# Blinded by Familiarity? Institutional Investors under Adverse Performance Shocks

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**Abstract**

Institutional investors' irrational familiarity bias can dominate their information advantage under adverse performance shocks to the home assets in their portfolios. Using data of U.S. REITs from 1993 to 2015 and the events of public non-REIT firm acquisitions, this paper investigates how institutional investors react to the geography-specific shocks to home assets. Equity REITs perform worse if they hold more properties in counties where the acquired non-REIT firms are located. If the value of properties that a REIT owns in the target county increases by 10 percentage points, its abnormal return (alpha) decreases by 14.7% in one month after the acquisition announcement. This negative impact is more prominent if the REIT owns more offices than other types of properties in the county, or if the acquired firms are larger than other remaining public firms in the county. Also, the REIT's return on asset and dividend yield decrease by 6.4% and 5.4% in the next quarter. However, using a difference-in-differences model, I find that institutional home investors are less likely than institutional non-home investors to lower the holdings of affected REITs after the acquisitions. This familiarity bias is stronger if the investors are closer to the affected properties or implement more active investment strategies.

Keywords: REIT, institutional investors, familiarity and home bias, information advantage, mergers and acquisitions
JEL Codes: G2, G4, R3

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# 1 Introduction

Investors tend to over-invest in their home assets, which results in under-diversification and inefficient portfolios. A major strand of literature explains this phenomenon with home investors' information advantage on home assets against the non-home investors (Garmaise & Moskowitz, 2004; Grinblatt & Keloharju, 2001; Hau, 2001; Ivković *et al.*, 2008; Teo, 2009; Van Nieuwerburgh & Veldkamp, 2009). These studies recognize the information advantage by showing that investors with more home assets have better investment performance (Coval & Moskowitz, 2001; Ivković & Weisbenner, 2005). Other studies argue that home assets do not always outperform non-home assets (Ambrose *et al.*, 2000; Milcheva *et al.*, 2020). Instead, the home-asset concentration and portfolio under-diversification can be driven by the irrational familiarity bias of investors (Pool *et al.*, 2012). Home investors tend to overestimate the return and underestimate the risk of their familiar home assets (Agarwal, 2007; Seiler *et al.*, 2013; Solnik & Zuo, 2017; Strong & Xu, 2003). Both information advantage and familiarity bias explain the home-asset concentration concurrently under normal or positive market conditions (Ling *et al.*, 2021c).

Existing evidence for familiarity bias are mainly documented for the individual investors (Cao *et al.*, 2011; Graham *et al.*, 2009; Huberman, 2001; Seasholes & Zhu, 2010), and fewer empirical studies investigate the familiarity bias of institutional investors (Hau & Rey, 2008). In particular, compared with normal or positive market conditions, it remains unexplored whether home and non-home institutional investors will respond differently to potential adverse performance shocks to home assets because of familiarity bias. Familiarity bias under negative performance shocks to the home assets is unique, as it may contradict home investors' information advantage under such conditions. Specifically, when market signals indicate that home assets will perform poorly in future, home investors should decrease their holdings of the home assets more and earlier than non-home investors if their information advantage in the local market has a dominating effect. In contrast, if the familiarity bias dominates the information advantage when there are considerable downside risks in the home assets, home investors should be more reluctant to decrease their holdings of home assets than non-home investors despite the adverse market signals.

To answer this question for the general investors, I use an unique setting of institutional investors of real estate investment trusts (REITs) and the shocks of other non-REIT firm acquisitions near the properties held by the REITs, which addresses two empirical challenges. First, for conventional asset classes, it is challenging to classify the home and non-home assets by the actual geographic footprint of their economic value. Real estate solves this issue as it has a precise location. Many prior studies compare foreign and domestic investors' holding in domestic assets (French & Poterba, 1991; Choi *et al.*, 2017), but it is more difficult to identify home assets among domestic investors. Some studies use the headquarter location of a firm to determine whether the firm is a home asset (Coval & Moskowitz, 1999; Grinblatt & Keloharju, 2001), as firms may locate their headquarter near their main business for more efficient management (Aarland *et al.*, 2007; Giroud, 2013). Several recent papers emphasize the limitation of this identification because the major economic activities (e.g., sales and operations) of geographically dispersed firms may not happen at or near the headquarter location (Bernile *et al.*, 2015; Garcia & Norli, 2012).

In contrast, the real estate asset has a clean geographic footprint for its economic value, as all property income will be generated at its location only (Hartzell *et al.*, 2014; Ling *et al.*, 2021a). Nevertheless, since the real estate market is illiquid, we cannot obverse the instant changes in investors' direct holding in real estate when there are negative stocks to local real estate performance. Therefore, in this paper, I study the institutional investors of REITs, instead of the direct real estate investors. Investors can adjust their holdings of REITs quickly in the open market when they predict the properties in the REITs' portfolios will not perform well.

As for the classification of home and non-home investors, I use the business addresses of the investment managers. Past studies measure individual managers' familiarity bias using their home addresses, mother tongues or cultural backgrounds (Grinblatt & Keloharju, 2001; Hau, 2001; Pool *et al.*, 2012), while business addresses are more commonly used in the fund-level analyses (Hau & Rey, 2008). Since this study focuses on the collective behaviors of institutions instead of individual fund managers, I follow the latter strategy and collect the business addresses of the institutional investors from their SEC 13F filings. The home investors are defined as institutional investors

located in the same county as the properties, while the out-of-county investors are denoted as non-home investors. This strategy directly measures the investors' proximity to the properties in REITs, which better identifies the familiarity bias toward the underlying assets than the indirect measurements using the proximity to REIT headquarter (Ling *et al.*, 2021a).

The second challenge is to find geography-specific shocks to the real estate returns that are exogenous to the local property market dynamics. Some studies use natural catastrophes, especially hurricanes, as the exogenous shocks (e.g., Rehse *et al.*, 2019). Still, their impacts may have already been priced effectively in the hurricane-prone areas (Sah *et al.*, 2008). In this paper, I propose an identification strategy by investigating the equity REITs' performance after other public non-REIT firm near the properties are acquired and the corresponding responses of the REITs' institutional investors. The rationale is that, after the acquisition, the target firm is likely to dispose of the redundant production lines and employees (Maksimovic *et al.*, 2011; Risberg, 2003), consolidate its research facilities and management team with the acquirer (Brueller *et al.*, 2018; Stiebale, 2016), or even entirely relocate to other locations (Brouwer *et al.*, 2004; Voget, 2011). Therefore, the commercial real estate in the acquired firm's headquarter is expected to perform worse due to a lower demand after the acquisition. This adverse effect may also spill over to the residential property sector (Chen *et al.*, 2021; Hu *et al.*, 2020). Meanwhile, compared to other shocks like firms' discretionary decisions of headquarter relocation, the acquisitions are less likely to be caused by the dynamics of local property markets.[1]

Using the data of all U.S. equity REITs from 1993 to 2015, the events of public firm acquisitions in the U.S. during the same period, and institutional investors of the affected REITs, this paper established two sets of empirical findings. First, by employing an event study model, I show that firm acquisitions serve as adverse shocks to the REIT performance, if the REITs hold prop-

[1]Only acquisitions between companies in the non-real estate sectors are used in this study to further reduce the possibility that the acquisitions are driven by falling local property markets. Still, it is noteworthy that the anticipation effect might not be entirely ruled out, as mergers and acquisitions in one industry tend to appear in waves (Jovanovic & Rousseau, 2008; Maksimovic *et al.*, 2013). Nevertheless, the anticipation is not likely to impact the conclusion that the acquisition announcements of incumbent non-REIT firms serve as important market signals to REIT performances. If any, the adjustments in investors' REIT holdings before the announcement could reflect their information advantage towards the underlining real estate assets.

erties in the target county. If the share of a REIT's property value in the target county increases by 10 percentage points, the abnormal return (alpha) of the REIT in one month after acquisition decreases by 0.122 percentage points. Since the average abnormal return of the observations is 0.829%, this translates to a 14.7% decrease in the alpha of REITs. This negative effect is prolonged to the second month after the acquisition, and there is no effect before the announcement. This finding is robust if using the 3-month cumulative abnormal return (i.e., [-1 month, +1 month] around the announcement) as the dependent variable or using the share of property number in the target county as the explanatory variable.

Next, I examine the heterogeneity in the predictive power of local non-REIT firm acquisitions on REIT performance across REIT types and locations. I find the negative impact of local firm acquisitions on REIT return is more prominent in magnitude if the REIT holds more office buildings than other property types in the target county, as shown in Figure 1. This finding can be explained as the demand in the office property market is more directly impacted by the acquisition of target firms than the other market sectors. Also, the adverse effect is stronger if the acquired firm is larger than the total size of remaining public firms in the target county. This is because the relative size of the demand shock due to the acquisition will be larger when there are fewer incumbent firms in the target county. Lastly, I find the predictive power of the local firm acquisitions on REIT performances is weak when the REIT is headquartered in the target county but holds no properties there, as the actual economic footprints of the REIT assets are not affected by the acquisitions in this circumstance.

— Insert Figure 1 about here —

In addition, I document the mechanisms for the REIT market reactions to the local firm acquisitions. I find the firm acquisition events not only impact the short-term stock market performance of REITs, but also affect the REITs' actual income and yield. In the quarter of the acquisitions, the rental income of REITs with properties in the target counties are not significantly affected, because it takes around three months to complete the merger on average (Luypaert & De Maeseneire, 2015). In one quarter after the announcement, the quarterly return on assets (ROA) of a

REIT decreases by 0.051 percentage points if the share of affected property value in its asset base increases by 10 percentage points, equivalent to a 6.4% decrease in the average quarterly ROA. Meanwhile, the quarterly ordinary dividend yield and total dividend yield decrease by 0.093 and 0.232 percentage points. These translate to a 5.4% and a 6.5% decrease in the corresponding average yield levels, respectively. These results indicate that the preceding stock market reactions reflect the expectations for the following decreases in the REIT fundamental performances.

Second, I estimate the changes in home and non-home investors' holding in REITs after the acquisitions using a difference-in-differences (DID) model and find that home investors in the target location are less likely to decrease their holdings in the affected REITs than non-home investors. Following Ling *et al.* (2021a), I define the treatment group as home institutional investors who locate in the same MSA of the affected real estate asset (and also the MSA of the acquired firm). They are expected to be influenced by either information advantage or familiarity bias under the property performance shocks. The control group is the out-of-MSA institutional investors, who are assumed not to be affected by either information advantage or familiarity bias. Therefore, if the effect of information advantage dominates familiarity bias, the home investors are expected to decrease their holdings of affected REITs more and earlier than non-home investors. In contrast, if the effect of familiarity bias dominates information advantage, the home investors are less likely to decrease their holdings of affected REITs than non-home investors.

I find that within one year after the firm acquisitions, the REITs' outstanding common shares held by their existing non-home investors decrease by 1.5 percentage points on average, but the existing home investors do not adjust their holdings. These findings are consistent if using the relative changes in holdings standardized by the pre-treatment holding levels instead. Before the shocks of firm acquisitions, the parallel trends between the treatment and control group are held up to at least one year prior to the treatment, indicating the changes in shareholdings are likely to be caused by the local demand shocks of acquisitions (See Figure 2). Also, the empirical finding does not support a dominating effect of information advantage, because the home investors do not sell the affected REITs before the general market responds. This result aligns with the prior literature

about individual investors that individual home investors tend to underestimate the downside risk (Seiler *et al.*, 2013) and be overconfident about the future performance of home assets (Agarwal, 2007; Solnik & Zuo, 2017; Strong & Xu, 2003).

— Insert Figure 2 about here —

The degree of familiarity bias under negative performance shocks also varies according to distances and investment styles. First, I further separate home investors into three subgroups by their distances to the affected real estate asset: (1) in the same county, (2) in the same MSA but from different counties, and (3) in the same state but from different MSAs. The non-home investors are redefined as those from different states. I find that the farther the investors are from the affected real estate asset, the less they decrease in their REIT holdings after firm acquisitions. This result indicates that the physical proximity to home assets positively correlates to the impact of familiarity bias. Second, I classify the institutional investors into quasi-indexers and active investors, following the methodology introduced in Bushee (1998) and Bushee & Noe (2000). The effect of familiarity bias is stronger for active home investors than quasi-index (passive) home investors, as the active home investors have more discretions in determining their holdings of the affected REITs after the acquisitions than passive home investors. However, the difference in REITs ownership changes between the active and passive non-home investors are small and statistically insignificant. In summary, these findings support that institutional investors' familiarity bias can dominate their information advantage when there are adverse shocks to the home assets in their portfolios.

This paper contributes to the thin literature on the familiarity bias of institutional investors (Hau & Rey, 2008). In particular, it introduces a novel identification for institutional investors' reactions to geography-linked adverse market signals, using the shocks of local firm acquisitions to the performance of real estate in the same county. It provides new evidence that the irrational familiarity bias of institutional investors can dominate their local information advantage when there are negative shocks to home assets. As a result, this behavioral bias could potentially lead to investment losses by holding more poorly performing home assets, at least in the short or medium term.

Therefore, this study bears important policy implications for institutional investment committees to deal with familiarity bias, especially in bad market conditions.

In addition, this paper links the real estate literature with the corporate finance literature and provide new facts on the spatial spillover effects of firm acquisitions on real estate markets. Prior studies investigate how corporate decisions, such as IPOs and headquarter relocations, affect the local housing market and the regional economy (Chen *et al.*, 2021; Hartman-Glaser *et al.*, 2018; Hu *et al.*, 2020). This paper extends the knowledge to commercial real estate and provides insights on the property market dynamics when firms are acquired or exit. It has policy implications for preventing negative externalities to real estate markets due to consolidations in other industries.

Moreover, this study adds to the general literature on the stock market responses to the micro-level risks of the REIT counterparts. Past studies document the stock market reactions under situations like REITs losing bank agents due to bank mergers (Hardin & Wu, 2009), increasing common ownership due to mergers of institutional investors (Ling *et al.*, 2021b), decreasing stock market supply due to mergers of other REIT competitors (Chan *et al.*, 2019), or tenants announcing bankruptcies (Liu & Liu, 2013). This paper provides new evidences on the stock market responses when the non-REIT firm acquisitions shock the demand for properties in the REIT portfolios.

The remaining parts of the paper are organized as follows. Section 2 reviews the literature. Section 3 presents the analysis of the impacts of local firm acquisition on REIT performances, including the methodology, data, and results. Following that, Section 4 contains the analysis of REIT institutional investors' responses to the adverse shocks of local firm acquisitions. Finally, Section 5 concludes the paper.

# 2 Literature Review

## 2.1 Firm Acquisition and REIT Performance

Past literature has extensively studied the impact of REITs' mergers and acquisitions (M&As) on their stock market performances. Some studies report positive abnormal returns of the REIT ac-

quirers after the acquisition announcements (Li *et al.*, 2001; Ooi *et al.*, 2011), while other studies document that the post-announcement returns are insignificantly different from zero, or even negative (Booth *et al.*, 1996; Glascock *et al.*, 1991; Pierzak, 2001; Olgun, 2005). Mechanisms driving the differences in the post-announcement returns include market conditions, payment methods and target types (Allen & Sirmans, 1987; Campbell *et al.*, 2001, 2003). The post-announcement effects on abnormal returns can last in the long run till at least five years after the merger (Campbell *et al.*, 2009). The REIT mergers also have a positive spillover effect on the returns of other incumbent REITs in the market (Chan *et al.*, 2019). These findings are generally consistent with the literature on M&As of firms in other conventional industries (e.g., Baker *et al.*, 2012; Bouwman *et al.*, 2009; Chang, 1998; Savor & Lu, 2009).

