Product Market Competition, Real Estate and Stock Returns

Moussa Diop
Department of Risk Management
Smeal College of Business
The Pennsylvania State University
University Park, PA 16802
mud173@psu.edu

Draft Dated January 25, 2013

Acknowledgment
Dissertation grant provided by the Real Estate Research Institute

Abstract

Recent studies suggest that corporate real estate ownership negatively affects shareholder value. If this is indeed the case, then why do most firms own and use substantial amounts of real estate? Borrowing from the IO literature on entry deterrence, I argue that product market competition affects the relation between real estate ownership and expected stock returns. Capacity expansions often require substantial real estate investments. In competitive industries where potential benefits from investments in excess capacity are competed away, firms that own a lot of real estate suffer a value discount. On the other hand, investors are likely to favorably view real estate ownership for firms operating in concentrated industries since investments in additional capacity may insulate profit margins by deterring new entries.

Using a large sample of industrial firms from 1973 to 2010, this study finds the documented positive relation between real estate ownership and stock returns to be specific to competitive industries. In concentrated industries, real estate ownership is largely negatively related to stock returns. This finding is robust to various definitions of real estate and industry classifications. In fact, controlling for industry structure alleviates the identification problem. This is the first study to examine the potential role of product market competition in the interaction between real estate and shareholder value.

1 Introduction

> *"The company generally owns the land and building or secures long-term leases for restaurant sites, which ensures long-term occupancy rights and helps control related costs... The company identifies and develops sites that offer convenience to customers and long-term sales and profit potential."* McDonald's Corporation

> *"We have more than 9,000 company-operated stores, almost all of which are leased. We also lease space in various locations worldwide for regional, district and other administrative offices, training facilities and storage."* Starbucks Corporation

What is the right real estate strategy for non-real estate firms? The above examples show two successful companies with starkly different approaches to real estate. Yet, it is often suggested, sometimes casually, that non-real estate firms should minimize real estate ownership and focus on core business activities.[1] Although this prescription appears to make a lot of sense, is it optimally applicable to or implementable by all firms? More fundamentally, do investors treat real estate ownership the same, irrespective of a firm's industry or competitive environment?

Real estate ownership likely reflects industry and firm characteristics as well as location. This study examines the impact of product market competition on the relation between real estate ownership and expected stock returns for non-real estate firms. Real estate ownership refers to direct ownership as well as indirect ownership through capitalized leases since both provide the same economic benefits. In the remainder of the paper, real estate intensity refers to the proportion of real estate in productive assets and real estate-intensive firms are firms that own substantial amounts of real estate compared other assets.

This real estate consists of real properties housing the productive activities of firms whose primary business is not directly related to the development, investment, management,

[1] This recommendation largely stemmed from the rise of large, well-capitalized equity real estate investment trusts (REITs) in the 1990s. The main issue facing corporations is generally whether to own or lease real estate assets, particularly those suitable to a broad range of users (i.e., general-purpose as opposed to firm-specific real estate assets). Linneman, 1998, is an example of that literature.

or financing of real estate. In this context, real estate strategy therefore is the leasing of or the purchase, management, and disposal of real estate assets with the objective to enhance the value of the firm's core businesses.[2] Generally, the acquisition of real estate, through leasing or purchase, by most firms is tantamount to securing a resource (similar to labor and capital) to meet future production objectives rather than expanding into the real estate business. Thus, market scope and output decisions, given a firm's product market strategy, should normally drive these investment decisions. The real estate intensity of a firm's production processes and the way through which that real estate is secured are at the discretion of management. These decisions must be given serious consideration because real estate investments affect operational and financial risks, and potentially impact market value since they have high opportunity costs and are not easily reversible when demand slows.

Departing from traditional event studies of market reactions to corporate real estate decisions, a number of recent studies have examined the equilibrium relation between real estate intensity and stock returns. The emerging conclusion from this literature is that investors require higher returns from real estate-intensive firms (Brounen and al., 2005; Yu and Liow, 2009; Tuzel, 2010; Ling et al., 2010). Said differently, real estate appears to adversely affect shareholder value for non-real estate firms. Although possible endogeneity between real estate intensity and stock returns may render identification problematic, this seemingly positive relation between real estate and stock returns is supported by widely-documented positive market reactions to corporate real estate divestitures, such as sale-leasebacks.[3]

[2]Corporate real estate investments driven by strategic purposes, such as marketing and corporate branding, fall under this category. However, real estate decisions may also be driven by portfolio diversification (return enhancement) considerations or even management's self-interests. Nourse, 1990, identifies three main approaches to managing corporate real estate. Real estate assets may be actively managed to meet core business objectives. In contrast, real estate management may be passive to the core business needs of the rest of the organization without being assigned any clear performance objectives. Finally, corporations, particulary those with strong cash flows, may embark in entrepreneurial real estate, in rare cases even establishing a real estate division whose primary objective is to seek profitable real estate investment opportunities.

[3]This endogeneity problem may have resulted in inconclusive results in the past. Recent studies deal with this problem by focusing on one industry (Brounen et al., 2005; Yu and Liow, 2009; Ling et al., 2010), by using a normalized measure of real estate intensity, or by adjusting returns at the industry level (Tuzel, 2010).

Despite this apparent negative effect of real estate on shareholder value, real estate still represents a substantial portion of most corporate balance sheets. The real estate owned by non-real estate, nonfinancial corporations was valued at $7.76 trillion in 2010, accounting for roughly 28% of total assets (Figure 1).[4] This real estate is primarily comprised of production facilities, warehouses, office buildings, land, and retail outlets. The proportion of this real estate has certainly decreased over time from 42% of total assets in 1970 to 28% in 2010 based on market value. However, it still represents over 9 times the value of the assets owned by REITs, which have received more attention from researchers. Given the documented negative impact of real estate on firm value, why do corporations still carry this considerable amount of real estate?

I argue that industry structure is a determinant factor of the amount of real estate used by firms in their production processes given available technologies. For firms operating in highly competitive markets, investors may negatively view excess production capacity or real estate investments geared toward facilitating rapid capacity expansions, unless such investments substantially lower production costs at current output, because of the associated increase in operating leverage and lack of pricing power at the firm level. On the other hand, the reverse investor attitude may prevail in oligopolistic industries since the output flexibility conferred by capacity-increasing real estate investments may deter entries, consequently consolidating the incumbents' market power and protecting profit margins (Wenders, 1971; Spence, 1977; Eaton and Lipsey, 1979).[5]

As noted earlier, there potentially exists an endogenous relation between real estate and stock returns. This endogeneity certainly reflects itself at the industry level since some economic activities are more real estate-intensive than others. For example, car manufacturing generally requires more real estate than computer production. Real estate intensity

[4]Source: http://www.federalreserve.gov/releases/z1/20110310/

[5]Dixit and Pindyck, 1994, note that real estate has the potential of conferring options to grow operations. However, market competition substantially eliminates or erodes the value of real options (Grenadier, 2002; Novy-Marx, 2007). Therefore, real options theory also leads to the conclusion that real estate-intensive firms may fare much better in oligopolistic industries than in competitive industries.

and stock returns may also be simultaneously determined at the firm level as well through capital structure for example. High-real estate firms possibly have higher leverage ratios, since real estate investments are capital intensive, and therefore may face higher costs of equity financing. Product market competition permits the disentangling, at least partially, at the industry level of the endogenous relation between real estate and stock returns. This study is the first to consider this dimension of industry structure.

