3.06)	(3.60)	(4.18)	(-3.64)	(3.04)
GEOHHI		-0.111	-0.088	-0.053**	0.025***	0.009	-0.046
		(-1.31)	(-1.07)	(-2.12)	(4.01)	(1.26)	(-1.02)
PropHHI			0.194***	0.024***	0.021***	-0.006	0.109***
			(10.02)	(3.14)	(6.11)	(-0.89)	(6.18)
UPREIT	0.109***	0.099***	0.094***	0.008***	0.017***	0.031***	0.022***
	(15.17)	(15.05)	(13.66)	(3.25)	(8.06)	(6.72)	(7.67)
MKTCAP	0.039***	0.041***	0.045***	0.012***	-0.004	-0.009***	0.020***
	(3.25)	(3.38)	(3.55)	(5.47)	(-0.96)	(-7.93)	(4.42)
VOLATILITY	-0.123	-0.018	-0.325	0.083	-0.189*	0.634***	-0.838***
	(-0.32)	(-0.05)	(-1.15)	(0.73)	(-1.76)	(4.92)	(-4.63)
ILLIQUID	-21.555***	-21.410***	-19.123***	-2.893***	-5.297***	0.029	-8.345**
	(-3.03)	(-3.01)	(-2.80)	(-2.88)	(-3.57)	(0.06)	(-2.14)
LOGPRC	0.006	0.008	0.009	-0.000	0.007	0.005	-0.004
	(0.44)	(0.49)	(0.53)	(-0.17)	(1.46)	(1.05)	(-0.56)
LAG3MRET	0.122	0.110	0.090	0.054*	0.003	0.015	-0.018
	(1.29)	(1.19)	(1.07)	(2.04)	(0.23)	(0.60)	(-0.52)
MB	-0.065***	-0.067**	-0.079**	-0.010	-0.004	-0.006	-0.032*
	(-2.95)	(-2.61)	(-2.69)	(-1.69)	(-0.87)	(-0.80)	(-2.03)
ROA	-2.850**	-2.821**	-2.673**	-0.348**	-0.313	-0.709***	-1.007
	(-2.40)	(-2.38)	(-2.44)	(-2.13)	(-1.24)	(-5.45)	(-1.61)
LEVERAGE	-0.150***	-0.134***	-0.098*	-0.009	-0.031***	0.010	-0.026
	(-5.02)	(-3.78)	(-1.99)	(-0.68)	(-2.84)	(0.64)	(-0.72)
CONSTANT	0.581***	0.557***	0.377***	0.034	0.163***	0.110***	0.129***
	(5.60)	(5.62)	(4.47)	(1.44)	(5.18)	(6.38)	(3.20)
Prop FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average R-squared	0.569	0.582	0.623	0.395	0.498	0.436	0.491
# Obs	1,657	1,657	1,657	1,657	1,657	1,657	1,657

Appendix 6: Excess Local Institutional Ownership and the Geography of REITs, by Property Type

This table gives the Fama-MacBeth (1973) regression results on the relationship between excess local institutional ownership and the geographical distribution of economic interest by property type. The dependent variable, $EO_{i,l,t}$, is $LIO_{i,l,t}$ (MSA-level ownership of firm *i*, calculated as aggregate ownership share of institutional investors headquartered in MSA *l* as a fraction of total institutional ownership share in firm *i* in quarter *t*) minus the aggregate ownership share of institutions in MSA *l* across all firms in quarter *t*. In Panel A, property type fixed effects are added to Table 4. The test variables (TS) are $HQMSA_{i,l,t}$ in Column (1), $OWNPPTY_{i,l,t}$ in Column (2), and $SHARE_{i,l,t}$ in Column (3). In Panel B, the variables of interest are the interaction terms between the TS and property type dummies. In Column (4), the TS is $SHARE\_PPTY_{i,k.l,t}$, the percentage share of properties of the corresponding type, *k*, (based on total adjusted cost) held by firm *i* in MSA *l* in quarter *t*. For example, *SHARE_PPTY x Office* is the percentage share of office properties interact with the office dummy. Similarly, *SHARE_PPTY x Multifamily* is the percentage share of multifamily properties interact with the multifamily dummy. Controls are the same as in Table 4 and not tabulated. See Table A1 for variable descriptions. Numbers in parentheses are *t*-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Adding Property Type Fixed Effects to Table 4

	(1)	(2)	(3)
Dependent Variable	*EO*	*EO*	*EO*
Test Variable (TS) =	*HQMSA*	*OWNPPTY*	*SHARE*
TS	1.401***	0.099***	4.041***
	(28.42)	(7.09)	(19.10)
CONSTANT	0.255***	0.340***	0.280***
	(3.01)	(4.15)	(3.65)
Controls in Table 4	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes
Property Type FE	Yes	Yes	Yes
Average R-squared	0.272	0.256	0.273
# Obs	197,656	197,656	197,656

Panel B: Interact the Test Variables with Property Type Dummies

	(1)	(2)	(3)	(4)
Dependent Variable	*EO*	*EO*	*EO*	*EO*
Test Variable (TS) =	*HQMSA*	*OWNPPTY*	*SHARE*	*SHARE_PPTY*
TS x Office	0.858***	0.044	1.008***	0.189
	(6.98)	(0.96)	(3.76)	(0.70)
TS x Multifamily	1.107***	0.133***	3.121***	1.379***
	(7.30)	(4.07)	(9.14)	(2.81)
TS x Industrial	0.552***	-0.010	0.577	3.464**
	(3.01)	(-0.33)	(1.28)	(2.14)
TS x Retail	2.524***	0.096***	9.057***	7.034***
	(17.39)	(7.95)	(14.14)	(14.84)
TS x Other	1.173***	0.114***	4.566***	1.943***
	(14.70)	(6.12)	(12.94)	(3.92)
CONSTANT	0.230**	0.324***	0.313***	0.285***
	(2.22)	(3.91)	(4.05)	(3.94)
Controls in Table 4	Yes	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes	Yes
Average R-squared	0.277	0.257	0.285	0.269
# Obs	197,656	197,656	197,656	197,656

Appendix 7: Factors Driving Corporate Headquarters Relocation Decisions

This appendix provides some examples of investor headquarters relocations. Examples are manually collected from various sources such as Factiva and Google news search. The first column summarizes the stated factors driving corporate headquarters relocation decisions. The second column includes the names of the investor(s). The second column. Some investors stated several reasons in the news article.

Reasons of Relocation	Stated by
Better access to clients, technology innovation, parent company and/or local amenities	BLACKROCK ADVISORS, LLC GM ASSET MANAGEMENT FISHER INVESTMENTS
Deep labor pool	AL FRANK ASSET MGMT, INC. CREDIT SUISSE SECS (USA) LLC
Lower state income tax	DIMENSIONAL FUND ADVISORS, LP FISHER INVESTMENTS
Friendly business environment	AL FRANK ASSET MGMT, INC. FISHER INVESTMENTS
Expanding business	AL FRANK ASSET MGMT, INC. UNIONBANCAL
Moving back to the CEO's hometown	HOVDE CAPITAL ADVR LLC