Apart from the M&As between REITs, a growing strand of literature studies the dynamics of REIT performances due to the M&As between other major counterparties of REIT investments, such as banks and REIT investors. Hardin & Wu (2009) find that bank mergers reduce bank competition for REIT loans, which affects the loan pricing in return. Also, the REITs losing their bank agents due to the bank mergers are more likely to be acquired by other unaffected REITs in the future. Ling *et al.* (2021b) find that after mergers among institutional investors, REITs with increases in common institutional ownership (i.e., institutional investors who own equity of multiple firms in the same industry) due to the mergers will end up with higher firm value. They explain that it is because institutional investors who hold multiple equity REITs are likely to have better access to the soft information on the properties owned by the REITs, in comparison to other institutional investors.

For the US REITs, it is required that at least 75% of the asset are invested in real estate assets and cash, while at least 75% of the REIT's gross income are derived from real estate related sources.[2] Since REITs primarily invest in real estate assets under these two requirements, the performances of REITs are expected to be affected by the local market shocks to the underlying properties held by the REITs. However, few studies have investigated the spillover effect of gen-

[2]See `https://www.sec.gov/files/reits.pdf`

eral firm acquisitions near the properties owned by REITs on REIT performances, although the evidence from past literature has implied that firm acquisitions influence local real estate markets.

Firm acquisitions impact the demand of local commercial real estate, as they are often associated with relocations of the target firms (Brouwer *et al.*, 2004). Even if the target firm is not entirely relocated, physical integration between the target and acquirer is common: Product lines are integrated, technologies are transferred, and redundant assets are re-deployed (Breinlich, 2008; Jovanovic & Rousseau, 2008; Risberg, 2003). Maksimovic *et al.* (2011) document that acquirers of entire firms sell 27% and close 19% of the plants of target firms within three years of the acquisition. The innovation activities in the target county also tend to decline after the acquisition, as the R&D investment is usually geographically concentrated within the acquirer (Stiebale, 2016). This, in return, will cause relocation of both facilities and employees of the target firm (Brueller *et al.*, 2018), which negatively affects the demand for local commercial real estate. This impact may spill over from the commercial property market to the residential property market as well. Hu *et al.* (2020) find firm relocations negatively impact local housing prices due to the exit of employees and decreases in local economic input.

Nevertheless, other researches indicate that the impact of firm acquisitions on the real estate market of the target county can be ambiguous. Some acquirers move their original headquarter to target firms in other counties after cross-border M&As, in order to enjoy the tax benefit in the target countries (Voget, 2011). Cross-state relocations due to state-level corporate income tax advantages are also observed in the U.S. (Chow *et al.*, 2021), while some of these domestic relocations may be completed through firm acquisitions. The local real estate markets of the target counties are more likely to benefit from the acquisitions under such circumstances. In addition, after the acquisition, the market value of the target firm and aggregate economic outcomes may increase (David, 2021), which could positively impact the local real estate market through the wealth effect (Hartman-Glaser *et al.*, 2018). Moreover, to ensure control of the acquired business, the top managers are often transferred from the acquiring to the acquired company (Risberg, 2003), who usually have high wages and may positively affect the high-end housing market in the target county. In summary,

the literature is scant and inconclusive for the impact of general (non-REIT) firm acquisitions on the performance of REITs that hold real estate assets in the target county.

## 2.2 Home Bias of Institutional Investors

Over-concentration on home assets is a widely observed phenomenon among institutional investors (Huberman, 2001), which deviates their actual holdings from the Markowitz optimal portfolios (French & Poterba, 1991). Investors are more likely to hold and trade the stocks of firms that are close to the investors, communicating in the investors' mother tongue or having chief executives of the same cultural background (Grinblatt & Keloharju, 2001; Hau, 2001). Some studies document that, by exploiting informational advantages in selections of nearby stocks, home investors can obtain an excessive risk-adjusted annual return that ranges between 1 and 4 per cent (Coval & Moskowitz, 2001; Ivković & Weisbenner, 2005; Teo, 2009). In the more illiquid real estate market, where information advantage can take a more significant effect in price discovery, Van Nieuwerburgh & Veldkamp (2009) find that market participants also resolve information asymmetries by purchasing nearby properties. Garmaise & Moskowitz (2004) argues that the effect of information asymmetry is unlikely to be eliminated by the improvement in global information access, because the learning effort of home investors can further amplify a small endowed home information advantage. This implies that the under-diversification phenomenon due to home bias is persistent.

Some other studies, however, argue that the home bias may stem from simply familiarity instead of information, as concentration on home assets does not always bring excessive returns. Pool *et al.* (2012) find that mutual fund managers overweight stocks from their managers' home states by 12% compared with their peers, but the home-state stocks do not outperform other holdings, which implies that home-state investments are not informed. Using transaction-level data, Seasholes & Zhu (2010) find that for individual investors, their purchases of local stocks significantly underperform their sales of local stocks, and their portfolios of local holdings do not generate excessive returns. In the real estate market, geographic concentration on home properties does not always bring benefits either. Real estate firms with higher geographic dispersion significantly

outperform the market in the post-GFC era (Ambrose *et al.*, 2000; Milcheva *et al.*, 2020).

Apart from the mixed evidence on excess return, literature has also documented the effects of familiarity bias on risk perception. Investors tend to underestimate the risk of home assets due to overconfidence (Graham *et al.*, 2009) and overestimate the risk of non-home assets because of the fear of unknown (Cao *et al.*, 2011). Eichholtz & Yönder (2015) find that overconfident CEOs are less likely to sell assets, and this behavior is not driven by their access to unique private information. Fund managers show a persistent and significant relative optimism towards the home equity, bonds, and currencies they are more familiar with (Solnik & Zuo, 2017; Strong & Xu, 2003). Homeowners are more confident about the future performance of their own houses than other properties in the same neighborhood (Agarwal, 2007), and underestimate the downside risks of their houses (Seiler *et al.*, 2013). Pool *et al.* (2012) find that overweighting on home assets leads to excessively risky portfolios, compared to the optimal levels.

In summary, the existing literature provides two explanations—familiarity bias and information advantage—for the home-asset concentration observed in the portfolios of global investors (Ling *et al.*, 2021c). Although these two effects concurrently lead to under-diversification under normal market conditions, they may have different effects on investment portfolios when there are adverse performance shocks to the portfolio assets: The irrational familiarity bias is persistent and less likely to be affected by the market shocks (Solnik & Zuo, 2017), while the informed investors are more likely to lower their exposure to affected asset and mitigate the negative shocks (Yuan, 2005). This study attempts to bridge this knowledge gap about how home/non-home investors respond differently to adverse performance shocks. Also, it is noteworthy that most of the findings on familiarity bias are documented at the individual (manager) level, while more evidence is yet to be explored at the firm (fund) level (e.g., Hau & Rey (2008)). In other words, it is not yet conclusive whether institutional investors led by the team of investment committees are still likely to be biased by the home location of their offices.

# 3 Impacts of Firm Acquisitions on REIT Performances

## 3.1 Empirical Methodology

I first investigate whether the shocks of firm acquisitions will negatively impact the stock market performance of REITs that hold properties located in the same districts as the acquired firms. Specifically, the following event-study model is applied to estimate the impact of REIT's exposure to local firm acquisition events on the REIT's stock return:

$$Y_{it} = \beta EXP_{it} + X_{it}^{'}\lambda + \varphi_i + \omega_t + \epsilon_{it}. \tag{1}$$

The explanatory variable, $EXP_{it}$, measures a REIT's exposure to local firm acquisition events, with the subscripts $i$ and $t$ referring to the REIT and the month, respectively. In the baseline estimation, $EXP_{it}$ equals the total value of a REIT $i$'s properties located in the same county of an acquired firm in the announcement month $t$ ($ValueEXP_{it}$), represented as a percentage of the REIT's total assets. If all properties held by the REIT $i$ are not in the same county of any firm acquisitions in month $t$, then $EXP_{it}$ will equal zero. In the robustness check, I also use the total number of affected properties ($NumEXP_{it}$) as a fraction of the total property number in the REIT to be an alternative measurement of $EXP_{it}$.

The dependent variable, $Y_{it}$, is the monthly abnormal return (alpha) of a REIT $i$ in month $t$. The monthly abnormal return of a REIT is estimated with a Fama-French four-factor model, using the return data of the REIT over the previous 60 months.[3] Therefore, the estimated coefficient $\beta$ represented the instant effect of firm acquisitions on the REIT's stock return in the month of the acquisition announcement. In a set of parallel models, I replace the dependent variables as the abnormal returns from $t-1$ to $t+2$ in order to estimate the effects in the pre-announcement and post-announcement months, respectively. Lastly, as the robustness checks, I also use the 3-day cumulative abnormal returns over a [-1 month, +1 month] window around each month $t$ as the

[3]The values of the Fama-French factors are provided on the personal website of Professor Kenneth French. See: `https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html`.

alternative dependent variables.

$X_{it}$ is a set of control variables for the REIT fundamentals. These controls include the return over asset, the market value (in logarithmic form), the cash holding scaled by the total assets, the leverage of the firm measured as the total debt over the total asset, and the market-to-book ratio. $\varphi_i$ presents the REIT fixed effects. $\omega_t$ denotes the year and month fixed effects. $\epsilon_{it}$ is the error term. The standard errors are clustered at the level of firms.

Apart from investigating the impact of firm acquisitions on the stock market performance, I also estimate the impact on the fundamental performance of the affected REITs. In these estimations, I use a REIT's return on asset, the ordinary dividend yield, and the total (ordinary and non-ordinary) dividend yield as the outcome variables in Equation (1). Since these fundamental performances are reported by quarters, I update the measurements of $EXP_{it}$ at the quarterly level in the corresponding estimations. In other words, $EXP_{it}$ equals the total value of REIT $i$'s properties located in the same county of an acquired firm announced in quarter $t$, presented as a share of the REIT's total asset. The same set of control variables ($X_{it}$) are included in these estimations, except that the return on asset is omitted from the controls because it is used as the dependent variable. The firm and year quarter fixed effects are also included in the corresponding estimations.

## 3.2 Data

The information of firm acquisitions is obtained from the Thomson ONE Database. The study period is from 1993 to 2015, and I apply the following filtering rules to select the samples further. First, I require the acquiring and target firms to be public firms from non-real estate sectors, with headquarters in the U.S, and listed on the NYSE, AMEX or NASDAQ Exchange. Second, I include only the completed M&A deals with non-missing deal values, and exclude the divestitures and spin-offs. Third, I include only the valid acquisitions if the acquirer's ownership is less than 50% before the event and is more than 50% after the event, as defined by the data vendor. Fourth, the events are dropped if the information on the target firm's headquarter location or total assets in the previous year before the announcement is missing. Lastly, I exclude the events if the target

and acquirer are in the same county, or if there are other confounding acquisitions in the target county in the announcement month. This is because these confounding events can potentially bias the overall shocks to the local real estate performance. The county of the firms are defined by the 5-digit FIPS code.

After the filtering processes, it ends up with 1,555 observations of public firm acquisitions, and Figure 3 plots the geographic distributions of the target firms by counties of their headquarter. It reveals that a lot of the acquired firms were initially located in areas along the east and west coast, such as California, Massachusetts, and Florida.

— Insert Figure 3 about here —

The data of REIT stock market performance in this study is obtained from the CRSP-Ziman REIT Database, which provides information on the monthly closing prices and dividends of all REITs listed on the NYSE, AMEX and NASDAQ Exchange. I include only the 408 equity REITs in the study period, because the income of equity REITs are mostly obtained from the rent of properties they hold and are more likely to be affected by acquisitions of local firms than mortgage REITs. Then I match them with the CRSP-Compustat Database to obtain their annual/quarterly fundamental information and drop the 27 unmatched ones. The headquarter locations of the REITs are obtained and cross-checked via multiple sources, including the header of 10-K/Q SEC filings from the Augmented 10-X Header Data (Chow *et al.*, 2021; Hu *et al.*, 2020), the historical snapshot in the Compustat Database, and a manual search on the Internet.

The time-variant information on properties in each REIT's portfolio is collected from the SNL Real Estate Database. For each property that is (ever) held by a REIT, the database provides the annually updated information on its net book value, initial cost, historical cost, property type, county, acquisition date, as well as the sold date if it exists. Following Ling *et al.* (2021a), I define the adjusted cost of a property as the maximum value among the reported net book value, the initial cost of the property, and the historical cost of the property, including capital expenditures, land improvements and net of writedowns.

— Insert Figure 4 about here —

Figure 4 plots the geographic distributions of properties held by the REITs, according to the counties of the property location. In comparison with the distribution of acquired firms, the properties held by REITs also tend to concentrate in the major cities, but they are more diversified across the nation. Figure 5 further plots the geographic concentration of the REITs' property investments, measured as the Herfindahl Index (HHI) of property numbers by county. It reflects that the REITs owning more properties are generally more diversified in property locations, and the average county-level HHI of the sampled REITs equals 0.218 in the study period.

— Insert Figure 5 about here —

After merging these three data sources, the final regression sample includes 362 unique equity REITs from 1993 to 2015, expanding to 37,716 firm-month observations and 12,205 firm-quarter observations. Around 36.54% of the firm-month observations (13,781) and 58.09% of the firm-quarter observations (7,090) are affected by the local firm acquisitions. Table 1 presents the summary statistics of the regression sample, and the variable definitions are presented in Appendix Table A1. The monthly abnormal return of the sampled REITs is 0.829%, and the 3-month cumulative abnormal return is 2.505%.[4] On average, the properties affected by a local firm acquisition constitute 1.7% of the REIT's total asset and 2% of the REIT's total property number. Within the subsamples of treated REIT and month only, the affected properties constitute 4.6% of the REIT's total asset and 5.4% of the property number.

— Insert Table 1 about here —

## 3.3 Baseline Results

Table 2 reports the baseline estimation results for the impact of local firm acquisitions on REITs' stock market performance, using Equation (1). In Columns (1) to (4), the dependent variable is the abnormal return of a REIT in month $t - 1$ to $t + 2$, respectively. The explanatory variable is the

[4]Since the abnormal returns are estimated based on the standard Fama-French momentum four-factor model, the positive average alpha of the observations suggests a positive risk-adjusted excess return of REIT investments against the general equity market.

REIT's share of property values exposed to the shocks of local firm acquisitions. If the affected property values increase by 10 percentage points relative to a REIT's total asset, the abnormal monthly return of the REIT decreases by 0.122 percentage points in the following month after the announcement of firm acquisitions (Column (3)). Since the average abnormal return of the REITs is 0.829%, this translates to a 14.7% decrease in the average abnormal return.

— Insert Table 2 about here —

Similarly, in the second month after the announcement of firm acquisitions, a 10-percentage-point increase in the affected property values leads to a 0.159-percentage-point (or 19.2%) decrease in the abnormal return (Column (4)). Both of the estimates are statistically significant at the 1% level. However, there is no impact of holding properties in the target countries on a REIT's abnormal return in one month before the official acquisition announcement (Column (1)), or instantly in the month of the announcement (Column (2)), which are revealed by the statistically insignificant estimates for the coefficient of *ValueEXP*.[5]

Therefore, these results support the hypothesis that if REITs hold properties in locations where a public firm is acquired, the stock market return of the REITs is negatively affected in the subsequent months after the acquisition announcement.[6]

[5]There is no pre-announcement impact from months $t-2$ to $t-3$, or post-announcement impact in month $t+3$, either. These estimation results are available upon request. Figure 1 presents the estimated cumulative changes to the REIT total returns given local demand shocks to properties equal to 10% of the REIT assets, compounded by month from $t-3$ to $t+3$.

[6]Some related studies on home investors of REITs identify home investors and home assets by matching the business address of the investors with the headquarter of the REITs, not with the locations of real estate in the REITs (e.g., Ling *et al.* (2021a)). While past literature has widely documented that REITs tend to invest more in properties near their headquarter (Milcheva *et al.*, 2020), the connections between the investors' locations and the REITs' headquarter are only likely to have a secondary effect in the setting of this paper. When firm acquisitions happen near the headquarter of the REITs, the performances of the REITs are likely to be affected only when the REITs hold properties near the headquarter (i.e., in the target county) as well. If the REITs do not hold any properties near its headquarter, the performances of the REITs are not likely to be affected, as the underlying real estate assets in the portfolio are far from the demand shocks. Aligning with these hypotheses, I find that if firm acquisitions happen in the county of the REITs' headquarter and the REITs also have underlying real estate holdings in that county, the REITs will have a decreasing abnormal return in 1 or 2 months after the acquisition announcement. However, the effect does not exist if the REITs do not hold any properties in that county. The corresponding results are provided in Appendix Table A2.