Using a large sample of industrial firms from 1973 to 2010, this study finds the positive relation between real estate intensity, defined as the ratio of real estate to properties, plants, and equipment (PPE), and stock returns to be specific to competitive industries, causing an arbitrage strategy consisting of holding high-real estate stocks and shorting low-real estate stocks (thereafter referred to as the *High-Low* investment strategy) to generate a significant positive average return during that period.[6] In concentrated industries, on the other hand, real estate intensity and stock returns are negatively related, now resulting in the *High-Low* investment strategy generally generating a net loss. As further evidence of the strength of these relationships, the *High-Low* strategy generates positive (negative) abnormal returns, relative to conventional risk factors, in competitive (concentrated) industries. These findings are robust to various measures of real estate intensity and industry concentration.

For non-real estate firms operating in concentrated industries, this evidence suggests that pursuing a low-real estate strategy is not necessarily in the shareholders' best interest. Obviously, intense competition requires nimbleness at all levels of the firm. At the extreme, firms facing cutthroat competition may be better off contracting out production in some cases. But this cannot be true in all competitive industries, let alone in non-competitive ones, since a firm's competitive advantages may be tied to firm-specific assets, including real estate.

However, market efficiency normally precludes consistent arbitrage opportunities. The

[6]Similar to previous studies, the test is performed on ex-post stock returns. However, this documented correlation between real estate ownership and ex-post returns likely stems from the argued ex-ante relationship given the sample size and methodology used.

basic argument that investors penalize real estate intensity in competitive markets must therefore imply a risk dimension, of real estate nature or otherwise, being priced by the market. It is possible that real estate alters exposure to conventional risk factors, introduces a separate real estate risk, or both. So far, these questions have not been fully addressed in the literature for the broader universe of all non-real estate firms. Unfortunately, the methodology used in this study does not permit a full elucidation of this issue. A concurrent research project addresses these fundamental questions.

This paper proceeds as follows. The next section frames the economic theory guiding this research. It is followed by a review of the relevant real estate and non-real estate literatures. Section 4 presents the research methodology. Sections 5, describing the data, is followed by a discussion of the main findings, robustness checks, the link between real estate and risk, and the role of REITs in section 6. Finally, section 7 concludes.

2 Proposed Framework

Framing a general principle governing the relation between real estate and stock performance is a complicated task. Industry characteristics are determinant factors of real estate use. But even at the industry level, it is not necessarily true that there exists a unique real estate strategy optimally applicable to all firms within that industry since location affects real estate decisions made by firms. Generally, the real estate used by corporations is of two natures: firm-specific (i.e., strategic) and general-purpose (i.e., non-strategic) assets. While there are valid strategic reasons why it may be optimal to own firm-specific real estate assets, local space markets often present firms with the option to own or lease general-purpose real estate, particularly in the last two decades. Since the relative importance of these two categories of real estate likely varies across industries and firms depending on their technological choices, and since these two types of real estate do not necessarily affect shareholder value the same way, it may be hazardous to argue for one single theory describing the relation between real

estate and firm value.[7] At the end of the day, this becomes an empirical question.

Yet corporations, even the most adept at managing of real estate, do not generally acquire real estate for the sole purpose of diversifying into real estate (Nourse and Roulac, 1993). How often does a computer producer buy an office building or a warehouse for the sole purpose of generating rental income for diversification purposes rather than securing space for its operations?[8] Therefore, this study approaches real estate as a factor of production, but a different one indeed compared to labor or equipment. Its bulkiness, high and asymmetric adjustment costs, and illiquidity limit the ability of firms to maintain an optimal level as demand fluctuates. This argument underlies the negative relation between real estate and firm value documented by Brounen and al., 2005, and Tuzel, 2010, for instance.

But this cannot be the whole story. If real estate is 'bad', resulting in the market punishing real estate-intensive firms regardless of their industry, then it is surprising that in equilibrium firms hold significant amounts of real estate, unless investors' aversion to real estate is driven by technological progress over time, leaving some firms saddled with more real estate than they need. If this is the case, one would expect the market to naturally develop avenues for firms to rid themselves of burdening real estate assets. The fact of the matter is that REITs, the proposed vehicle, only gained eminence relatively recently and owe their existence, to a great deal, to government action.[9]

As noted, industry, technology, and location matter in real estate decisions made by firms. Although the impact of real estate on firm value is probably better identified at the industry level, I argue that industry structure, as proxied by product market competition, should control for most of the endogeneity at the industry level by permitting the classification of industries into similar groups. Furthermore, product market competition likely plays

[7]For instance, Deng and Gyourko, 2000, the first study to address this important question, presents four possible scenarios describing how real estate might affect firm value.

[8]Even though purchasing rather than leasing real estate may in some instances reduce the volatility of operating cashflows, this secondary effect is unlikely to be the rationale behind the transaction.

[9]Incidently, the purpose of the tax act of 1960 establishing REITs is to facilitate the diversification of small investors into commercial real estate. Also, Figure 1 shows that the decrease in corporate real estate predated the new REIT era.

a key role in corporate real estate strategies and that controlling for it should reveal the true nature of the relation between real estate and firm value, for real estate investments generate different incentives in competitive and concentrated industries. Based on IO theory, capacity and output decisions may represent important strategic tools, particularly in oligopolistic markets. In competitive industries, capacity-increasing real estate investments are likely to yield marginal economic gains since firms have little to no pricing power. Consequently, real estate-intensive firms may be perceived as riskier by investors because of their higher operating leverage and, therefore, may face higher costs of equity financing. In concentrated markets, on the other hand, investors may reward strategic capacity decisions aimed at creating or consolidating economic rents (as explained for example by Wenders, 1971; Spence, 1977; and Eaton and Lipsey, 1979) through lower required returns to providers of equity financing.[10]

This form of entry deterrence consists of keeping excess capacity that could be deployed to expand production in order to eliminate potential profits from entry. If the strategy is successful (i.e., credibly perceived by potential entrants), the additional capacity should normally be left idle to continue enjoying the higher profit margins. However, it is possible that these additional capacity investments lead to a reshuffling of the industry later as an outcome of a second-stage game among incumbents since firms compete on the basis of accumulated capacity in the long run (Tirole, 1997).[11] The outcome of this second game is therefore likely to favor high-capacity firms due to their greater market power. Furthermore, firms undertaking these additional capacity investments may be bigger and therefore more diversified in terms of product mix and market presence. Even though additional investments increase operating leverage, the resulting gain in market power may cause these firms to still

[10]Firms using more real estate may have lower productivity (Imrohoroglu and Tuzel, 2010) or may be more exposed to agency problems between managers and shareholders (Du et al., 2006). If one of these stories explains the negative effect of real estate on shareholder value, product market competition should therefore be irrelevant.

[11]In the event the burden of the capacity expansion is not evenly shared, firms saddled with unutilized capacity would bear the costs of entry deterrence whereas the benefits would accrue to all incumbent firms. This potential free-rider problem would deter the use of capacity as entry deterrent in the first place, unless an output re-adjustment takes place in the long run.

be less risky than their smaller rivals.