## 3.4 Heterogeneity Analysis

The local firm acquisitions are expected to directly affect the demand for office buildings held by the REITs as the target management is merged with the acquirer out of the county. In contrast, the demand shocks are expected to spill over to other property types as the secondary effect. Therefore, it is hypothesized that firm acquisitions are stronger adverse market signals to REITs with more offices in portfolios. To investigate this heterogeneous effect across property types, I further separate a REIT's share of affected property values into two categories: office and non-office properties. Then I use the shares of affected office and non-office properties as the independent variables of interest in Equation (1).

The corresponding estimation results are reported in Table 3. Consistent with the baseline estimation results, I find that holding either office or non-office properties in the target counties before or in the month of the acquisition announcement does not impact the return of the REITs (Columns (1) and (2)). It confirms that the firm acquisitions are likely to be unexpected shocks to local real estate performances. One month after the acquisition announcement (Column (3)), a REIT's abnormal return decreases by 0.10% percentage points if the share of its non-office property values in the target county increases by 10 percentage points. In contrast, the abnormal return decreases by 0.17% percentage points if the share of the REIT's office property values in the target county increases by 10 percentage points. The former estimate is statistically significant at the 1% level, and the latter one is statistically significant at the 5% level.

— Insert Table 3 about here —

Similarly, as reported in Column (4), the REIT's abnormal return in the second month after the announcement decreases by 0.14 percentage points with a 10-percentage-point increase in the share of affected non-office properties. In contrast, the return will decrease more (0.18% percentage points) conditional on the same 10-percentage-point increase in the share of affected office properties. Both the estimates are statistically significant at the 1% level. These results indicate that, compared with the REITs holding non-office properties in the target county, the returns of

REITs holding office properties in the target county are more directly and seriously affects by the exits of the acquired firms.

Apart from the heterogeneity across property types owned by the REITs, the size of the acquired firm relative to the size of local economy in the target county may also impact the magnitude of the shocks on REITs' performances. For instance, compared to the firm acquisitions in the counties with many public firms, an acquisition is expected to have a more significant impact on the demand for commercial real estate in a county if the acquired firm is the only large public firm headquartered there. Since there lacks the data to directly measure the employment bases of each firm in the headquarter, I construct a proxy measurement for the real impact of the acquired firms on the local real estate market. Specifically, I use the the target firm's size (i.e., total asset) as a fraction of the total size of all public firms headquartered in the same county[7], assuming that larger firms will also have more employees and rent more offices in their headquarters. I denote this measurement as *RelTargetSize*. For the REIT-month observations that are not affected by any firm acquisitions, *RelTargetSize* is assigned as zero.

I first add *RelTargetSize* as an additional explanatory variable in Equation (1), and the corresponding estimation results are reported in Columns (1) to (4) in Table 4. As expected, I find that a larger relative size of the target firm is associated with a larger decrease in the REIT return, and this effect is more pronounced in the month of the announcement (Column (2)) and the following month afterwards (Column (3)). In Columns (5) to (8), I report the estimation results by interacting $ValueEXP$ with $RelTargetSize$[8], which essentially represents the value exposure of the REIT to the acquisition, weighted by the relative size of the shock compared to the local economy. I continue to observe an economically and statistically significant effect in the following month after the announcement (Column (7)). Suppose the acquired firm is the only public firm located in the county ($RelTargetSize = 1$), and the share of property values held by the REIT in the county

[7]Many target firms cease to provide financial reports in the year of the acquisition announcement, so the total asset of the firms in one year before the announcement is used for the calculation.

[8]Since both $ValueEXP$ and $RelTargetSize$ will be zero only when the REITs are not affected by any firm acquisition events in a month, the individual terms of the two variables are omitted when their interactions are already included in the model.

increases by 10 percentage points. In that case, the REIT return will decrease sharply by 2.88 percentage points. This estimate is also statistically significant at the 1% level.

— Insert Table 4 about here —

## 3.5 Mechanism Analysis: Fundamental Performance

Lastly, apart from investigating the instant responses to the local demand shocks in the REIT stock market, I further examine the mechanism of the market reactions. Specifically, the stock market reactions may reflect the adverse impact on REITs' future fundamental performances. Alternatively, they could be transient over-reactions to the imprecise market signals, if the REITs' fundamental performances are not truly affected. Therefore, I study whether the shocks indeed affect the REITs' fundamental performances, including their rental income and dividend yield. Since the fundamental performances are only reported quarterly, I modify the event study model of Equation (1) by using the quarterly data accordingly.

The corresponding estimation results are reported in Table 5. In Columns (1) to (3), the dependent variables are the REITs' quarterly return on asset (*ROA*), the ordinary dividend yield (*ODY*), and the total dividend yield (*TDY*) in the same quarter of the firm acquisition announcement, respectively. I find that the share of the REIT's property values in the target county does not have a statistically significant impact on the REIT's ROA and dividend yield instantly in the quarter of firm acquisitions. This result can be explained by the fact that the rental demand is not immediately affected right after the announcement of the acquisition, as it takes time for the actual merge to happen.[9]

— Insert Table 5 about here —

However, in the next quarter after the announcement, the quarterly ROA of the REIT decreases by 0.051 percentage points with a 10-percentage-point increase in its share of property

[9]For the U.S. listed companies, the mean and median durations between acquisition announcement and completion are 112 days and 93 days, respectively (Luypaert & De Maeseneire, 2015).

values in the target county (Column (4)). Since the average quarterly ROA of the REITs is 0.798%, this impact translates to a 6.4% drop from the average quarterly ROA. Increasing the share of property values in the target county by 10 percentage points is also associated with a decrease in ordinary dividend yield by 0.093 percentage points (Column (5)) and a reduction of total dividend yield by 0.232 percentage points (Column (6)), in the subsequent quarter after the announcement. Given the average ODY and TDY in the sample are 1.745% and 3.575%, these changes are equivalent to decreases from the average ODY and TDY levels by 5.4% and 6.5%, respectively. All these estimates are statistically significant at the level of 5%.

Therefore, the empirical findings support that the local firm acquisitions also negatively affect the fundamental performances of REITs that hold properties in the target county. Also, the stock market responds earlier than the occurrence of actual effects on the REIT fundamentals. Since the decreases in REIT stock market returns reflect the real adverse impacts on REIT fundamentals instead of over-reactions to imprecise market signals, the rational existing investors are expected to short the overvalued REITs after the local demand shocks. It lays the empirical foundation for the following analysis on the change in holdings by home and non-home REIT investors.

## 3.6 Robustness Checks

I have conducted a battery of robustness checks for the results. As for the impact of firm acquisitions on REITs' stock market performance, I first use the 3-month cumulative abnormal return (CAR) over a [-1 month, +1 month] window as the alternative outcome variable in Equation (1). The corresponding regression results are reported in Appendix Table A3. It reveals that the share of properties in the target county does not have a statistically significant impact on REIT's CAR in the month of acquisition announcement or one month before that. In contrast, a 10-percentage-point increase in the share of property values in the target county will lead to a 0.24-percentage-point (0.28-percentage-point) drop in the CAR in the first (second) month after the announcement. These are equivalent to decreases in the average CAR by 9.7% and 11.1%, respectively. Both estimates are statistically significant at the 1% level.

Secondly, I construct an alternative measurement for the REIT's asset exposure to the firm acquisitions. Specifically, instead of using the share of property values in the target county as the explanatory variable in Equation (1), I use the number of properties in the target county as a fraction of the total property number in the REIT's portfolio. Appendix Table A4 represents the corresponding estimation results. Consistent with the baseline results, the share of property numbers in the target county does not have a statistically significant impact on the REIT's abnormal return in the month of acquisition announcement or one month before the announcement. However, holding more properties in the target county will result in lower abnormal returns of the REITs in one month or two months after the announcement of local firm acquisitions. If the share of property numbers in the target county increases by 10 percentages points, the REIT's abnormal return in one month and two months after the announcement will decrease by 0.20 percentage points and 0.15 percentage points, respectively. Compared to the average levels, these translate to a lower abnormal return by 23.6% and 18.1%, respectively. Therefore, these robustness test results support our baseline findings that local firm acquisitions have a negative effect on the stock market performance of REITs that hold properties in the target county.

As for the impact of firm acquisitions on REITs' fundamental performance, the results also remain robust if using the share of property numbers in the target county as the alternative explanatory variable. As reported in Internet Appendix Table A5, REITs with a higher share of property number in the target county by 10 percentage points will have a lower quarterly ROA by 0.07 percentage points in the next quarter after the announcement of firm acquisitions. Meanwhile, the ordinary dividend yield is lowered by 0.17 percentage points, and the total dividend yield reduces by 0.35 percentage points. These are equivalent to decreases from the average level of the corresponding fundamental performances by 9.1%, 9.6%, and 9.7%, respectively. Also, consistent with the baseline result, I find that the share of property numbers in the target county does not have a statistically significant effect on the REIT's fundamental performances in the exact quarter of announcement. Therefore, this result supports that the stock market reacts before the real impacts occur on the REIT's rental income.

Another potential concern for the baseline results on REIT's fundamental performances is the seasonality of the REITs' rental income and dividend payout. Some REITs may not pay dividends at the quarterly level, which potentially bias the estimation results in Equation (2). I address this concern by including the REIT times quarter fixed effects in the model, which assumes that for each REIT, the variations in the REIT income across different quarters due to seasonality are relatively consistent. The estimation results using these alternative fixed effects are reported in Appendix Table A6. The estimates are similar to the baseline results for both the size of the magnitude and the statistical significance level, which indicates that the baseline results are robust.

# 4 Impacts of Firms Acquisitions on Institutional Investors' Holdings of Affected REITs

## 4.1 Empirical Methodology

Next, I investigate how home and non-home institutional investors react differently to the negative performance shocks to the real estate assets. Specifically, I use the subsample of REITs from Section 3 that are affected by the shocks of local firm acquisitions. In other words, at least one property in the REIT portfolio is located in the same county as the acquired firms. The home institutional investors are defined as the investment managers with the business addresses located in the same MSA as the affected properties, and the non-home institutional investors are those from different MSAs.[10] The hypothesis is that if the home investors have significant information advantages over the non-home investors about the negative shocks, they are likely to adjust their holdings of the affected REITs earlier and more than the non-home investors. This is because the advantageous knowledge might cover the likelihood of acquisition before the official announcement or the potential impact on local real estate performances. On the contrary, if the familiarity bias towards home

[10]Home institutional investors at the MSA level are used in the baseline estimations, as the number of home institutional investors at the county level is relatively small. Different classifications of home institutional investors by counties, MSAs, and states are applied in the heterogeneity analyses to examine the impact of distances to home assets on the degree of familiarity bias.

assets dominates the information advantages, the home investors may be overconfident about the performance of home assets despite the adverse market signals and are less likely than the non-home investors to adjust their holdings of the affected REITs after the acquisitions.

To test these hypotheses, I apply the following difference-in-differences (DID) model to estimate the changes in REIT holdings by the home and non-home investors due to the impact of firm acquisitions events:

$$Ownership_{ijt} = \beta_1 Post_{ijt} + \beta_2 InMSA_{ijt} * Post_{ijt} + X_{it}^{'}\lambda + Event_{it}^{'}\lambda + \varphi_{ij} + \omega_t + \epsilon_{ijt}. \quad (2)$$

The dependent variable, $Ownership_{ijt}$, denotes the percentage of a REIT's outstanding shares held by the home investors or non-home investors at the end of each quarter, with the subscripts $i$, $j$, and $t$ referring to the REITs, the investors and the quarters, respectively. Within each REIT, I calculate the total percentage of shares held by the home or non-home institutional investors, respectively, and use a dummy variable $InMSA_{ijt}$ to indicate the holdings by the home institutional investors (the treatment group). For the non-home investors outside the MSA of the acquired firms (the control group), $InMSA_{ijt}$ is equal to zero. $Post_{ijt}$ is a dummy variable equal to one if the ending date of a holding report is after the announcement of the firm acquisition. Otherwise, $Post_{ijt}$ equals zero.[11] Therefore, the coefficient $\beta_1$ represents the changes in REIT holdings by non-home investors after the acquisition events, and $\beta_1 + \beta_2$ represents the corresponding changes for home investors. The coefficient $\beta_2$ is the estimate for the impact of familiarity bias on home investors' asset holdings given the adverse market signals, assuming that only the treatment group (home investors) are subject to the familiarity bias toward the home assets, but the control group (non-home investors) are not affected by the familiarity bias.

$X_{it}$ is the same set of control variables for the firm fundamentals as in Equation (1), including the return on asset, market capitalization, cash holding, leverage, and market-to-book ratio. In addition, I include a set of acquisition-specific features for each affected REIT, denoted by $Event_{it}$.

[11]Note that $InMSA_{ijt}$ is omitted from the model, as the model contains the REIT and investor fixed effects. However, $Post_{ijt}$ is not absorbed by the year quarter fixed effects and is still included in the model, because the pre- and post-treatment samples are identified at the monthly level.

According to the discussion in Section 3, these acquisition-specific controls include the share of property values in the REIT that is affected by the local firm acquisitions and the relative size of the acquired firms in comparison to the total size of all public firms located in the same county. $\varphi_i j$ presents the REIT and investor fixed effects. $\omega_t$ denotes the year and quarter fixed effects. $\epsilon_{ijt}$ is the error term. The standard errors are clustered by REITs.

## 4.2 Data

To construct the regression sample for the DID analysis, I start with the subsample of REITs in Section 3 that hold properties in the same county as the acquired firms and collect institutional investors' quarterly holdings of these REITs within the [-12 months, +12 months] window around each firm acquisition announcement. The information on institutional investors' holdings of these REITs is obtained from the Thomson Reuters 13F Institutional Holdings Database. It provides quarterly reports on the common stock holdings in the SEC 13F filings, in which the SEC requires all institutional investment managers to report their holdings over $100 million in the qualified assets. Since the database has a reporting issue starting in 2013 (Ben-David *et al.*, 2021), I drop the observations after 2013, and the final study period is between 1993 and 2012.

The historical business addresses of the institutional investors in each quarter are collected from the original 13F filings stored on the SEC DEGAR, using a web-crawling program. The 13F filings of the institutional investors are identified using their company names, and the accuracy of the name matching is also cross-checked with the WRDS SEC 13F Holdings Database. Figure 6 presents the geographic distributions of the investment managers' business addresses. It reflects that the investors' business addresses also concentrate in a number of counties, but their distribution is not the same as the distribution of the target firms.

— Insert Figure 6 about here —

The following filtering rules are further applied to obtain a clean selection of the treatment and control groups. Firstly, I require that the acquired firm is not in the same county as the acquirer,

and there are no other firm acquisitions in the same county within the [-12 months, +12 months] window around the announcement. Therefore, the holdings by the institutional investors are not likely to be affected by any confounding firm acquisition events. Secondly, I only keep the REITs that do not sell or purchase any properties within each [-12 months, +12 months] window around the announcement. In other words, any changes in the REIT holdings by the institutional investors are not driven by the property purchases or sales in the REIT portfolios. Lastly, I require the institutional owners of REIT in the sample to have non-missing quarterly reporting within the [-12 months, +12 months] window around the announcement. Consequently, within each study window of the REIT by acquisition event sample, the compositions of the home investors in the treatment group and the non-home investors in the control group are consistent in each quarter.

After the filing processes, the final regression sample covers 335 public firm acquisitions in the U.S. from 1993 to 2012, In total, 134 REITs are affected by these events, ending with 2,226 REIT by event observations. Using the [-12 months, +12 months] study window around each treatment, this expands to 15,582 REIT by acquisition event by quarter observations. Further separating the total holdings of these REITs by the home investors and non-home investors, I finally get 31,164 samples of the institutional holding data. Table 6 summarizes the total holdings by the home investors and the non-home investors of the REITs in the sample. On average, the groups of home or non-home institutional investors hold 19.3% of the REIT's outstanding shares in the sample.[12] The average value of properties in the target county equals around 3.8% of the sampled REITs' total assets. The average total assets of the acquired firms equal about 18.1% of the total assets of all public firms located in the same county.

— Insert Table 6 about here —

[12]In the full sample from the Thomson Reuters 13F Institutional Holdings Database, around 72.8% of the REITs outstanding common shares are held by the institutional investors, which are close to the findings (75.9%) in recent studies like Ling *et al.* (2021a). After the data filtering process, the remaining sampled institutional investors hold 38.7% of the REITs' outstanding shares. The average total shares held by the groups of home investors and non-home investors are 3.3% and 35.3% in the sampled REITs, respectively. Therefore, after separating the total shares of a REIT held by home investors and non-home investors as different samples in the treatment and control groups, respectively, the average holdings in the regression sample becomes 19.3%. For each REIT, there are on average 4.5 sampled home institutional investors in the same MSA and 62.0 sampled non-home investors from different MSAs. Each home investor holds 0.75% of the REIT's shares on average, and each non-home investor holds 0.57% of the shares, which aligns with the conclusion in prior literature that home investors are more likely to invest in home assets.

## 4.3 Baseline Results

Table 7 reports the baseline estimation results for the impact of local firm acquisitions on institutional investors' holdings of affected REITs, using Equation (2). In Columns (1) and (2), the dependent variables are the total percentage of the REIT's outstanding shares held by the home or non-home investors (denoted as *Ownership*). Since the quarterly fundamental control variables from the Compustat Database are missing for a small proportion of the samples, I first report the estimation results without the fundamental controls in Column (1). It reveals that the total holdings by non-home investors for a REIT decreases by 1.52 percentage points within one year after the announcement of acquisitions, as reflected by the coefficient of variable *Post*. In comparison with the non-home investors, the total holdings by home investors increase by 1.64 percentage points after the announcement, as shown by the coefficient of the interaction term between *Post* and *InMSA*. Both these estimates are statistically significant at the 1% level. After the linear combination of *Post* and *Post*InMSA*, the coefficient becomes statistically insignificant, indicating that the home investors did not significantly change their REIT holdings within one year after the announcement.

— Insert Table 7 about here —

In Column (2), the quarterly fundamentals of the REITs are included as control variables. As discussed in Section 3, I also include the REIT's share of property values in the target county (*ValueEXP*) and the relative size of the target firm in comparison to all public firms in the target county (*RelTargetSize*) as the additional controls for the shock-specific features. I find that non-home investors decrease their holdings in the affected REITs by 1.54 percentage points after the acquisition announcement, but the home investors do not have statistically significant adjustments in their REIT holdings, which leads to a larger difference between the total REIT holdings by non-home and home investors by 1.71 percentages points. The estimates are statistically significant at the 1% level. These baseline estimation results indicate that home investors are more reluctant to adjust their exposure to the home assets than the non-home investors when there are adverse shocks to the performance of the home assets. Therefore, it implies that the home investors'

irrational familiarity bias may outweigh their information advantages over the non-home investors under such adverse market shocks.

The parallel trend between the treatment and control groups before the treatment is a critical assumption for validating the DID model. I test the parallel pre-trend by using a set of dummies to indicate the quarters relative to the treatment time instead of using the *Post* dummy in Equation (2). The dummy for three quarters before the acquisition announcement ($t-3$) is used as the base. Then, I use the subsamples of the home and non-home investors in separate models and re-estimate Equation (2) but exclude the interaction term. Therefore, the coefficients for the relative quarter dummies represent how the home and non-investors adjust their holdings of the REITs by quarters, in comparison to their holdings in quarter $t-3$ (i.e., the base).

Figure 2 plots the estimated coefficients for the relative quarter dummies. The squared symbols represent point estimates for the non-home investors from different MSAs. It reflects that the non-home investors start to lower their holdings in the affected REITs from the first quarter after the announcement ($t+1$), and their holdings keep decreasing until the quarter $t+3$. However, the holdings by the non-home investors do not have statistically significant changes between quarters $t-2$ and $t$, in comparison to the holdings in quarter $t-3$. As for the home investors, there are no statistically significant changes in their holdings over the entire window between $t-3$ and $t+3$. The point estimates for the quarter dummies do not statistically differ from zero in the pre-treatment period for both the treatment group (home investors) and the control group (non-home investors). Therefore, it supports that the parallel trend assumption is held for the DID model.

The parallel trends indicate that the acquisition announcement of a public non-REIT firm is likely to be an unexpected shock to both home and non-home investors' holding of REITs. In a semi-strong form market, this might also be explained as the fact that institutional investors are unlikely to trade on material nonpublic information before the M&A incentives are officially announced, and the market primarily reacts in the post-announcement period (Bacon & Von Gersdorff, 2008; Chen *et al.*, 2020; Humphery-Jenner & Powell, 2011; Masulis *et al.*, 2007).

Since the number of home investors for a REIT at the MSA level is smaller than the number

of non-home investors of the REIT, the total shares of a REIT held by the non-home investors are also higher than the total shares held by the home investors. Thus, one potential concern for the baseline estimation result is that the absolute changes in the holdings may be biased by the ex ante differences in the holding levels by the home or non-home investors. To address this concern, I standardize the holdings by the home and non-home investors separately, using the pre-treatment mean and standard deviations in the holdings within the treatment and control group, respectively. The standardized holdings are denoted as *SD_Ownership*, which represent the relative changes in the home/non-home investors' holdings in comparison to their ex ante holding levels before the treatment.

Columns (3) and (4) in Table 7 report the estimation results of Equation (2), using *SD_Ownership* as the dependent variable. In Columns (3), the time and firm fixed effects are included in the model. It reveals that the non-home investors decrease their holdings by 0.079 standard deviations after the announcement, as reflected by the coefficient of variable *Post*. This estimate is statistically significant at the 1% level. However, the relative holdings of affected REITs by the home investors do not have substantial changes after the treatment, as reflected by a statistically insignificant point estimate combining the coefficients of *Post* and *Post*InMSA*. Column (4) further reports the estimation results after including the REIT fundamentals and the treatment-specific features as the control variables. A similar estimate for the coefficient of *Post* is obtained, both for the magnitude and the statistical significance level. The linear combination for the coefficients of *Post* and *Post*InMSA* also remain statistically insignificant. Therefore, these implicate results further support the conclusion that home investors are less likely to lower the holdings in the home assets than the non-home investors, regardless of the negative performance shocks to the home assets.

## 4.4 Heterogeneity Analysis

I further examine the heterogeneities in the home investors' familiarity bias. Firstly, distances to the home assets may impact the degree of home bias under adverse performance shocks, because the physical proximity usually has a positive correlation with familiarity, It is hypothesized that

institutional managers with business addresses closer to the real estate affected by local firm acquisitions are more likely to be influenced by the familiarity bias. To test this hypothesis, I classify the institutional investors into four groups and use a set of dummy variables to indicate them: (1) the home investors in the same county of the affected real estate, denoted by the dummy variable *InCty*; (2) the home investors in the same MSA but from different counties of the affected real estate, denoted by the dummy variable *InMSAOutCty*; (3) the home investors in the same state from different MSAs of the affected real estate, denoted by the dummy variable *InStateOutMSA*; and (4) the non-home investors from different states of the affected real estate (the base group in the regression analysis). Then I replace the dummy variable *treat* in Equation (2) with these variables denoting the investor subgroups and re-estimate the model using samples of the REITs' ownership by each subgroup of investors.

The corresponding estimation results are reported in Table 8. In Columns (1) and (2), *Ownership* is used as the dependent variable, while *SD_Ownership* is the dependent variable in Columns (3) and (4). Time and firm fixed effects are included in all columns, and the firm fundamentals and acquisition-specific features are further controlled for in Columns (2) and (4). In all these estimation models, the magnitudes of the coefficients of the interaction terms are positive and statistically significant, and they decrease by order of *Post*InCty*, *Post*InMSAOutCty*, and *Post*InStateOutMSA*. Therefore, these results support the hypothesis that investors closer to the home assets are more likely to be affected by the familiarity bias given adverse performance shocks to the home assets.

— Insert Table 8 about here —

Secondly, the investment strategies of the institutional investors may also affect the extend of their familiarity bias under negative performance shocks to the home assets. Specifically, investors implementing active investment strategies rely more on the management's discretionary analysis, so they are more likely to be affected by the behavioral bias than the passive investors. To test this hypothesis, I classify the institutional investors into passive and active investors, following the methodology introduced by Bushee (1998) and Bushee & Noe (2000). According to the turnover,

diversification, and momentum trading patterns in the investors' portfolios, Bushee (1998) classifies the investors as quasi-indexers, transient active investors, and dedicated active investors. I group the transient active and dedicated active investors as the active investors, and consider the quasi-indexers as the passive investors. Then I use a dummy variable to indicate the total holdings by active investors and interact it with the variable denoting home investors.

I report the corresponding results in Table 9, using *Ownership* as the dependent variable in Columns (1)–(2) and *SD_Ownership* as the dependent variable in Columns (3)–(4). Same as the baseline analysis, I first include time and firm fixed effects only in Columns (1) and (3), and then add the controls for firm fundamentals and acquisition-specific features in Columns (2) and (4). In all the models, the coefficients of the triple interaction term *Post*InMSA*Active* have the largest positive magnitude among all the interaction terms, which indicate that active home investors have a stronger tendency to hold more shares of the affected REITs after the shocks. In particular, after considering the relative holding changes compared to pre-treatment holding levels by using *SD_Ownership* as the dependent variables (Columns (3) and (4)), I find that both the active and passive non-home investors decrease their holdings after the treatment. However, there is no statistically significant difference in their post-treatment changes, as shown by the insignificant coefficients of *Post*Active*.

— Insert Table 9 about here —

These results imply that, since the non-home investors are not likely to be affected by the familiarity bias toward the home assets, their investment styles will not impact the extent of the familiarity bias either. As for the home investors, the quasi-indexers do not have significant changes in their holdings after the treatment, as indicated by the insignificant coefficient after linearly combining *Post* and *Post*InMSA*. Surprisingly, the active home investors even tend to increase their holdings of the affected REITs. The possible explanations include that the home investors tend to underestimate the downside risks (Seiler *et al.*, 2013) and are overconfident about the future performance of home assets (Agarwal, 2007; Solnik & Zuo, 2017; Strong & Xu, 2003). Since the familiarity bias is often associated with overconfidence towards the familiar asset (Graham *et al.*,

2009), these results also complement the findings in Eichholtz & Yönder (2015) that overconfident CEOs of REITs are less likely to sell assets than their counterparts while their access to valuable private information is not the main driver for this behavior.

In summary, the empirical results reveal that the home investors are less likely to lower their holdings of home assets than the non-home investors when there negative signals to home asset performances, at least in the short to medium term. This finding implies that home investors are more likely to be affected by the irrational familiarity bias towards home assets, which could dominate their information advantage over the non-home investors. This effect is more substantial for home investors who are closer to the asset locations and implement a more active investment strategy.

## 4.5 Robustness Checks

The historical business addresses of the institutional investors in the sample are collected from the quarterly13F filings stored on the SEC DEGAR database, which are available since the year 1999 only. In the baseline analysis, I use the earliest business address available in the database for the investors' holdings before 1999, assuming that few investors relocate in the early part of the sample period (i.e., between 1993 and 1999). To mitigate the potential concern for measurement error, I conduct a robustness check by including only the acquisition events and corresponding investors' holdings after 1999. Appendix Table A7 reports the corresponding estimation results. Our baseline conclusions remain robust, as I find relatively consistent estimates using the subsamples, both in terms of the sizes of coefficient magnitudes and the significance levels.

Another potential concern for the baseline DID analysis is the imbalanced composites of the treatment and control samples. According to the definition of home investors at the MSA level in the baseline estimation, not all affected REITs will simultaneously have home and non-home investors. For instance, if there are no investors located in the same MSA as the target firm, the identified total holdings by home investors will consistently be zero in the entire [-1 year, +1 year] window. Therefore, the decreases in the holdings by home investors in the post-acquisition

period may be underestimated. To address this concern, I create a subsample by only including the affected REITs with both the home and non-home investors. This ends with 118 REITs affected by 258 firm acquisition events. I re-estimate Equation (2) and report the results in Appendix Table A8. The results are qualitatively similar to the baseline analysis results, which support that our findings remain robust.

# 5 Conclusion

Prior literature has debated over two major reasons why institutional investors concentrate their portfolios in the home assets: The information advantage in the local market which leads to excess returns (Garmaise & Moskowitz, 2004; Grinblatt & Keloharju, 2001; Hau, 2001; Ivković *et al.*, 2008; Ling *et al.*, 2021c; Teo, 2009; Van Nieuwerburgh & Veldkamp, 2009), and the irrational behavioral bias towards the home assets which they are more familiar with (Ambrose *et al.*, 2000; Milcheva *et al.*, 2020). While these two effects can co-exist under normal conditions, they are expected to have differential effects on portfolio diversification when institutional investors face adverse market signals. Using the public firm acquisitions near the properties in REITs as a novel setting to identify the market performance shocks specific at home locations, this paper provides new insights that the familiarity bias tend to have a dominating effect over information advantage, given negative market signals.

This paper demonstrates that the acquisitions of public firms serve as negative demand shocks and adverse market signals to commercial real estate in the target county. The REITs holding more properties in the target county are likely to have poorer stock market performances and lower rental income after the announcement of acquisitions. This impact is not observed before the announcement, which indicates that the events are likely unexpected by the market. Also, the effect is stronger for the REITs holding more office properties in the target county, as the office properties are under a more direct impact of the acquisitions than the other property types. Last, if the acquired firm is larger in comparison with the other public firms located in the same county,

the negative impact on REITs performance is also more substantial, as the relative demand shock to the local real estate market is more remarkable.

However, I find the home investors near the acquired firm, who are expected to have better information on the adverse shocks to the local real estate market, are less likely to decrease their holdings of the affected REITs than the non-home investors despite of the adverse market signals. This tendency of underestimating risks is more evident if the home investors' business addresses are closer to the location of the affected real estate asset, because physical proximity is likely to foster familiarity. Therefore, it implies the dominating effect of irrational familiarity bias under adverse market conditions. I also find this effect is amplified when the investors implement active investment strategies, namely if the managers have a stronger discretionary power to adjust their portfolios.

This paper provides implications on how the consolidations of firms in other non-real estate sectors potentially affect the real estate markets. Past literature implies that firm acquisitions can affect the local real estate market, as the target firms tend to dispose of spare facilities and reduce redundant workforce during the post-acquisition integrations (Brueller *et al.*, 2018; Maksimovic *et al.*, 2011; Stiebale, 2016). However, the wealth effect on target firms after acquisitions and the tendency of assigning senior management from the acquirers to the targets may also offset the negative demand shocks to the real estate market (Hartman-Glaser *et al.*, 2018; Risberg, 2003). This paper narrows this knowledge gap in literature by showing that, on average, local firm acquisitions serve as negative signals to commercial real estate performance.

Finally, this study contributes to the literature on the home bias of institutional investors (Coval & Moskowitz, 2001; Ivković & Weisbenner, 2005; Pool *et al.*, 2012). It identifies the dominating effects among familiarity bias and information advantage with a novel setting and a clean identification strategy. It also extends the prior findings of the individual investors to the institutional investors (Agarwal, 2007; Seiler *et al.*, 2013; Solnik & Zuo, 2017; Strong & Xu, 2003). The results in this study imply that institutional investors may also underestimate the downside risks and overestimate the future performance of their home assets, although the investment commit-

tees rigorously monitor their investments. While this study uses institutional investors of REITs to identify the location-specific performance shocks, the findings in the study are generalizable to the institutional investors of other industries and asset classes. Therefore, this study also bears significant implications for the evaluation and management of the institutional investment committees.