Thus, capacity decisions, including real estate investments, may affect a firm's competitive position in the product market and ultimately its market value. Although investors may negatively view real estate in competitive markets, where margins are relatively thin, they may assess such investments more positively in oligopolistic markets since they help protect profit margins. I therefore argue that the negative effect of real estate on firm value applies to competitive industries. In oligopolistic industries, real estate investments may fetch benefits that annihilate the negative effect of the resulting increase in operating leverage. The real options literature also offers arguments supportive of this view.[12]

Product market competition should matter more for firm-specific, strategic real estate than non-strategic real estate. Independent of industry structure, the ownership of non-strategic real estate potentially negatively affects shareholder value if leasing is a cheaper alternative since it does not confer any competitive advantage. In contrast, the impact of strategic real estate on firm value should vary with product market competition, negatively affecting value only in competitive industries. Basically, the reversing effect of real estate and shareholder value stems from the importance of strategic real estate, relative to non-strategic assets, in corporate balance sheets. Figure 1 shows that the real estate owned by non-farm, nonfinancial firms are mostly of non-residential nature, hence likely firm-specific.

[12]Real estate, especially land, can be viewed as real options since it provides firms with opportunities to acquire additional production capacity (Titman, 1985; Dixit and Pindyck, 1994). The ability of a firm to choose the timing of irreversible investments becomes valuable with uncertainty. But market structure affects the value of real options. Competition erodes the value of the option to wait embodied in real options as firms strategically rush to exercise their options to avoid preemption from rivals (Grenadier, 2002); Novy-Marx, 2007, argues that this prediction is based on simplifying assumptions. Even though perfect competition may not exist, competition certainly decreases the value of growth options, even in the world of Novy-Marx. Consequently, the value of firms operating in competitive markets reflect almost entirely that of assets in place. On the other hand, real options embodied in real estate may represent a significant portion of the value of firms operating in non-competitive industries. The fact that options have higher betas than assets in place does not necessary lead to a higher systematic risk in oligopolistic industries compared to firms in competitive industries, for the systematic risk associated with assets in place is substantially higher in competitive markets (Aguerrevere, 2009).

3 Literature Review

The stock return anomalies documented by Fama and French (FF), 1992, particularly the size and book-to-market premiums, have spawned a growing literature examining the link between corporate investment decisions and stock returns.[13] The knowledge gained from that literature has focused more attention on understanding the impact of real estate investments on expected returns, for real estate represents an important factor of production for most firms, accounting for a substantial portion of their balance sheets, but possesses special characteristics compared to other input factors.

3.1 Real Estate Literature

Academic corporate real estate research has notoriously lagged other areas of real estate research. Traditionally, the impact of real estate on firm value has largely been analyzed from a flow perspective using event studies to examine market reactions to acquisitions, leasing, divestitures, sale-leasebacks, and spin-offs of real estate assets. The main finding of that literature is that most firms poorly manage their real estate. Leasing and the disgorgement of real estate through sale-leasebacks and spin-offs often cause positive market reactions (Allen et al., 1993; Slovin et al., 1990; Rutherford, 1990). Similarly, the establishment of a separate real estate unit is favorably greeted by investors (Rutherford and Nourse, 1988). Rodriguez and Sirmans, 1996, present a detailed review of that earlier research.

However, a major drawback of event studies is that the event of interest must be large enough to significantly impact market value. Unfortunately, most corporate real estate transactions do not meet this size threshold. Furthermore, contagions from unrelated (past and contemporaneous) events and any information conveyed through the announcement obscure the price impact of the event of interest.[14] It is also difficult to generalize from event

[13]Important papers in this literature include Berk et al., 1999; Carlson et al., 2004; Aguerrevere, 2003; and Cooper, 2006. Berk et al. first link investment decisions to the riskiness of assets-in-place and expected returns. Carlson et al. relate the dynamics of operating leverage and expected returns. Cooper ties adjustment costs and investment irreversibility to the book-to-market premium.

[14]For example, it is possible that firms selling their real estate are under stress because of poor management

studies because they are often fraught with sample selection bias (Deng and Gyourko, 2000). In addition to these known drawbacks, event studies cannot directly address the question of the appropriateness of a firm's real estate portfolio relative to its strategic business objectives. They are more suitable for the analysis of marginal real estate investment decisions made by firms.

Beside the limited insight gained from the event-study literature, little was known about the relation between real estate and stock returns until Deng and Gyourko, 2000. For a large sample of industrial firms spanning the 10-year period from 1984 to 1993, Deng and Gyourko document a negative, moderately statistically significant relation between abnormal returns and real estate intensity, defined as the ratio of PPE to total assets (TA). But this effect was not economically significant, except for high-cost of capital firms (i.e., those with betas higher than that of commercial real estate). Seiler et al., 2001, also find no evidence of diversification benefits (lower systematic risk or higher risk-adjusted return) from real estate for a cross section of industries from 1985 to 1994. Similarly, Brounen and Eichholtz, 2005, find no systematic correlation between real estate and abnormal returns for international non-real estate firms from 1992 to 2000, but document a significant negative effect of real estate on systematic risk. In summary, these early empirical studies yield no definite understanding of the effect of real estate on firm value, even though they indicate a negative correlation between real estate and systematic risk, which should not come as a surprise since real estate has a lower beta. The inconclusiveness of these studies may be due to the endogeneity problem discussed earlier and to the use of PPE as a proxy for real estate. Deng and Gyourko find the ratio of PPE to TA to have a low cross-industry variance.

As a result of this identification problem, a number of following studies restrict their analyses to retail firms, whose values are supposedly more sensitive to real estate investment decisions since real estate accounts for a large portion of their balance sheets. For inter-

that resulted in misaligned real estate and business strategies. In this instance, a substantial portion of announcement returns may stem from the resulting lower agency costs rather than the intrinsic values of transactions themselves.

national retail firms, Brounen et al., 2005, document a significant positive relation between real estate and abnormal returns from 1993 to 2002 and also confirm the negative effect of real estate on market beta previously documented by Brounen and Eichholtz, 2005. Using a less conventional approach, Yu and Liow, 2009, also find real estate to be associated with higher stock returns for international retail firms, but find no significant negative effect on systematic risk.[15] Although these findings are credible, they are not necessarily generalizable to other sectors.

Tuzel, 2010, extends these findings to non-real estate firms, at least as far as the effect of real estate on expected returns is concerned. Adopting the FF portfolio formation methodology, Tuzel documents a positive relation between real estate intensity, defined as the ratio of buildings and capital leases to PPE, and average excess and abnormal returns on real estate-sorted stock portfolios from 1971 to 2005. Furthermore, an investment strategy consisting of holding high-real estate stocks and shorting low-real estate stocks generates a significant average abnormal return of 3.6% per annum during that period. This result, which reinforces the findings of the cited event studies, is tantamount to stating that investors assign lower valuations to real estate-intensive firms by requiring higher expected returns. The author argues that this positive relation stems from the operational inflexibility associated with real estate as a factor of production. This proposed study adopts a similar approach but introduces product market competition into the equation, arguing that real estate has the potential of enhancing shareholder value in oligopolistic industries since capacity decisions can be used to protect economic rents available to incumbents in those markets. This intuition is tested on industrial firms given the paradigm through which the research question is framed.