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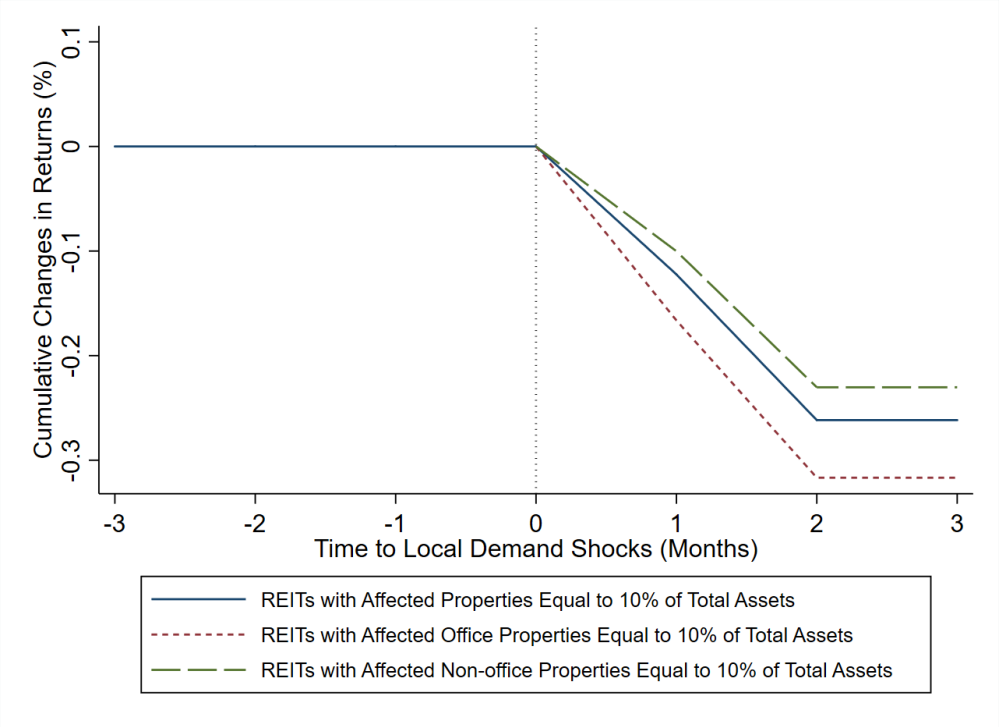
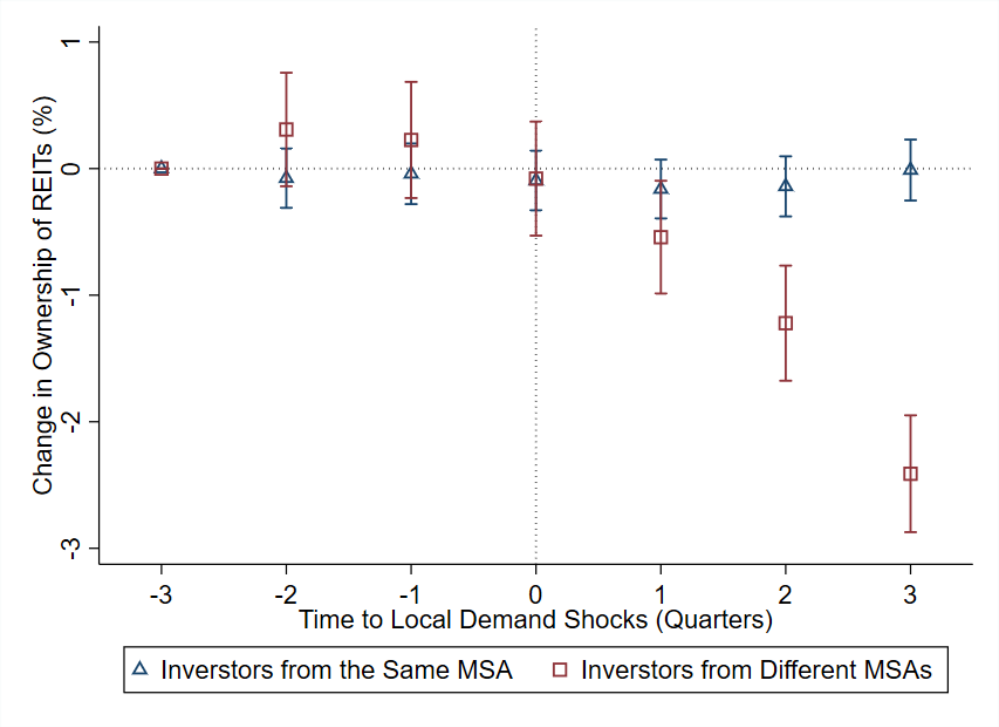
**Figure 1:** Cumulative Impacts on REIT Total Returns Due to Local Demand Shocks: Heterogeneity by Property Types



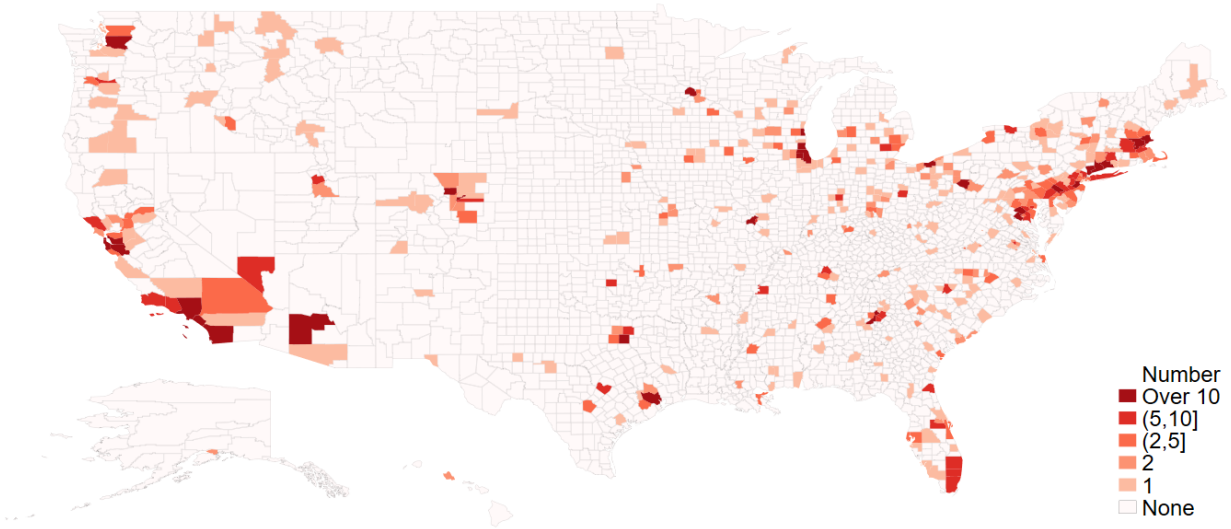

*Notes:* The figure plots the cumulative changes in REIT total returns due to the local demand shocks from firm acquisitions near the REIT properties. The cumulative changes are calculated by compounding the estimated changes in the REIT monthly abnormal returns. The solid line denotes the REITs with any types of properties in the target county that worth 10% of their total assets. The short-dash line denotes the REITs owing office properties in the target county that worth 10% of their total assets. The long-dash line denotes the REITs owning non-office properties in the target county that worth 10% of their total assets.

**Figure 2:** Parallel Trend Test between the Existing Home and Non-home Investors' Ownership of Affected REITs



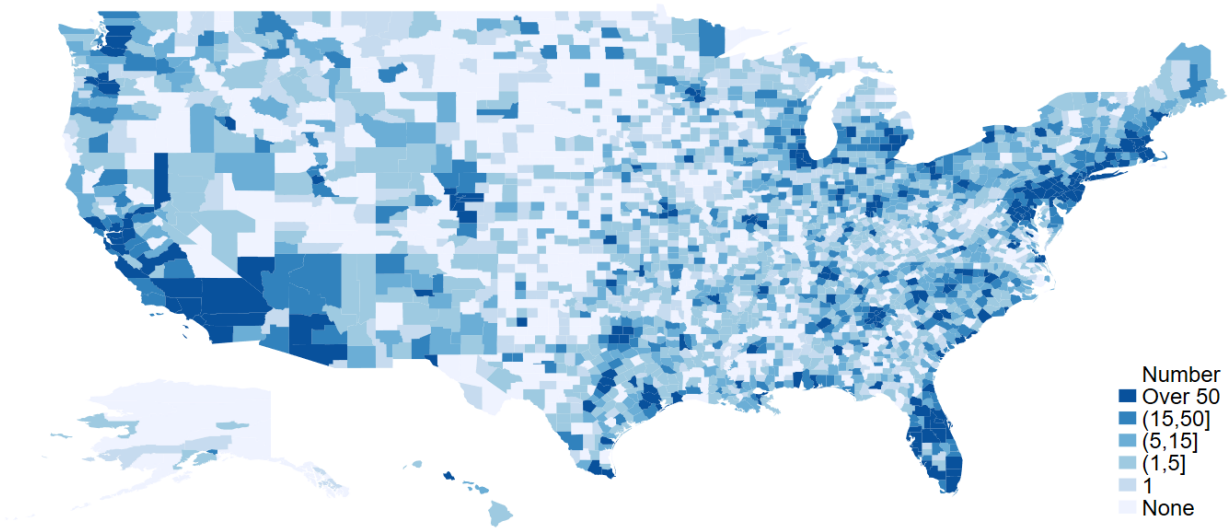

*Notes:* The figure plots the parallel trend test result for the existing home and non-home Investors' ownership of REITs that are affected by the firm acquisitions. The x-axis denotes the relative time to the local demand shocks, measured in quarter. The y-axis denotes the relative changes in the REIT holdings, after controlling for the REIT fundamentals, time trends and firm fixed effects. Only existing investors with REIT holdings before the treatment are included, and new investors of REITs after the treatment are excluded. The home investors are defined as those located in the same MSA as the firm acquisitions, and the non-home investors are defined as those from different MSAs. The error bars indicate the 95% confidence intervals.

**Figure 3:** Distribution of Firm Acquisitions in the U.S. between 1993 and 2015



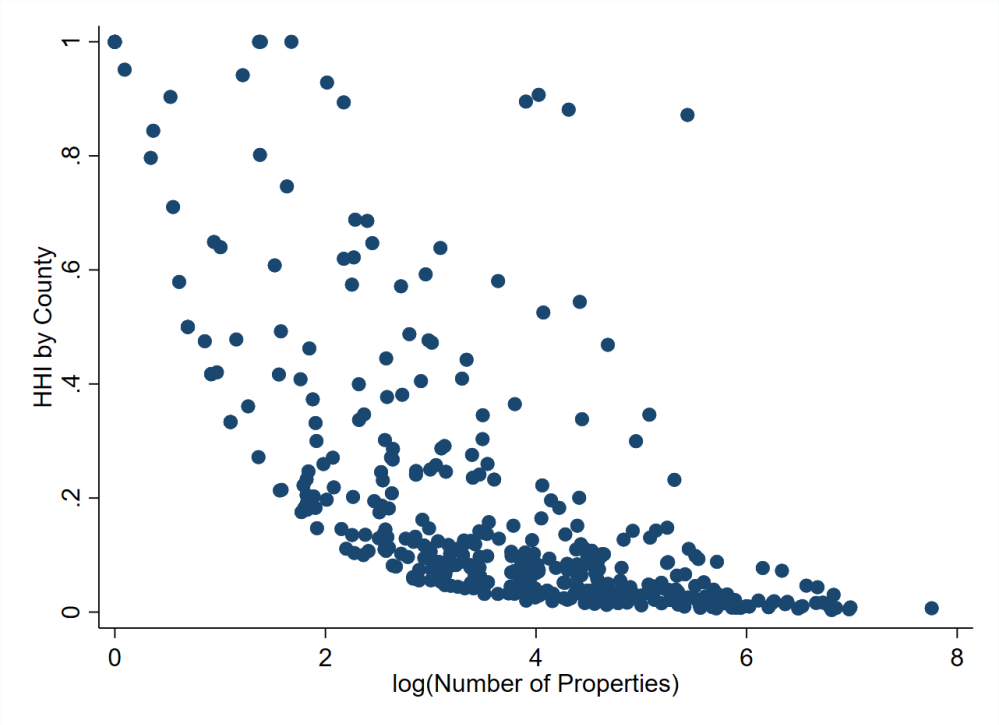

*Notes:* This figure plots the geographic distribution of headquarter of the public firms in the U.S. that were acquired between 1993 and 2015. This distribution is plotted at the FIPS county level.

**Figure 4:** Distribution of Properties in the U.S. Equity REITs between 1993 and 2015



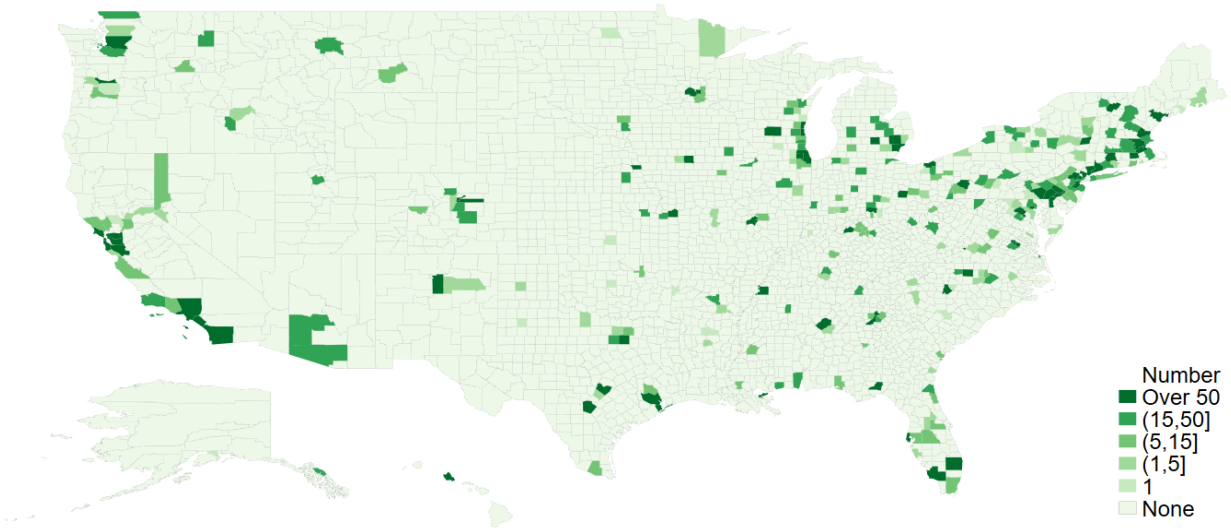

*Notes:* This figure plots the geographic distribution of properties held by the equity REITs in the U.S. between 1993 and 2015. This distribution is plotted at the FIPS county level.

**Figure 5:** Geographic Concentration of REIT Properties: Herfindahl Index (HHI) by County




*Notes:* This figure presents the geographic concentration of properties held by the equity REITs in the U.S. between 1993 and 2015, measured as the Herfindahl Index (HHI) of each REIT's properties at the county level. The annual HHI of a REIT is calculated as the sum of the squared share of property numbers in each county. The y-axis denotes the average HHI of each REIT over the study period. The x-axis denotes the average number of properties (in logarithmic form) owned by each REIT in the study period.

**Figure 6:** Distribution of Institutional Investors of the Equity REITs Affected by Local Firm Acquisitions




*Notes:* This figure plots the distribution of business addresses of the institutional investors, which hold equity REITs that are affected by local firm acquisitions. This distribution is plotted at the FIPS county level. If the investors are affected by multiple firm acquisition events at different months, they are considered as different observations. Foreign institutional investors without business addresses in the U.S. are excluded.