Assuming market efficiency, this positive relation between real estate and expected re-

[15]They engineer a pure-play retail counterpart for each firm as the residuals of the regression of the firm's returns on the residuals from the regression of the returns on a public real estate index on stock market returns to obtain a pure real estate return series. They then compare the distributional characteristics (median and standard deviation), betas, alphas, and Sharpe ratios of the initial (composite real estate and retail) return series to those of the pure-play retail series.

turns implicitly implies the pricing of some risk directly or indirectly associated to real estate. Ling et al., 2010, tackle that very question for retail firms by examining the sensitivity of systematic market risk and exposure to a real estate risk factor (proxied by the orthogonalized portion of total returns on retail REITs relative to market returns) to real estate intensity, measured by the ratio of PPE plus operating leases to TA plus operating leases. In individual time-series regressions, they find 16% (3%) of stocks to exhibit a significant positive (negative) sensitivity to real estate for the 10-year period from 1998 to 2008. Furthermore, pooled time-series regressions of estimated market betas on the real estate variable and other control variables reveal an insignificant relation between real estate and market beta. In contrast, they find estimated real estate betas to be positively and strongly affected by real estate intensity. These findings basically imply that the positive abnormal returns on retail stocks documented by Brounen et al., 2005, for example, may be real estate related.

Overall, this real estate literature documents a positive (negative) relation between real estate and stock returns (market value), despite the fact that real estate appears to have a negative impact on systematic market risk. This literature does not consider the possible role of product market competition.

3.2 Non-Real Estate Literature

This section reviews the relevant non-real estate literatures, namely the IO literature dealing with strategic capacity and output decisions in oligopolistic industries and the product market competition finance literature.

3.2.1 IO Literature

Firms operating in competitive industries technically have no market power and consequently are unable to sustainably earn economic rents since opportunities to generate above-normal profits as demand grows quickly evaporate with additional supply from new entrants. In these industries it is then crucial that incumbent firms avoid the burden of carrying excess

capacity, which increases operating leverage and the volatility of operating earnings.

In contrast, oligopolistic industries present incumbent firms with opportunities to earn above-normal profits and it is in the best interest of these firms to protect these rents from the threat of new entry by erecting entry barriers or adopting strategic behaviors aimed at thwarting off potential new competitors (Tirole, 1997).[16] Capacity and capital investment decisions, along with output strategies, can be used for that purpose. Since such investments are irreversible for the most part, at least in the short run, they represent preemptive commitments to the industry and become consequently credible threats to potential entrants. Wenders, 1971, and Spence, 1977, argue that an excess capacity strategy can be used in oligopolistic markets to prevent new entries and protect oligopolistic pricing. Eaton and Lipsey, 1979, further show that even if demand growth is foreseen, it always pays existing firms to add capacity before the growth materializes. Dixit, 1980 argues that as long as the rule of the post-entry game are understood by all firms, then capacity investments help deter entry. This form of entry deterrence becomes even more potent if output prices react quickly to supply relative to the time it takes investments from new entrants to become productive. However, Spulber, 1981, shows that, if one considers the post-entry game, the success of excess capacity or high-output strategies depends on market power and cost relative to marginal returns at the entry-deterring outputs.

Both the level of excess capacity maintained and the ability to quickly ramp up production allow incumbent firms to protect economic rents in oligopolistic industries. These strategic investment and operating decisions may arise as an equilibrium outcome in those industries, resulting in investors naturally assessing the cashflows of firms adopting such strategies as less risky, as discussed in the next section. Highlighting the importance of capacity decisions, Tirole, 1997, notes that although competition (if any) determines market prices in the short run, in the longer run firms compete through the accumulation of

[16]Entry barriers can also stem from regulations or industry structure (i.e., economies of scale or large initial capital requirements). The argument developed in this paper is consistent with entry barriers resulting from the strategic behavior of incumbent firms.

productive capacity. Competition and the resulting capacity game therefore may impact, at equilibrium, returns required by equity investors by affecting the riskiness of operating cashflows.

3.2.2 Product Market Competition Literature

Product market competition is found to be a determinant factor of corporate governance since it impacts managerial incentives, hence the agency problems between managers and shareholders (Hart, 1983; Scharfstein, 1988; Karuna, 2007; Giroux and Mueller, 2011). The link between corporate governance and the propensity to undertake real estate investments has been established by Du et al., 2006, and Sing and Sirmans, 2008, but this dimension of product market competition is not explored here. Also, output decisions and product market behavior have been linked to capital structure (Brander and Lewis, 1986, 1988; Chevalier, 1995). By increasing leverage, real estate may therefore affect behavior in product markets. This characteristic of real estate may be responsible for some of the endogeneity between real estate intensity and returns at the firm level.

Product market competition has also been identified as one of the drivers of the increase in firm-level volatility documented by Campbell et al., 2001. Irvine and Pontiff, 2008, document a significant positive trend in the idiosyncratic volatility of firm-level earnings, cashflows, and sales, largely due to increased competition. As noted by Gaspar and Massa, 2004, a high degree of market power therefore lowers information uncertainty for investors and return volatility. Peress, 2010, proposes a theoretical model showing that firms can use their monopoly power to pass on shocks to customers, thereby insulating profits. As far as market risk is concerned, Aguerrevere, 2009, shows that the effect of competition on individual firms' exposure to systematic risk is conditional on demand at the industry level and that systematic risk generally increases with competition even if installed capacity is not sufficient to accommodate current demand within a reasonable range.

Hou and Robinson, 2006, present strong empirical evidence of the impact of product

market competition on stock returns. They document an inverse correlation between industry concentration and average returns, even after controlling for the size, book-to-market, and momentum risk factors. For the period from 1963 to 2001, Hou and Robinson find firms operating in competitive industries generating adjusted monthly returns 0.36% higher than those earned by firms in concentrated industries.[17] This inverse relation evidences itself in industry portfolios as well. The authors further show that the documented return differential, which does not stem from differences in unexpected cashflow shocks between competitive and concentrated industries, remains a persistent feature of stock returns since the great depression and conjecture that it is consistent with the view that innovation (distress) risk, which is more pronounced in competitive industries, is a priced source of risk. They argue that barriers to entry in highly concentrated industries may, all else equal, insulate incumbent firms from non-diversifiable, aggregate demand shocks.

In summary, industry structure affects strategic operating decisions, which in turn impact the riskiness of operating cashflows. This establishes the link between industry structure, capacity decisions, and stock returns that is at the crux of this paper.

4 Methodology

This study extends Hou and Robinson, 2006, and Tuzel, 2010. It links stock returns to real estate intensity, taking into consideration industry concentration. It is argued that in competitive industries, incumbent firms cannot credibly use an excess capacity strategy to deter entries because the industry structure does not allow for the emergence of economic rents. Excluding the possibility of local market monopolies, investments in unproductive capacity (via real estate or otherwise) therefore ultimately hurt shareholder value, leading to a positive relation between real estate and expected returns. In oligopolistic industries, on the other hand, it may be optimal to maintain unutilized production capacity to deter

[17] Adjusted returns are calculated by subtracting the return on a characteristic-based benchmark from each firm's return.

entries and protect profit margins.

4.1 Portfolio Formation

The analysis of the effect of product market competition on the relation between real estate intensity and stock returns is performed by comparing the performance of real estate-sorted stock portfolios of firms operating in competitive and concentrated industries. Following Hou and Robinson, the industries are classified into quintiles according to their Herfindahl index values defined as:

$$H_i = \sum_{j=1}^{J} S_{ij}^2$$

H_i, industry i's concentration Herfindahl, depends on the number of firms (J) in the industry and the firms' respective market shares (S_{ij}). Consequently, the Herfindahl index decreases with competition, a large value of the index being indicative of an industry dominated by few large firms (therefore a concentrated industry) and a low index value implying a competitive industry made up of many firms of similar sizes. This calculation is performed annually, possibly resulting in some industries changing concentration groups over time due to increased competition or industry consolidations. As is common in the literature, a firm's market share is primarily measured by the ratio of net sales to aggregate industry net sales. Every year, each industry is assigned the average of the last three years' index values since changes in industry concentrations are likely to be gradual. The industries are then sorted into concentration quintiles, with the industries in the low-concentration and high-concentration quintiles classified as the competitive and concentrated industry groups, respectively.

Next, the firms in these two concentration groups are separately sorted into decile portfolios according to their real estate intensities (REIs), defined as the ratio of real estate assets to PPE assets, with the firms in the bottom and top deciles classified as the low-real estate and high-real estate portfolios. This classification is also done annually and the

performance of the resulting portfolios is then tracked over the next twelve months before the deck is re-shuffled again and new portfolios are formed following the same double sorting along industry concentration and real estate intensity.

4.2 Portfolio Performance Measurement

After sorting firms according to industry concentration and real estate intensity, the study next compares the average excess returns (over the risk-free rate) and industry-adjusted returns (deviations from average industry returns) on the resulting portfolios. If industry concentration and real estate intensity are not determining pricing factors, there should technically be no significant differences in average portfolio returns. As argued, however, average portfolio returns are expected to increase with REI in competitive industries, resulting in a positive average return on the *High-Low* investment strategy consisting of going long high-real estate stocks and shorting low-real estate stocks. On the other hand, average portfolio returns in concentrated industries are not expected to increase with REI. Consequently, the average return on the *High-Low* investment strategy should now be non-positive, in contrast to the predicted positive outcome in competitive industries.

However, the finding of significant return differences should not be automatically construed as evidence that investors price some risk tied to real estate, for real estate intensity may just affect exposure to conventional risk factors. The next step of the analysis therefore considers whether the portfolios generate abnormal returns after controlling for the conventional risk factors and the extent to which these returns are related to the portfolios' real estate contents. Hence, the following 3-factor pricing model is estimated for each portfolio.

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_i.(r_{m,t} - r_{f,t}) + \gamma_i.smb_t + \delta_i.hml_t + \varepsilon_{i,t} \quad (1)$$

The dependent variable is the excess portfolio return in month t ($r_{i,t}$) minus and the risk-free rate ($r_{f,t}$). The righthand-side variable $r_{m,t}$ is the market return in month t, $r_{m,t} - r_{f,t}$

representing therefore the excess market return for that period. The variables smb_t and hml_t are respectively the returns on the FF size and book-to-market portfolios in month t. Therefore, the coefficient β_i measures portfolio i's market beta, with γ_i, and δ_i measuring its exposure to the size and book-to-market risk factors. Lastly, α_i and $\varepsilon_{i,t}$ respectively represent portfolio i's average abnormal monthly return (Jensen's alpha) over the study period and the resulting return error in month t.

If model 1 properly accounts for all risk factors priced by the market, the estimated abnormal portfolio returns should be statistically undistinguishable from zero. Otherwise, it would be technically impossible to reject the possibility that product market competition and exposure to real estate might have affected portfolio returns. It is expected that estimated portfolio alphas will be non-decreasing with real estate intensity in competitive industries, resulting in the *High-Low* investment strategy yielding a non-negative alpha. The predicted non-positive relation between real estate intensity and stock returns in concentrated industries may manifest itself in abnormal portfolio returns as well. However, the *High-Low* strategy should now produce a non-positive alpha.

As a word of caution, an insignificant alpha does not necessary imply that real estate does not affect stock returns since it is still possible that real estate affects one of the portfolios' risk-factor loadings; this is a downside of focusing on alphas. This portfolio approach cannot adequately address the effect of real estate on stock risk. Only casual comments are made about how real estate intensity affects the portfolios' loadings on the risk factors. A concurrent project explores, using a micro firm-level approach, the channels through which industry structure intervenes.

5 Study Sample

This section describes the data and the main variables used in this study. It also discusses the average characteristics of firms at the industry-group and portfolio levels.

5.1 Sample Selection

The initial sample consists of U.S. industrial firms (SICs between 2000 and 5999) listed on NYSE, AMEX, and NASDAQ between January 1970 and December 2010 that are at the intersection of the Center for Research in Security Prices (CRSP) monthly return file and the merged Compustat annual industrial accounting data file. Therefore, it excludes REITs, construction, financial services, mining and oil, agriculture, services, and healthcare.[18] The sample is further restricted to ordinary common shares (CRSP share codes 10 or 11). The CRSP stock return and Compustat accounting data are matched following FF, 1992, to ensure that the accounting data are available prior to the return data they are meant to explain. Hence, each firm's monthly stock returns from July of year t to June of year $t+1$ are linked to its accounting data of year $t-1$, resulting in at least a 6-month lag of returns relative to the corresponding accounting data.

Following Hou and Robinson, 2006, firms are assigned to industries at the end of June according to the first three digits of their Compustat SICs.[19] Then, the industries' concentrations are computed using net sales as explained previously. Only industries with at least three firms are kept and classified into concentration quintiles based on their 3-year average Herfindahl values.[20] Again, the industry classification occurs at the end of June and the resulting industry quintiles are kept for the next twelve months from July to June. This classification method and the 3-year smoothing of industry concentrations explain why the analysis covers the 37-year period from July 1973 to June 2010.

Next, the firms forming the low-concentration and high-concentration industry groups are separately classified into portfolios according to their real estate intensity. This second classification also takes place at the end of June with the performance of the resulting

[18] The choice of 1970 as the starting date reduces a potential bias towards large firms since NASDAQ firms were added to CRSP in 1973. Also, Compustat's PPE component accounts were sparsely populated prior to 1970.

[19] Although the Compustat and CRSP SICs do not perfectly match (Kahle and Walking, 1996), the outcome of the analysis is not affected if CRSP SICs are used instead. The robustness section discusses the results based on 2-digit SICs and the FF industry classifications.

[20] However, Table 1 and unreported robustness checks show this smoothing to be inconsequential.

portfolios tracked over the next twelve months. Compustat breaks down PPE into buildings, machinery and equipment, capitalized leases, land and improvements, construction in progress, natural resources, and others. Following Tuzel, 2010, buildings and capitalized leases, the largest components of PPE and closest to production capacity, are therefore the primary measure of real estate used in this study.[21] A firm's REI is therefore the ratio of buildings and capitalized leases to PPE.[22] Again, this double classification of firms along industry groups and real estate intensity is done annually.