**Table 1:** Summary Statistics: The Event Study Sample for the Impact of Firm Acquisitions on REIT Performances

| | (1) N | (2) Mean | (3) S.D. | (4) P25 | (5) P50 | (6) P75 |
|---|---|---|---|---|---|---|
| *Abnormal Return (AR)* | 37,716 | 0.829 | 5.731 | -1.086 | 0.959 | 3.056 |
| *Cumulative Abnormal Return (CAR)* | 37,716 | 2.505 | 11.138 | -1.149 | 2.938 | 6.744 |
| *ValueEXP* | 37,716 | 0.017 | 0.064 | 0.000 | 0.000 | 0.003 |
| *ValueEXP_Office* | 37,716 | 0.004 | 0.032 | 0.000 | 0.000 | 0.000 |
| *ValueEXP_NonOffice* | 37,716 | 0.013 | 0.055 | 0.000 | 0.000 | 0.000 |
| *NumEXP* | 37,716 | 0.020 | 0.061 | 0.000 | 0.000 | 0.015 |
| *Return on Assets (ROA)* | 37,716 | 0.798 | 3.430 | 0.243 | 0.710 | 1.187 |
| *Log(Market Cap)* | 37,716 | 6.273 | 1.827 | 5.273 | 6.485 | 7.525 |
| *Cash Ratio* | 37,716 | 0.034 | 0.070 | 0.007 | 0.015 | 0.035 |
| *Leverage* | 37,716 | 0.514 | 0.210 | 0.416 | 0.519 | 0.635 |
| *M/B Ratio* | 37,716 | 1.987 | 2.208 | 1.187 | 1.602 | 2.259 |
| *Relative Target Size (RelTargetSize)* | 37,716 | 0.026 | 0.102 | 0.000 | 0.000 | 0.004 |
| *Ordinary Dividend Yield (ODY)* | 12,205 | 1.745 | 6.589 | 0.977 | 1.528 | 2.012 |
| *Total Dividend Yield (TDY)* | 12,205 | 3.575 | 13.772 | 1.957 | 3.057 | 4.027 |

*Notes:* This table reports the summary statistics of the event study sample for the impact of firm acquisitions on REIT performances. Definitions of the other variables are represented in Appendix Table A1.

**Table 2:** The Impact of Firm Acquisitions on REIT Return

| | (1)<br>*AR(t-1)* | (2)<br>*AR(t)* | (3)<br>*AR(t+1)* | (4)<br>*AR(t+2)* |
|---|---|---|---|---|
| *ValueEXP* | 0.1288 | 0.4201 | -1.2230*** | -1.5877*** |
| | (0.4173) | (0.3842) | (0.3164) | (0.3591) |
| *ROA* | -0.0089 | -0.0116 | -0.0108 | -0.0137 |
| | (0.0074) | (0.0097) | (0.0100) | (0.0107) |
| *Log(Market Cap)* | -0.1735* | -0.1913** | -0.2227** | -0.2678*** |
| | (0.0895) | (0.0922) | (0.0912) | (0.0905) |
| *Cash Ratio* | 1.0300 | 1.0570 | 0.7159 | 0.8845 |
| | (0.9257) | (0.9703) | (1.0052) | (1.0522) |
| *Liquidity* | -0.6456 | -0.6929 | -0.6899 | -0.6954 |
| | (0.6668) | (0.7408) | (0.7564) | (0.7541) |
| *M/B Ratio* | 0.0003 | 0.0003 | 0.0004 | 0.0003 |
| | (0.0011) | (0.0009) | (0.0010) | (0.0009) |
| Constant | 2.2594*** | 2.3700*** | 2.6018*** | 2.8888*** |
| | (0.5800) | (0.5807) | (0.5505) | (0.5331) |
| Year & Month FEs | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y |
| Observations | 37,683 | 37,716 | 37,544 | 37,372 |
| R-squared | 0.118 | 0.115 | 0.136 | 0.170 |

*Notes:* This table reports the estimated impact of firm acquisitions at time $t$ on the return of REITs that hold properties in the same county of the acquired firms (i.e., the target county). The dependent variables are the monthly risk-adjusted abnormal returns (alpha) of the REITs at time $t-1$ to $t+2$. The abnormal returns are calculated with a Fama-French four-factor model using return data in the previous 60 months. The explanatory variable, $ValueEXP$, is the total value of properties that a REIT holds in the target county at the acquisition time, as a fraction of the REIT's total asset. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table 3:** Heterogeneity Analysis for the Impact of Firm Acquisitions on REIT Return: Property Type

| | (1) *AR(t-1)* | (2) *AR(t)* | (3) *AR(t+1)* | (4) *AR(t+2)* |
|---|---|---|---|---|
| *ValueEXP_Office* | -0.6673 | -0.4165 | -1.6632** | -1.8042*** |
| | (0.6350) | (0.7284) | (0.8057) | (0.6796) |
| *ValueEXP_NonOffice* | 0.4193 | 0.7297 | -1.0013*** | -1.4465*** |
| | (0.4910) | (0.4632) | (0.3350) | (0.4202) |
| *ROA* | -0.0090 | -0.0117 | -0.0108 | -0.0137 |
| | (0.0074) | (0.0097) | (0.0100) | (0.0108) |
| *Log(Market Cap)* | -0.1726* | -0.1902** | -0.2222** | -0.2678*** |
| | (0.0896) | (0.0923) | (0.0911) | (0.0905) |
| *Cash Ratio* | 1.0301 | 1.0571 | 0.7173 | 0.8859 |
| | (0.9253) | (0.9699) | (1.0050) | (1.0521) |
| *Liquidity* | -0.6491 | -0.6965 | -0.6919 | -0.6965 |
| | (0.6666) | (0.7404) | (0.7563) | (0.7542) |
| *M/B Ratio* | 0.0003 | 0.0003 | 0.0004 | 0.0003 |
| | (0.0011) | (0.0009) | (0.0010) | (0.0009) |
| Constant | 2.2549*** | 2.3645*** | 2.5991*** | 2.8879*** |
| | (0.5807) | (0.5816) | (0.5500) | (0.5332) |
| Year & Month FEs | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y |
| Observations | 37,683 | 37,716 | 37,544 | 37,372 |
| R-squared | 0.118 | 0.115 | 0.136 | 0.170 |

*Notes:* This table reports the estimated impact of firm acquisitions at time $t$ on the return of REITs that hold different types of properties in the same county of the acquired firms (i.e., the target county). The dependent variables are the monthly risk-adjusted abnormal returns (alpha) of the REITs at time $t-1$ to $t+2$. The abnormal returns are calculated with a Fama-French four-factor model using return data in the previous 60 months. The explanatory variables, *ValueEXP_Office* and *ValueEXP_NonOffice*, are the total value of office properties and other properties that a REIT holds in the target county at the acquisition time, as a fraction of the REIT's total asset, respectively. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table 4:** Heterogeneity Analysis for the Impact of Firm Acquisitions on REIT Return: Size of Acquired Firm

| | (1) *AR(t-1)* | (2) *AR(t)* | (3) *AR(t+1)* | (4) *AR(t+2)* | (5) *AR(t-1)* | (6) *AR(t)* | (7) *AR(t+1)* | (8) *AR(t+2)* |
|---|---|---|---|---|---|---|---|---|
| *ValueEXP* | 0.1367 | 0.4512 | -1.1715*** | -1.5866*** | | | | |
| | (0.4179) | (0.3875) | (0.3139) | (0.3601) | | | | |
| *RelTargetSize* | -0.1441 | -0.5612** | -0.9285*** | -0.0196 | | | | |
| | (0.1756) | (0.2171) | (0.2698) | (0.2006) | | | | |
| *ValueEXP*RelTargetSize* | | | | | 3.8772 | 11.4402 | -28.7752*** | 7.7507 |
| | | | | | (6.8761) | (8.5339) | (10.0207) | (8.7362) |
| *ROA* | -0.0089 | -0.0117 | -0.0109 | -0.0137 | -0.0089 | -0.0115 | -0.0112 | -0.0141 |
| | (0.0074) | (0.0097) | (0.0101) | (0.0108) | (0.0074) | (0.0097) | (0.0100) | (0.0107) |
| *Log(Market Cap)* | -0.1732* | -0.1899** | -0.2204** | -0.2678*** | -0.1743* | -0.1937** | -0.2160** | -0.2617*** |
| | (0.0895) | (0.0921) | (0.0910) | (0.0905) | (0.0891) | (0.0919) | (0.0908) | (0.0902) |
| *Cash Ratio* | 1.0301 | 1.0569 | 0.7154 | 0.8845 | 1.0274 | 1.0485 | 0.7415 | 0.9252 |
| | (0.9258) | (0.9708) | (1.0059) | (1.0522) | (0.9253) | (0.9700) | (1.0047) | (1.0534) |
| *Liquidity* | -0.6436 | -0.6849 | -0.6767 | -0.6951 | -0.6477 | -0.6995 | -0.6716 | -0.6796 |
| | (0.6669) | (0.7409) | (0.7564) | (0.7539) | (0.6661) | (0.7406) | (0.7565) | (0.7541) |
| *M/B Ratio* | 0.0003 | 0.0003 | 0.0004 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0003 |
| | (0.0011) | (0.0009) | (0.0010) | (0.0009) | (0.0011) | (0.0009) | (0.0010) | (0.0009) |
| Constant | 2.2599*** | 2.3720*** | 2.6050*** | 2.8889*** | 2.2650*** | 2.3884*** | 2.5476*** | 2.8111*** |
| | (0.5798) | (0.5801) | (0.5492) | (0.5331) | (0.5742) | (0.5767) | (0.5473) | (0.5307) |
| Year & Month FEs | Y | Y | Y | Y | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 37,683 | 37,716 | 37,544 | 37,372 | 37,683 | 37,716 | 37,544 | 37,372 |
| R-squared | 0.118 | 0.115 | 0.136 | 0.170 | 0.118 | 0.115 | 0.136 | 0.170 |

*Notes:* This table reports the estimated impact of different firm acquisitions by sizes at time $t$ on the return of REITs that hold properties in the same county of the acquired firms (i.e., the target county). The dependent variables are the monthly risk-adjusted abnormal returns (alpha) of the REITs at time $t-1$ to $t+2$. The abnormal returns are calculated with a Fama-French four-factor model using return data in the previous 60 months. The explanatory variable, *Value-EXP*, is the total value of properties that a REIT holds in the target county at the acquisition time, as a fraction of the REIT's total asset. *RelTargetSize* equals the total asset of the acquired firm as a fraction of the total asset of all public firms in the same county at the acquisition time. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table 5:** The Impact of Firm Acquisitions on REIT Fundamental Performance

| | (1) *ROA(t)* | (2) *ODY(t)* | (3) *TDY(t)* | (4) *ROA(t+1)* | (5) *ODY(t+1)* | (6) *TDY(t+1)* |
|---|---|---|---|---|---|---|
| *ValueEXP* | -0.2110 | 1.1370 | 1.5954 | -0.5118** | -0.9307** | -2.3191** |
| | (0.1705) | (0.7807) | (1.6568) | (0.2070) | (0.4531) | (0.9517) |
| *Log(Market Cap)* | 0.1006 | -0.5263 | -1.2880* | -0.0527 | -0.5983 | -1.4788* |
| | (0.1306) | (0.3473) | (0.7191) | (0.1262) | (0.3651) | (0.7586) |
| *Cash Ratio* | 3.0353 | 19.4214* | 37.6117 | 1.4408* | 11.7290* | 25.5347** |
| | (4.8804) | (11.6932) | (23.3671) | (0.8644) | (6.3819) | (12.8491) |
| *Liquidity* | -1.6862*** | 0.1862 | -0.7874 | -0.8977** | -0.6132 | -2.5260 |
| | (0.5352) | (0.5384) | (1.5251) | (0.4152) | (0.9591) | (2.2468) |
| *M/B Ratio* | -0.0034 | -0.0017** | -0.0041** | -0.0018 | -0.0026** | -0.0058*** |
| | (0.0026) | (0.0009) | (0.0017) | (0.0020) | (0.0011) | (0.0022) |
| Constant | 0.9418 | 4.2015* | 10.6022** | 1.7636* | 5.4677** | 13.4133** |
| | (1.0899) | (2.2801) | (4.8709) | (0.9690) | (2.6213) | (5.5725) |
| Year & Quarter FEs | Y | Y | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y | Y | Y |
| Observations | 12,205 | 12,205 | 12,205 | 12,205 | 12,205 | 12,205 |
| R-squared | 0.158 | 0.094 | 0.094 | 0.111 | 0.083 | 0.089 |

*Notes:* This table reports the estimated impact of firm acquisitions at time $t$ on the return on asset and dividend yield of REITs that hold properties in the same county of the acquired firms (i.e., the target county). The dependent variable $ROA(t)$ is the quarterly return on asset of REITs in the quarter of firm acquisitions, and $ROA(t+1)$ is the quarterly return on asset in the following quarter. The dependent variables $ODY(t)$ and $TDY(t)$ are the quarterly ordinary dividend yield and the total dividend yield of REITs in the quarter of firm acquisitions, respectively, while $ODY(t+1)$ and $TDY(t+1)$ denote the quarterly ordinary dividend yield and total dividend yield in the following quarter. *ValueEXP* is the total value of properties that a REIT holds in the target county at the acquisition time, as a fraction of the REIT's total asset. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table 6:** Summary Statistics: The DID Estimation Sample for the Impact of Firm Acquisitions on Institutional Investors' Ownership of REIT

| | (1)<br>N | (2)<br>Mean | (3)<br>S.D. | (4)<br>P25 | (5)<br>P50 | (6)<br>P75 |
|---|---|---|---|---|---|---|
| *Ownership* | 31,164 | 0.193 | 0.212 | 0.004 | 0.111 | 0.350 |
| *SD_Ownership* | 31,164 | 0.006 | 1.004 | -0.617 | -0.361 | 0.600 |
| *Post* | 31,164 | 0.490 | 0.500 | 0.000 | 0.000 | 1.000 |
| *InMSA* | 31,164 | 0.500 | 0.500 | 0.000 | 0.500 | 1.000 |
| *ROA* | 31,164 | 0.829 | 1.431 | 0.398 | 0.810 | 1.212 |
| *Log(Market Cap)* | 31,146 | 6.977 | 1.230 | 6.218 | 6.994 | 7.755 |
| *Cash Ratio* | 31,164 | 0.021 | 0.029 | 0.005 | 0.012 | 0.025 |
| *Leverage* | 30,990 | 0.544 | 0.165 | 0.455 | 0.538 | 0.632 |
| *M/B Ratio* | 30,362 | 2.177 | 2.493 | 1.324 | 1.743 | 2.394 |
| *RelTargetSize* | 31,164 | 0.181 | 0.290 | 0.007 | 0.030 | 0.216 |
| *ValueEXP* | 31,164 | 0.038 | 0.071 | 0.001 | 0.013 | 0.044 |

*Notes:* This table reports the summary statistics of the DID estimation sample for the impact of firm acquisitions on institutional investors' ownership of REIT. Definitions of the other variables are represented in Appendix Table A1.