5.2 Data

The resulting final sample consists of 7,736 industrial firms, representing 171 industries based on the firms' 3-digit Compustat SICs. The data span the 37-year period from 1973 to 2010, consisting of 71,885 firm-years or 1,943 firms per year on average. Table 1 summarizes the distributional characteristics of industry concentrations based on net-sales (*Hsales*), total assets (*Hassets*), and their 3-year moving averages ($Hsales\_ma$ and $Hassets\_ma$). These distributions are slightly positively skewed with a mean $Hsales$ of 0.36 and a median of 0.33. Independent of the measurement method, industry concentrations vary considerably, ranging from 0.04, indicative of a highly competitive industry, to 0.99 despite the exclusion of industries with less than three firms. Table 1 shows that anyone of these four measures should adequately capture the variations in industry concentrations of the sample.

However, these distributions did not remain constant over time as Table 1 might suggest. Figure 2 depicts the time series of mean and median industry concentrations from 1973 to 2010. Overall, these first moments remained interlocked, closely moving together, but vary considerably over time. For example, average $Hsales$ increased from a low 0.29 in 1976 to 0.42 in 1990. Generally, Figure 2 shows an upward trend in industry concentrations, underpinned by two distinct waves. The first wave that started in mid 1970s and crested in

[21] The robustness section discusses results based on other measures of real estate intensity.

[22] Since Compustat only reports PPE accounts net of depreciations prior to 1985, net figures are used to compute REIs for those years, with gross figures used after 1985.

the earlier 1990s was the strongest, resulting in average industry concentrations increasing by almost 50%; the last decade witnessed a milder increase in industry concentrations of roughly 20%.[23] In addition to the cross-sectional variations described earlier, these time-series variations should facilitate the identification of the role of product market competition in the interaction between real estate intensity and stock returns.

5.3 Characteristics of Industry Concentration Groups

Tables 2 and 3 summarize the characteristics of the industry concentration groups based on the firms 3-digit SICs and net sales. This classification produces industry groups made up of 26 or 27 business sectors, with the high-concentration industries (e.g., communications) about 4 times less competitive than low-concentration industries (e.g., food and kindred products), an average Herfindahl index value of 0.66 vs. 0.14 in the first column of section I in Table 2. The difference between these two industry groups is even more pronounced at the firm level. On average, firms in the high-concentration group are almost 30 times larger than those in the low-concentration group, which explains the disproportionate number of firms in the two groups (second column of section II in Table 2). As a result, the tests of difference in means reported in last row of Table 2 unequivocally reject the equality of the two groups' average industry concentrations and market power of constituent firms. This difference between the low-concentration and high-concentration groups is further highlighted in Figure 3. The gap between the two never narrows and both time series display the two waves of industry consolidation discussed previously, even though their effects on the low-concentration group were understandably milder. Again, given the significant difference in industry structure between these two groups, a comparative analysis of the effects of real estate intensity on stock returns in these groups should normally provide valuable insights

[23]The first wave coincided with the expansion of hostile takeovers, partly caused by an important surge in debt financing (particularly, junk bonds) that collapsed as the economy went into recession in the early 1990s (Carney, 2009; Lipton, 2006). The latter wave was partly driven by globalization, the rise in commodity prices, low interest rates, shareholder activism, hedge funds, and the tremendous growth in private equity funds (Lipton, 2006).

on the role of competition, if any.

Table 3 shows that as the number of firms decreases with industry concentration, average firm size (in terms of sales, total assets (TA), or market value of equity (MV), in 2010 U.S. dollars) generally increases. On average, firm in the high-concentration group have twice more sales and assets than those in the low-concentration group. However, their market values are only 1.5 times larger on average. Consequently, book to market (BM) generally increases with industry concentration.[24] Tobin Q, the inverse of BM, therefore decreases with industry concentration reflecting the fact that firms in competitive industries are growth-oriented since they have more incentives to undertake value-enhancing innovations (Hou and Robinson, 2006). As noted in the literature review, product market competition also affects capital structure decisions (Brander and Lewis, 1986, 1988; Chevalier, 1995), both leverage (LEV) and long-term debt ratio (LTDR) increasing with industry concentration.[25] Since firms operating in concentrated industries are larger and face lower cashflow volatility than firms in competitive industries, they are better able to accommodate higher debt financing, given the advantages associated with debt (Myers, 1984, Myers and Majluf, 1984; Jensen, 1986; Jensen and Meckling, 1976).

Table 3 clearly reveals significant differences in size, market value, and capital structure between firms in the high-concentration and low-concentration groups, as evidenced by the tests of difference in means in the last row of the table, that should be reflected in the firms' stock performance. These differences in firm characteristics also extend to real estate and other productive assets in last four columns of the table. The real estate-intensity variables *REI1* and *REI2* show firms in the high-concentration group to be less real estate-intensive than low-concentration firms, the reverse being true for *REI3*.[26] This finding shows as

[24]BM is the ratio of book value of equity (TA minus total liabilities plus balance sheet deferred taxes and investment tax credit minus book value of preferred stocks) to MV.

[25]LEV is the ratio of book value of total liabilities (TA minus book equity) to total market value of firm (MV plus book value of total liabilities). LTDR is the ratio of book value of long-term debt to MV plus book value of long-term debt.

[26]Again, *REI1*, *REI2*, and *REI3* are respectively the ratio of buildings and capitalized leases to PPE; the ratio of buildings, capitalized leases, construction in progress, and land to PPE; and the ratio of buildings and land to PPE.

expected that firms operating in concentrated industries tend to use leasing less, as compared to firms in competitive industries, probably due to a higher proportion of firm-specific real estate assets. Also, these firms are generally more capital-intensive as evidenced by their higher *PPEI*, the ratio of PPE to TA. These differences in asset intensities, though not enormous, are not surprising.

5.4 Characteristics of Real Estate-sorted Portfolios

Table 4 presents the average characteristics of firms comprising the low-real estate and high-real estate portfolios in the high-concentration and low-concentration industry groups. This portfolio classification is based on *REI1*, the ratio of buildings and capitalized leases to PPE. Whether measured by sales, assets, or market value, the average size of high-real estate firms in the low-concentration group is roughly 2 to 3 times larger than that of their low-real estate counterparts. The difference in firm size is even more pronounced in the high-concentration group, high-real estate firms being on average 8.6 times larger in terms of sales. As noted in the previous section, the firms in concentrated industries are generally larger, have higher book-to-market, and are more levered, as evidenced in the t-statistics of cross-industry tests of difference in means in Table 4.

A comparison of average firm sizes in the high-concentration group in table 3 and 4 also reveals real estate to be increasing with size in those industries. In contrast, low-concentration industries fail to show a similar pattern, probably due to greater heterogeneity within that group of firms. In addition, Table 4 shows a striking difference in real estate intensity (*REI1*, *REI2*, or *REI3*) and capital asset intensity (*PPEI*) between the portfolios. Even though high-real estate firms hold on average 7.7 to 22 times more real estate than their low-real estate counterparts in both concentration groups (depending on the measure used), they are only about twice more capital intensive in low-concentration industries, with no perceptible difference in capital intensity in concentrated industries.

In summary, Table 4 highlights two important points. First, the characteristics of

firms in the low-concentration and high-concentration groups are not the same, the low-concentration group being largely composed of smaller, growth firms. Also, within each of the two industry groups, the low-real estate firms are smaller, more growth-oriented, and less levered than their high-real estate counterparts. These noticeable differences in average firm characteristics should normally transpire in the performance of the portfolios as well.