**Table 7:** The Impact of Firm Acquisitions on Institutional Investors' Ownership of REIT

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Base Group: Out-of-MSA Investors | | | |
| | *Ownership* | *Ownership* | *SD_Ownership* | *SD_Ownership* |
| *Post* | -0.0152*** | -0.0154*** | -0.0791*** | -0.0802*** |
| | (0.0020) | (0.0021) | (0.0103) | (0.0109) |
| *Post * InMSA* | 0.0164*** | 0.0171*** | 0.0866*** | 0.0912*** |
| | (0.0025) | (0.0025) | (0.0162) | (0.0169) |
| *ROA* | | 0.0005 | | 0.0023 |
| | | (0.0007) | | (0.0054) |
| *Log(Market Cap)* | | 0.0371*** | | 0.2493*** |
| | | (0.0065) | | (0.0429) |
| *Cash Ratio* | | -0.0515 | | -0.4543 |
| | | (0.0646) | | (0.5074) |
| *Leverage* | | 0.0093 | | 0.0063 |
| | | (0.0207) | | (0.1832) |
| *M/B Ratio* | | -0.0018 | | 0.0016 |
| | | (0.0029) | | (0.0126) |
| *ValueEXP* | | -0.0046 | | -0.0473** |
| | | (0.0132) | | (0.0203) |
| *TargetSize* | | 0.0012 | | 0.1028 |
| | | (0.0024) | | (0.1427) |
| Constant | 0.1968*** | -0.0648 | 0.0175*** | -1.6995*** |
| | (0.0005) | (0.0501) | (0.0031) | (0.3481) |
| Year & Quarter FEs | Y | Y | Y | Y |
| REIT & Investor FEs | Y | Y | Y | Y |
| Observations | 31,164 | 30,188 | 31,164 | 30,188 |
| R-squared | 0.818 | 0.823 | 0.473 | 0.479 |

*Notes:* This table reports the estimated impact of firm acquisitions on home and non-home institutional investors' ownership of affected REITs that hold properties in the same county of the acquired firms (i.e., the target county). The home investors (the treatment group) are defined as those investors located in the same MSA as the firm acquisitions, and the non-home investors (the control group) are defined as those investors from different MSAs. For each affected REIT by acquisition event, I calculate the total shares held by all sampled home investors and by all sampled non-home investors. The regression sample includes the quarterly aggregate ownership of the affected REITs by home or non-home investors within a [-3 quarters, +3 quarters] window of each firm acquisition. In Columns (1) to (3), the dependent variable, *Ownership*, is the total shares of a REIT that are held by the sampled home or non-home investors in each quarter, as a fraction of the REIT's total shares outstanding. In Columns (4) to (6), *SD_Ownership* is the standardized value of *Ownership* within groups of home or non-home investors, which measures the relative changes in ownership within the two subgroups. *Post* is a dummy variable equal to one if the sample is after the acquisition, zero otherwise. *InMSA* is a dummy variable denoting the sample of the home investors. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table 8:** Heterogeneity Analysis for the Impact of Firm Acquisitions on Institutional Investors' Ownership of REIT: Distance to Firm Acquisitions

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Base Group: Out-of-State Investors | | | |
| | *Ownership* | *Ownership* | *SD_Ownership* | *SD_Ownership* |
| *Post* | -0.0124*** | -0.0128*** | -0.0703*** | -0.0721*** |
| | (0.0022) | (0.0022) | (0.0120) | (0.0127) |
| *Post * InStateOutMSA* | 0.0111*** | 0.0117*** | 0.0457** | 0.0483** |
| | (0.0026) | (0.0027) | (0.0186) | (0.0194) |
| *Post * InMSAOutCty* | 0.0129*** | 0.0136*** | 0.0715*** | 0.0756*** |
| | (0.0024) | (0.0024) | (0.0157) | (0.0165) |
| *Post * InCty* | 0.0132*** | 0.0139*** | 0.0885*** | 0.0936*** |
| | (0.0025) | (0.0025) | (0.0193) | (0.0199) |
| *ROA* | | 0.0002 | | 0.0020 |
| | | (0.0004) | | (0.0046) |
| *Log(Market Cap)* | | 0.0184*** | | 0.1829*** |
| | | (0.0033) | | (0.0276) |
| *Cash Ratio* | | -0.0291 | | -0.2154 |
| | | (0.0322) | | (0.3930) |
| *Leverage* | | 0.0032 | | -0.0087 |
| | | (0.0110) | | (0.1224) |
| *M/B Ratio* | | -0.0008 | | -0.0297** |
| | | (0.0014) | | (0.0148) |
| *ValueEXP* | | -0.0006 | | -0.0263 |
| | | (0.0012) | | (0.0221) |
| *RelTargetSize* | | -0.0004 | | 0.0729 |
| | | (0.0071) | | (0.0989) |
| Constant | 0.0992*** | -0.0296 | 0.0093*** | -1.2479*** |
| | (0.0002) | (0.0253) | (0.0022) | (0.2205) |
| Year & Quarter FEs | Y | Y | Y | Y |
| REIT & Investor FEs | Y | Y | Y | Y |
| Observations | 62,328 | 60,376 | 62,328 | 60,376 |
| R-squared | 0.777 | 0.781 | 0.277 | 0.278 |

*Notes:* This table reports the estimated heterogeneous impact of firm acquisitions by distance on home and non-home institutional investors' ownership of affected REITs. The home investors are classified into three groups by their distances to the affected properties: in the same county (*InCty*), in the same MSA but from different counties (*InMSAOutCty*), and in the same state but from different MSAs (*InStateOutMSA*). The base group contains non-home investors from different states. The regression sample includes the quarterly aggregate ownership of the affected REITs by each group of investors within a [-3 quarters, +3 quarters] window of each firm acquisition. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table 9:** Heterogeneity Analysis for the Impact of Firm Acquisitions on Institutional Investors' Ownership of REIT: Investment Strategies

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Base Group: Out-of-MSA Quasi-index Investors | | | |
| | *Ownership* | *Ownership* | *SD_Ownership* | *SD_Ownership* |
| *Post* | -0.0127*** | -0.0126*** | -0.0649*** | -0.0637*** |
| | (0.0011) | (0.0011) | (0.0131) | (0.0134) |
| *Post * Active* | 0.0102*** | 0.0098*** | 0.0355 | 0.0299 |
| | (0.0016) | (0.0016) | (0.0286) | (0.0190) |
| *Post * InMSA* | 0.0127*** | 0.0129*** | 0.0597*** | 0.0617*** |
| | (0.0016) | (0.0016) | (0.0186) | (0.0190) |
| *Post * InMSA * Active* | 0.0139*** | 0.0141*** | 0.1011*** | 0.1018*** |
| | (0.0016) | (0.0016) | (0.0186) | (0.0190) |
| *ROA* | | 0.0002 | | 0.0017 |
| | | (0.0002) | | (0.0026) |
| *Log(Market Cap)* | | 0.0186*** | | 0.1344*** |
| | | (0.0008) | | (0.0091) |
| *Cash Ratio* | | -0.0258** | | -0.4067*** |
| | | (0.0131) | | (0.1544) |
| *Leverage* | | 0.0047 | | -0.0549 |
| | | (0.0032) | | (0.0376) |
| *M/B Ratio* | | -0.0009 | | 0.0042 |
| | | (0.0023) | | (0.0270) |
| *ValueEXP* | | 0.0006 | | -0.0399*** |
| | | (0.0010) | | (0.0120) |
| *RelTargetSize* | | -0.0023 | | 0.0190 |
| | | (0.0047) | | (0.0558) |
| Constant | 0.0984*** | -0.0324*** | 0.0078* | -0.8787*** |
| | (0.0004) | (0.0063) | (0.0045) | (0.0737) |
| Year & Quarter FEs | Y | Y | Y | Y |
| REIT & Investor FEs | Y | Y | Y | Y |
| Observations | 62,328 | 60,376 | 62,328 | 60,376 |
| R-squared | 0.790 | 0.793 | 0.386 | 0.388 |

*Notes:* This table reports the estimated heterogeneous impact of firm acquisitions on home and non-home institutional investors' ownership of affected REITs, by the investment strategies of the institutional investors. The home investors are defined as those investors located in the same MSA as the firm acquisitions, and the non-home investors are defined as those investors from different MSAs. The regression sample includes the quarterly aggregate ownership of the affected REITs by each group of investors within a [-3 quarters, +3 quarters] window of each firm acquisition. *InMSA* is a dummy variable denoting the sample of the home investors. *Active* equals one if the investor is "transient" or "dedicated" in active investment and zero if the investor is a passive "quasi-indexer", as defined by Bushee (1998). Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

# Appendix: Supplementary Tables

**Table A1:** Definition of Variables

| Variable Name | Definition |
|---|---|
| *AR* | The monthly risk-adjusted abnormal returns (alpha) of the REITs, represented in percentage. It is calculated with a Fama-French four-factor models, using return data of the REIT in the previous 60 months. *AR(t-1)*, *AR(t)*, *AR(t+1)*, and *AR(t+2)* denotes the monthly abnormal return in the previous month, the current month, the next month, and the second next month, respectively. |
| *CAR* | The 3-month cumulative abnormal returns of the REITs, calculated as the sum of abnormal returns (AR) within the [−1 month, +1 month] window, represented in percentage. *CAR(t-1)*, *CAR(t)*, *CAR(t+1)*, and *CAR(t+2)* denotes the cumulative abnormal return in the previous month, the current month, the next month, and the second next month, respectively. |
| *ValueEXP* | The total value of properties that a REIT holds in the target FIPS county at the firm acquisition time, as a fraction of the REIT's total asset. It equals zero if none of the properties held by the REIT is in the same county of a public firm acquisition. |
| *NumEXP* | The total number of properties that a REIT holds in the target FIPS county at the firm acquisition time, as a fraction of the total number of properties held by the REIT. It equals zero if none of the properties held by the REIT is in the same county of a public firm acquisition. |
| *ROA* | The quarterly return on asset of a REIT, calculated as the quarterly net income over the total asset, represented in percentage. *ROA(t+1)* denotes the return on asset of the REIT in the following quarter. |
| *Log(Market Cap)* | The quarterly market value of a REIT in logarithmic form. |
| *Cash Ratio* | The quarterly holding of cash and equivalent by a REIT, as a fraction of the REIT's total asset. |

| | |
|---|---|
| *Leverage* | The quarterly debt to asset ratio of a REIT. |
| *M/B Ratio* | The quarterly market to book value ratio of a REIT. |
| *ValueEXP_Office* | The total value of office properties that a REIT holds in the target FIPS county at the firm acquisition time, as a fraction of the REIT's total asset. It equals zero if none of the office properties held by the REIT is in the same county of a public firm acquisition. |
| *ValueEXP_NonOffice* | The total value of non-office properties that a REIT holds in the target FIPS county at the firm acquisition time, as a fraction of the REIT's total asset. It equals zero if none of the non-office properties held by the REIT is in the same county of a public firm acquisition. |
| *RelTargetSize* | The total asset of the acquired firm in one year before acquisition, as a fraction of the total assets of all public firms in the same county in one year before acquisition. |
| *ODY* | The quarterly ordinary dividend yield of a REIT, calculated as the sum of ordinary dividends paid in the quarter divided by the closing price of the REIT, represented in percentage. *ODY(t+1)* denotes the ordinary dividend yield in the following quarter. |
| *TDY* | The quarterly total dividend yield of a REIT, calculated as the sum of ordinary and non-ordinary dividends paid in the quarter divided by the closing price of the REIT, represented in percentage. *ODY(t+1)* denotes the ordinary dividend yield in the following quarter. |
| *Ownership* | The total shares of a REIT held a group of institutional investors (i.e., the home investors or non-home investors of the REIT) as a fraction of the total shares of the REIT outstanding. |
| *SD_Ownership* | The total shares of a REIT held a group of institutional investors (i.e., the home investors or non-home investors of the REIT) as a fraction of the total shares of the REIT outstanding, standardized within each group of investors. |

| | |
|---|---|
| *Post* | A dummy variable equal to one if the sample is for investor ownership after the firm acquisitions, zero otherwise. |
| *InMSA* | A dummy variable equal to one if the group of investors are from the same MSA as the acquired firm, zero otherwise. |
| *InCty* | A dummy variable equal to one if the group of investors are from the same FIPS county as the acquired firm, zero otherwise. |
| *InMSAOutCty* | A dummy variable equal to one if the group of investors are from the same MSA as the acquired firm but from different FIPS counties, zero otherwise. |
| *InStateOutMSA* | A dummy variable equal to one if the group of investors are from the same state as the acquired firm but from different MSAs, zero otherwise. |
| *Active* | A dummy variable equal to one if the group of investors are classified as "transient" or "dedicated" active investors, zero otherwise. |
| *TargetInHQ* | A dummy variable equal to one if there is a public firm being acquired in the same county as the headquarter of the REIT, zero otherwise. |
| *ValueEXP>0* | A dummy variable equal to one if the REIT holds at least one property in the target county (i.e., the share values of the properties in the target county is larger than zero), zero otherwise. |
| *ValueEXP=0* | A dummy variable equal to one if the REIT does not hold any properties in the target county (i.e., the share values of the properties in the target county is equal to zero), zero otherwise. |

**Table A2:** The Impact of Firm Acquisitions in REITs' Headquarter on REIT Return

| **Panel A: Impact on All REITs Headquartered in Target County** | | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | *AR(t-1)* | *AR(t)* | *AR(t+1)* | *AR(t+2)* |
| *TargetInHQ* | 0.1373 | -0.1443 | -0.1992** | -0.2971*** |
| | (0.1124) | (0.1369) | (0.1006) | (0.1132) |
| Fundamental Controls | Y | Y | Y | Y |
| Year & Month FEs | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y |
| Observations | 37,683 | 37,716 | 37,544 | 37,372 |
| R-squared | 0.118 | 0.115 | 0.135 | 0.170 |
| **Panel B: Impact on REITs with Property Investment in the Headquarter** | | | | |
| | (1) | (2) | (3) | (4) |
| | *AR(t-1)* | *AR(t)* | *AR(t+1)* | *AR(t+2)* |
| *TargetInHQ * ValueEXP>0* | 0.1665 | -0.0159 | -0.2301* | -0.4330*** |
| | (0.1549) | (0.1467) | (0.1187) | (0.1385) |
| Fundamental Controls | Y | Y | Y | Y |
| Year & Month FEs | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y |
| Observations | 37,683 | 37,716 | 37,544 | 37,372 |
| R-squared | 0.118 | 0.115 | 0.135 | 0.170 |
| **Panel C: Impact on REITs without Property Investment in the Headquarter** | | | | |
| | (1) | (2) | (3) | (4) |
| | *AR(t-1)* | *AR(t)* | *AR(t+1)* | *AR(t+2)* |
| *TargetInHQ * ValueEXP=0* | 0.0827 | -0.3176 | -0.1365 | -0.0739 |
| | (0.1708) | (0.2283) | (0.1666) | (0.1539) |
| Fundamental Controls | Y | Y | Y | Y |
| Year & Month FEs | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y |
| Observations | 37,683 | 37,716 | 37,544 | 37,372 |
| R-squared | 0.118 | 0.115 | 0.135 | 0.170 |

*Notes:* This table reports the estimated impact of firm acquisitions in the same county as the REITs' headquarter at time $t$ on the return of REITs, using the cumulative abnormal return as the dependent variable. The dependent variables are the monthly risk-adjusted abnormal returns (alpha) of the REITs at time $t-1$ to $t+2$. The abnormal returns are calculated with a Fama-French four-factor model using return data in the previous 60 months. In Panel A, the explanatory variable, *TargetInHQ*, is a dummy variable denoting the target firms in the same county as the REITs' headquarter at time $t$. In Panel B, the variable $TargetInHQ * ValueEXP > 0$ denotes the situation when the target firms are in the same county as the REITs' headquarter, and the REITs also hold some properties in the same county. In Panel C, the variable $TargetInHQ * ValueEXP = 0$ denotes the situation when the target firms are in the same county as the REITs' headquarter, but the REITs do not hold some properties in the same county. The unreported fundamental controls are the same as the baseline estimations, and their definitions are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table A3:** Robustness Check for the Impact of Firm Acquisitions on REIT Return: Cumulative Abnormal Return

| | (1) *CAR(t-1)* | (2) *CAR(t)* | (3) *CAR(t+1)* | (4) *CAR(t+2)* |
|---|---|---|---|---|
| *ValueEXP* | 0.6930 | -0.6871 | -2.4370*** | -2.7734*** |
| | (0.9572) | (0.8570) | (0.6078) | (0.6056) |
| *ROA* | -0.0295 | -0.0308 | -0.0341 | -0.0423 |
| | (0.0253) | (0.0267) | (0.0307) | (0.0330) |
| *Log(Market Cap)* | -0.5135* | -0.5688** | -0.6097** | -0.7653** |
| | (0.2655) | (0.2760) | (0.3003) | (0.2956) |
| *Cash Ratio* | 2.7654 | 2.7314 | 2.5847 | 2.4382 |
| | (2.6633) | (2.9096) | (3.1423) | (3.2075) |
| *Liquidity* | -2.0836 | -2.0744 | -2.2788 | -2.2975 |
| | (2.0374) | (2.2015) | (2.3928) | (2.4221) |
| *M/B Ratio* | 0.0008 | 0.0010 | 0.0010 | 0.0005 |
| | (0.0031) | (0.0030) | (0.0028) | (0.0026) |
| Constant | 6.7913*** | 7.1287*** | 7.4481*** | 8.4694*** |
| | (1.7230) | (1.6778) | (1.6729) | (1.6397) |
| Year & Month FEs | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y |
| Observations | 37,716 | 37,716 | 37,716 | 37,544 |
| R-squared | 0.245 | 0.276 | 0.315 | 0.347 |

*Notes:* This table reports the robustness check result for the estimated impact of firm acquisitions at time $t$ on the return of REITs that hold properties in the same county of the acquired firms (i.e., the target county), using the cumulative abnormal return as the dependent variable. The dependent variables are the risk-adjusted 3-month cumulative abnormal returns (CAR) of the REITs at time $t-1$ to $t+2$. The abnormal returns are calculated with a Fama-French four-factor model using return data in the previous 60 months. The cumulative abnormal returns are calculated as the sum of abnormal returns within the [-1 month, +1 month] window. The explanatory variable, *ValueEXP*, is the total value of properties that a REIT holds in the target county at the acquisition time, as a fraction of the REIT's total asset. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table A4:** Robustness Check for the Impact of Firm Acquisitions on REIT Return: Number of Properties

| | (1) *AR(t-1)* | (2) *AR(t)* | (3) *AR(t+1)* | (4) *AR(t+2)* |
|---|---|---|---|---|
| *NumEXP* | 0.2517 | 0.5346 | -1.9576*** | -1.5031*** |
| | (0.4471) | (0.5233) | (0.4881) | (0.5168) |
| *ROA* | -0.8881 | -1.1525 | -1.1098 | -1.4099 |
| | (0.7436) | (0.9711) | (0.9998) | (1.0679) |
| *Log(Market Cap)* | -0.1742* | -0.1933** | -0.2161** | -0.2601*** |
| | (0.0892) | (0.0919) | (0.0911) | (0.0904) |
| *Cash Ratio* | 1.0299 | 1.0523 | 0.7301 | 0.9117 |
| | (0.9256) | (0.9698) | (1.0028) | (1.0511) |
| *Liquidity* | -0.6467 | -0.6966 | -0.6813 | -0.6817 |
| | (0.6662) | (0.7400) | (0.7591) | (0.7564) |
| *M/B Ratio* | 0.0003 | 0.0003 | 0.0004 | 0.0003 |
| | (0.0011) | (0.0009) | (0.0009) | (0.0009) |
| Constant | 2.4891*** | 2.6080*** | 2.8023*** | 3.0643*** |
| | (0.5743) | (0.5762) | (0.5495) | (0.5318) |
| Year & Month FEs | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y |
| Observations | 37,683 | 37,716 | 37,544 | 37,372 |
| R-squared | 0.115 | 0.112 | 0.134 | 0.168 |

*Notes:* This table reports the robustness check result for the estimated impact of firm acquisitions at time $t$ on the return of REITs that hold properties in the same county of the acquired firms (i.e., the target county), using the share of affected property numbers in the REIT portfolio as the explanatory variable. The dependent variables are the monthly risk-adjusted abnormal returns (alpha) of the REITs at time $t-1$ to $t+2$. The abnormal returns are calculated with a Fama-French four-factor model using return data in the previous 60 months. The explanatory variable, *NumEXP*, is the total number of properties that a REIT holds in the target county at the acquisition time, as a fraction of the total number of properties held by the REIT. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table A5:** Robustness Check for the Impact of Firm Acquisitions on REIT Fundamental Performance: Number of Properties

| | (1) *ROA(t)* | (2) *ODY(t)* | (3) *TDY(t)* | (4) *ROA(t+1)* | (5) *ODY(t+1)* | (6) *TDY(t+1)* |
|---|---|---|---|---|---|---|
| *NumEXP* | 0.2560 | 0.1812 | 0.0124 | -0.7226** | -1.6779*** | -3.4561*** |
| | (0.7430) | (0.9597) | (1.9417) | (0.3477) | (0.6232) | (1.2906) |
| *Log(Market Cap)* | 0.1025 | -0.5383 | -1.3044* | -0.0464 | -0.5860 | -1.4498* |
| | (0.1295) | (0.3458) | (0.7148) | (0.1249) | (0.3635) | (0.7555) |
| *Cash Ratio* | 3.0403 | 19.3568* | 37.5268 | 1.4869* | 11.8228* | 25.7486** |
| | (4.8804) | (11.6986) | (23.3757) | (0.8667) | (6.3775) | (12.8411) |
| *Liquidity* | -1.6821*** | 0.1700 | -0.8110 | -0.8933** | -0.6069 | -2.5066 |
| | (0.5338) | (0.5423) | (1.5217) | (0.4170) | (0.9573) | (2.2422) |
| *M/B Ratio* | -0.0034 | -0.0017** | -0.0040** | -0.0019 | -0.0026** | -0.0059*** |
| | (0.0026) | (0.0009) | (0.0017) | (0.0020) | (0.0011) | (0.0022) |
| Constant | 0.9055 | 4.3285* | 10.7909** | 1.7345* | 5.4289** | 13.2884** |
| | (1.0825) | (2.2923) | (4.8741) | (0.9598) | (2.6214) | (5.5653) |
| Year & Quarter FEs | Y | Y | Y | Y | Y | Y |
| REIT FEs | Y | Y | Y | Y | Y | Y |
| Observations | 12,205 | 12,205 | 12,205 | 12,205 | 12,205 | 12,205 |
| R-squared | 0.158 | 0.094 | 0.094 | 0.111 | 0.084 | 0.089 |

*Notes:* This table reports the robustness check results for the impact of firm acquisitions at time $t$ on the return on asset and dividend yield of REITs that hold properties in the same county of the acquired firms (i.e., the target county), using the share of affected property numbers in the REIT portfolio as the explanatory variable. The dependent variable $ROA(t)$ is the quarterly return on asset of REITs in the quarter of firm acquisitions, and $ROA(t+1)$ is the quarterly return on asset in the following quarter. The dependent variables $ODY(t)$ and $TDY(t)$ are the quarterly ordinary dividend yield and the total dividend yield of REITs in the quarter of firm acquisitions, respectively, while $ODY(t+1)$ and $TDY(t+1)$ denote the quarterly ordinary dividend yield and total dividend yield in the following quarter. *NumEXP* is the total number of properties that a REIT holds in the target county at the acquisition time, as a fraction of the total number of properties held by the REIT. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table A6:** Robustness Check for the Impact of Firm Acquisitions on REIT Fundamental Performance: Alternative Fixed Effects

| | (1) *ROA(t+1)* | (2) *ODY(t+1)* | (3) *TDY(t+1)* | (4) *ROA(t+1)* | (5) *ODY(t+1)* | (6) *TDY(t+1)* |
|---|---|---|---|---|---|---|
| *ValueEXP* | -0.3328** | -0.4113** | -0.8529* | | | |
| | (0.1670) | (0.1960) | (0.4377) | | | |
| *NumEXP* | | | | -0.7002* | -0.9658** | -1.8741* |
| | | | | (0.3818) | (0.4801) | (0.9850) |
| *Log(Market Cap)* | -0.1239 | 0.1168 | -0.0738 | -0.1193 | 0.1226 | -0.0619 |
| | (0.0954) | (0.3529) | (0.7253) | (0.0938) | (0.3542) | (0.7277) |
| *Cash Ratio* | 8.1250*** | 21.4590* | 45.5608* | 8.1398*** | 21.4778* | 45.5991* |
| | (2.7240) | (12.4921) | (24.8657) | (2.7265) | (12.4902) | (24.8622) |
| *Leverage* | -1.6505*** | 1.2732 | 1.1578 | -1.6382*** | 1.2885 | 1.1895 |
| | (0.4651) | (1.1270) | (2.5396) | (0.4619) | (1.1313) | (2.5465) |
| *M/B Ratio* | -0.0025 | 0.0019 | 0.0029 | -0.0025 | 0.0018 | 0.0029 |
| | (0.0020) | (0.0048) | (0.0094) | (0.0020) | (0.0047) | (0.0093) |
| Constant | 2.3249*** | -0.3486 | 1.9268 | 2.3103*** | -0.3621 | 1.8931 |
| | (0.7608) | (3.0853) | (6.3593) | (0.7478) | (3.0817) | (6.3518) |
| Year FEs | Y | Y | Y | Y | Y | Y |
| REIT*Quarter FEs | Y | Y | Y | Y | Y | Y |
| Observations | 12,058 | 12,058 | 12,058 | 12,058 | 12,058 | 12,058 |
| R-squared | 0.227 | 0.150 | 0.176 | 0.227 | 0.150 | 0.176 |

*Notes:* This table reports the robustness check result for the estimated impact of firm acquisitions at time $t$ on the return on asset and dividend yield of REITs that hold properties in the same county of the acquired firms (i.e., the target county). The REIT time quarter fixed effects are included in the regressions to control for the potential REIT-specific seasonal variations in net income and dividend payouts. The dependent variable $ROA(t+1)$ is the quarterly return on asset of REITs in one quarter after firm acquisitions. The dependent variables $ODY(t+1)$ and $TDY(t+1)$ are the quarterly ordinary dividend yield and the total dividend yield of REITs in one quarter after firm acquisitions, respectively. *ValueEXP* is the total value of properties that a REIT holds in the target county at the acquisition time, as a fraction of the REIT's total asset. *NumEXP* is the total number of properties that a REIT holds in the target county at the acquisition time, as a fraction of the total number of properties held by the REIT. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table A7:** Robustness Check for the Impact of Firm Acquisitions on Institutional Investors' Ownership of REIT: Firm Acquisitions After 1999

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Base Group: Out-of-MSA Investors | | | |
| | *Ownership* | *Ownership* | *SD_Ownership* | *SD_Ownership* |
| *Post* | -0.0154*** | -0.0157*** | -0.0784*** | -0.0805*** |
| | (0.0025) | (0.0026) | (0.0133) | (0.0141) |
| *Post * InMSA* | 0.0154*** | 0.0160*** | 0.0589*** | 0.0627*** |
| | (0.0032) | (0.0033) | (0.0214) | (0.0225) |
| *ROA* | | 0.0008 | | 0.0054 |
| | | (0.0007) | | (0.0049) |
| *Log(Market Cap)* | | 0.0379*** | | 0.2672*** |
| | | (0.0089) | | (0.0559) |
| *Cash Ratio* | | 0.0017 | | 0.0206 |
| | | (0.0725) | | (0.5731) |
| *Leverage* | | 0.0071 | | -0.0060 |
| | | (0.0276) | | (0.1860) |
| *M/B Ratio* | | -0.0007 | | 0.0057 |
| | | (0.0024) | | (0.0123) |
| *ValueEXP* | | 0.0034 | | -0.0471* |
| | | (0.0028) | | (0.0248) |
| *RelTargetSize* | | 0.0121 | | 0.2891* |
| | | (0.0138) | | (0.1570) |
| Constant | 0.2114*** | -0.0619 | 0.1225*** | -1.7667*** |
| | (0.0006) | (0.0717) | (0.0036) | (0.4615) |
| Year & Quarter FEs | Y | Y | Y | Y |
| REIT & Investor FEs | Y | Y | Y | Y |
| Observations | 25,746 | 24,894 | 25,746 | 24,894 |
| R-squared | 0.822 | 0.826 | 0.462 | 0.464 |

*Notes:* This table reports the robustness check result for the estimated impact of firm acquisitions on home and non-home institutional investors' ownership of affected REITs. Only the subsample of firm acquisitions after 1999 are included to address the concern for potentially incomplete investor addresses in earlier years. The home investors (the treatment group) are defined as those investors located in the same MSA as the firm acquisitions, and the non-home investors (the control group) are defined as those investors from different MSAs. The regression sample includes the quarterly aggregate ownership of the affected REITs by home or non-home investors within a [-3 quarters, +3 quarters] window of each firm acquisition. In Columns (1) to (3), the dependent variable, *Ownership*, is the total shares of a REIT that are held by the sampled home or non-home investors in each quarter, as a fraction of the REIT's total shares outstanding. In Columns (4) to (6), *SD_Ownership* is the standardized value of *Ownership* within groups of home or non-home investors, which measures the relative changes in ownership within the two subgroups. *Post* is a dummy variable equal to one if the sample is after the acquisition, zero otherwise. *InMSA* is a dummy variable denoting the sample of the home investors. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

**Table A8:** Robustness Check for the Impact of Firm Acquisitions on Institutional Investors' Ownership of REIT: Subsample of REITs with Both Home and Non-home Investors

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Base Group: Out-of-MSA Investors | | | |
| | *Ownership* | *Ownership* | *SD_Ownership* | *SD_Ownership* |
| *Post* | -0.0144*** | -0.0145*** | -0.0753*** | -0.0743*** |
| | (0.0022) | (0.0022) | (0.0112) | (0.0118) |
| *Post * InMSA* | 0.0143*** | 0.0151*** | 0.0696*** | 0.0736*** |
| | (0.0026) | (0.0027) | (0.0186) | (0.0195) |
| *ROA* | | -0.0003 | | -0.0006 |
| | | (0.0012) | | (0.0106) |
| *Log (Market Cap)* | | 0.0350*** | | 0.2384*** |
| | | (0.0069) | | (0.0494) |
| *Cash Ratio* | | -0.0641 | | -0.6820 |
| | | (0.0602) | | (0.5038) |
| *Leverage* | | -0.0120 | | -0.2374 |
| | | (0.0207) | | (0.1751) |
| *M/B Ratio* | | -0.0001 | | -0.0084 |
| | | (0.0033) | | (0.0137) |
| *ValueEXP* | | 0.0021 | | 0.0036 |
| | | (0.0030) | | (0.0320) |
| *RelTargetSize* | | -0.0174 | | 0.2083 |
| | | (0.0155) | | (0.1622) |
| Constant | 0.2233*** | -0.0222 | 0.2602*** | -1.3300*** |
| | (0.0005) | (0.0550) | (0.0044) | (0.4074) |
| Year & Quarter FEs | Y | Y | Y | Y |
| REIT & Investor FEs | Y | Y | Y | Y |
| Observations | 21,392 | 20,944 | 21,392 | 20,944 |
| R-squared | 0.832 | 0.835 | 0.436 | 0.444 |

*Notes:* This table reports the robustness check result for the estimated impact of firm acquisitions on home and non-home institutional investors' ownership of affected REITs. Only the subsample of affected REITs with both home and non-home investors are included. The home investors (the treatment group) are defined as those investors located in the same MSA as the firm acquisitions, and the non-home investors (the control group) are defined as those investors from different MSAs. The regression sample includes the quarterly aggregate ownership of the affected REITs by home or non-home investors within a [-3 quarters, +3 quarters] window of each firm acquisition. In Columns (1) to (3), the dependent variable, *Ownership*, is the total shares of a REIT that are held by the sampled home or non-home investors in each quarter, as a fraction of the REIT's total shares outstanding. In Columns (4) to (6), *SD_Ownership* is the standardized value of *Ownership* within groups of home or non-home investors, which measures the relative changes in ownership within the two subgroups. *Post* is a dummy variable equal to one if the sample is after the acquisition, zero otherwise. *InMSA* is a dummy variable denoting the sample of the home investors. Definitions of the other variables are represented in Appendix Table A1. Robust standard errors are clustered by REITs and are reported in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.