6 Main Findings

This section discusses the return characteristics of the real estate-sorted portfolios and the *High-Low* investment strategy, which consists of shorting low-real estate stocks and simultaneously buying high-real estate stocks. The analysis separately covers the low-concentration and high-concentration industry groups to assess the extent to which product market competition may be a determinant factor in the relation between real estate intensity and stock returns.

6.1 Average Returns

6.1.1 Levered Returns

Tables 5 and 6 present levered excess and industry-adjusted returns earned by the real estate-sorted decile stock portfolios and the *High-Low* investment strategy in the low-concentration and high-concentration industry groups during the 444-month period from July 1973 to June 2010.[27] The equally-weighted and value-weighted average levered excess portfolios returns in competitive industries (i.e., *ew_exret* and *vw_exret* in top half of Table 5) are positive and generally strongly significant. More importantly, they increase with the portfolios' real estate intensities, as reflected in the *LL* quadrant of Figure 4. For example, the portfolios' valued-

[27]The risk-free rate is the 1-month Treasury bill rates from Ibbotson and Associates. Equally-weighted industry-adjusted returns (*ew_adjret*) and value-weighted industry-adjusted returns (*vw_adjret*) refer to respectively the annualized equally-weighted and value-weighted average monthly stock returns minus equally-weighted or value-weighted average monthly returns on the industry portfolio regrouping firms sharing the same 3-digit SIC.

weighted levered excess returns range from 4.7% for the low-real estate portfolio to 10.6% for the high-real estate portfolio, resulting in the *High-Low* investment strategy generating a positive and significant value-weighted average levered excess returns of 5.9%.

The return penalty suffered by high-real estate firms in competitive industries also materializes in the portfolios' levered industry-adjusted returns (top half of Table 6). Although these return estimates display low statistical significance, they also trend positively with real estate intensity (*LL* quadrant of Figure 5), resulting in the *High-Low* investment strategy earning a positive and statistically significant average levered industry-adjusted return of roughly 4.8%. The tests of difference in mean returns between the *Low* and *high* real estate portfolios (last columns of table 4 and 5) highlight the importance of controlling for industry fixed effects; unlike with excess returns, the difference in industry-adjusted returns is statistically significant and in the right direction.

Overall, these findings confirm the positive relation between real estate and stock returns documented in the literature. Basically, managers of firms operating in competitive industries should seriously consider constraining real estate investments given their fiduciary responsibility to shareholders. But it is often argued that all firms, no matter their competitive environment, should pursue a low-real estate strategy because real estate diverts valuable resources from core activities (Linneman, 1998) and may be associated with low productivity (Imrohoroglu and Tuzel, 2010). This paper argues that the documented positive correlation between real estate and stock returns applies primarily to competitive industries because the impact of capacity decisions on the riskiness of cashflows depends on the intensity of competition.

The bottom half of Table 5 reports levered excess portfolio returns in concentrated industries. Again, average excess portfolio returns are positive and generally statistically significant. However, the direction of the relation between real estate intensity and stock returns, depicted in the *LH* quadrant of Figure 4, is now the reversed of that documented in competitive industries, with the *Low* real estate portfolio earning an equally-weighted

average levered excess return of 17.2%, compared to 8.9% for the *High* real estate portfolio. As a result, the *High-Low* investment strategy now generates a loss of 8.3%. Abstracting from any risk considerations, the right arbitrage strategy in concentrated industries would obviously be to short high-real estate stocks and buy low-real estate stocks. The positive effect of real estate on firm value in these industries also evidences itself in the portfolios' levered industry-adjusted returns (bottom half of Table 6 and *LH* quadrant of Figure 5). Again, the results of the tests of difference in mean returns between the *High* and *Low* real estate portfolios highlight the importance of controlling for industry fixed effects (*DMT* column of tables 4 and 6). The next section examines the extent to which leverage might have contributed to these findings.

6.1.2 Unlevered Returns

To no surprise, the industry-group and portfolio descriptive tables 3 and 4 reveal a positive relation between real estate intensity and leverage, which may be partly explained by the high collateral value of real estate, the positive correlation between firm size and real estate intensity, or both. To ensure that the above findings are not driven by leverage effects, this section examines whether they persist in unlevered returns as well.

Tables 7 and 8 present unlevered excess and industry-adjusted returns earned by the real estate-sorted stock portfolios and the *High-Low* investment strategy in the low-concentration and high-concentration industry groups during the 444-month period from July 1973 to June 2010.[28] As expected, these returns are generally lower than the corresponding levered excess returns in Table 5 and industry-adjusted returns in Table 6, reflecting the positive effect of leverage on expected returns. In competitive industries for example, the *Low* and *High* real estate-portfolios post value-weighted unlevered excess returns of 2.6% and 6.7%, resulting in the *High-Low* strategy yielding 4.1% (top half of Table 7), as compared to value-weighted levered returns of 4.7%, 10.6%, and 5.9%, respectively (top half of Table 5).

[28]Unlevered returns are calculated assuming no taxes and a cost of the debt of 7% across the board.

The corresponding unlevered figures in concentrated industries are 8.2%, 3%, and -5.2% in bottom half of Table 7, as compared to levered figures of respectively 11.3%, 4.8%, and -6.5% in the bottom half of Table 5.

Generally, unlevered returns confirm the conclusions derived from the analysis of levered returns. In competitive industries, both unlevered excess and industry-adjusted portfolio returns increase with real estate intensity (top half of tables 7 and 8). This positive correlation is displayed in the *UL* quadrant of figures 4 and 5. The unlevered portfolio returns and the resulting returns on the *High-Low* investment strategy confirm that real estate does not negatively affect firm value in concentrated industries (bottom half of tables 7 and 8 and *UH* quadrant of figures 4 and 5. Again, the tests of difference in mean returns between the *High* and *Low* real estate portfolios in the *DMT* columns of tables 7 and 8 highlight the importance of industry characteristics.

Controlling for leverage greatly enhances the positive effect of real estate on firm value in oligopolistic industries since identification is improved at the firm level, as noticed by comparing the *High-Low* columns of tables 7 and 5 to those of tables 8 and 6. By adjusting for industry fixed-effects and firm-level endogeneity, Table 8 gives in fact the most accurate representation of the fundamental role of product market competition in the relation between real estate intensity and stock returns. On the continuum of industry concentrations, the impact of real estate on stock returns (firm values) appears to vary from positive (negative) in competitive industries to negative (positive) in concentrated industries, with possibly a concentration range within which real estate has little to no effect on shareholder value. This is the first study to document this reversing effect of real estate intensity on shareholder value as competition increases.

So far, the analysis has largely abstracted from risk considerations. Even though the *High-Low* investment strategy presents an arbitrage opportunity, when implemented properly, its risk implications have not been explored. It is possible that the portfolios' performance is driven by changes in systematic risk as real estate intensity increases.

6.2 Abnormal Returns

This section examines whether the portfolios generate any abnormal returns (alphas) after controlling for exposure to conventional risk factors and explores the relation between abnormal returns and real estate intensity in competitive and concentrated industries. Since the finding of significant alphas is necessarily conditional on the adopted pricing model, this analysis uses the 3-factor model 1 to minimize the risk of omitted variable bias. This section does not dwell on the effects of real estate on the portfolios' risk loadings or seek evidence in favor of the existence of a real estate risk factor, even though the finding of significant abnormal returns might just be construed as such.

Tables 9 and 10 report estimated alphas from equally-weighted and value-weighted levered excess returns (respectively, *ew_exret* and *vw_exret*) in competitive industries. Equally-weighted levered excess returns produce positive and generally significant (both statistically and economically) alphas ranging from -0.6% for the *Low* real estate portfolio to 4.3% for the *High* real estate firms (Table 9). More importantly, these abnormal returns increase with the portfolios' real estate intensities, as depicted in the *LL* quadrant of Figure 6, causing the *High-Low* investment strategy to produce a significant alpha of 4.9%. The finding is the same with regression estimations based on value-weighted levered excess returns in Table 10, the *High-Low* strategy again producing a significant alpha of 6.6%. Furthermore, estimated abnormal portfolio returns from equally-weighted and value-weighted unlevered excess returns (respectively, *ew_exuret* and *vw_exuret*) in tables 11 and 12, displayed in the *UL* quadrant of Figure 6, confirm that these results are not driven by the positive correlation between leverage and real estate intensity highlighted earlier. Therefore, the positive impact of real estate intensity on stock returns in competitive industries present in portfolio returns is obviously not driven by exposure to these conventional risk factors.

As far as the impact of real estate on systematic risks in competitive industries is concerned, a visual inspection of the coefficient estimates in tables 9 to 12 appears to show that real estate reduces market beta and exposure to the size risk factor. This observation

aligns with the findings of Deng and Gyourko, 2000, and Brounen and Eichholtz, 2005. In contrast, sensitivity to the book-to-market risk factor appears to increase with real estate intensity, probably due to the positive correlation between real estate and size.

The non-positive relation between real estate intensity and average portfolio returns in concentrated industries also evidences itself in abnormal returns from equally-weighted and value-weighted levered excess returns presented in tables 13 and 14, as displayed in the *LH* quadrant of Figure 6. For example, equally-weighted levered excess returns produce abnormal returns ranging from 8.8% for the *Low* real estate portfolio to -1% for the *High* real estate portfolio, causing the *High-Low* investment strategy to post now a significant negative average abnormal return of 9.8% during the 37-year period (Table 13). Also, abnormal returns estimated from equally-weighted and value-weighted unlevered portfolio returns in tables 15 and 16 confirm the non-positive effect of real estate on stock returns in concentrated industries (*UH* quadrant of Figure 6). This result confirms that, unlike in competitive industries, high-real estate firms are not necessarily penalized in oligopolistic industries.

Interestingly, the effects of real estate on the portfolios' risk loadings in competitive and concentrated industries are quite similar. In tables 13 to 16 real estate appears again to negatively affect market beta and sensitivity to the size risk factor and to increase exposure to the book-to-market risk factor.[29] However, a comparison of estimated regression coefficients (e.g., tables 9 vs. 13) appears to indicate that firms operating in competitive industries generate on average higher alphas, as documented by Hou and Robinson, 2006, and have higher systematic risk, as predicted by Aguerrevere, 2009.

In conclusion, this analysis shows that real estate positively affects stock returns in competitive industries and generally has the opposite return effect in concentrated industries. Since these effects appear to be stronger in competitive industries and most industries are relatively competitive, it is conceivable that the positive return effect dominates in studies

[29]This observation, along with the reversing effect of real estate on abnormal returns, might suggest the existence of an additional risk dimension, perhaps of real nature or highly correlated to real estate, being priced by the market.

that do not control for market structure.

6.3 Robustness Checks

The previous findings technically apply to industrial firms classified into industry concentration quintiles according to their 3-digit SICs using net sales, with firms in the low and high industry-concentration groups then sorted into decile portfolios according *REI1*, the ratio of buildings and capitalized leases to PPE. These findings remain robust to various alternative specifications.

Table 17 reports unlevered excess and industry-adjusted returns generated by the *High-Low* investment strategy in competitive and concentrated industries using alternative real estate measures. The *Base Case* column combines excess returns in the *High-Low* columns of tables 7 and 8, where firms are classified into portfolios according to *REI1*. First, adopting a broader measure of real estate by using *REI2*, which adds construction in progress and land to *REI1*, does not significantly alter the results (column 2). However, the adoption of *PPEI*, the ratio of PPE to TA, as a measure of real estate intensity practically eliminates the significance of the results in competitive as well as concentrated industries (column 3). Basically, the broader real estate is measured, the more serious the identification problem becomes. This may explain why Deng and Gyourko, 2000, who use the same measure, find weak results. In contrast, the results are slightly stronger (particularly in competitive industries) when real estate intensity is measured as deviations from industry averages in column 4. Following Tuzel, 2010, *AREI* is *REI1* minus the industry's average *REI1*.

So far, the impact of product market competition on the interaction between real estate intensity and stock returns has been tested by examining returns on real estate-sorted decile portfolios in competitive and concentrated industries. But if the argument advanced in this study is correct, quintile portfolios should also provide supporting, albeit weaker, evidence. The results of such analysis presented in column 2 of Table 18 confirm this prediction. The returns on the *High-Low* investment strategy using quintile portfolios are lower in absolute

terms compared to the decile returns. For example, the strategy's value-weighted unlevered excess returns (*vw_exuret*) using quintile portfolios in competitive industries is 2.5% in column 2, compared to 4.1% when decile portfolios are used in column 1. In concentrated industries, the strategy's value-weighted unlevered excess returns using quintile portfolios is -3.2%, compared to -5.2% using decile portfolios. As expected, these quintile returns generally show slightly lower statistical significance. The finding is the same with unlevered industry-adjusted returns and levered returns (table not included).[30]

The documented findings are also robust to alternative industry definitions. Columns 3 and 4 of Table 18 show average returns on the *High-Low* strategy when firms are classified into industries according to 2-digit SICs and the 48 FF industry groups, a widely used industry classification method in the finance literature.[31] These returns generally confirm the previous findings. However, the FF classification method works much better than the 2-digit industry grouping. In fact, it performs as well as the 3-digit industries used in the *Base Case*, even though it results in a much smaller number of industry groups (48 vs. 171). Obviously, FF do a better job at classifying industries into similar classes, which facilitates identification in this instance.

Finally, column 5 of Table 18 lists average returns on the *High-Low* investment strategy when TA, rather than net sales, is used to compute industry concentrations for the first-level sorting of industries into concentration groups. As expected, these results are in line with the previous findings since Table 1 and Figure 2 show that these two concentration measures can substitute for one another.

[30] A closer look at average returns on the *Low* and *High* decile and quintile portfolios (figures not presented in Table 18) further corroborates the thesis defended in this paper. In competitive industries, average returns on the *Low* quintile portfolio are higher than on the *Low* decile portfolio, whereas average returns on the *High* quintile portfolio are lower than on *High* decile portfolio. This interesting finding confirms the positive relation between real estate intensity and stock returns in competitive industries. In contrast, average returns on the *Low* quintile portfolio in concentrated industries are lower than on the *Low* decile portfolio, whereas the corresponding average returns on the *High* quintile and decile portfolios are generally similar, hence confirming the documented non-positive relation between real estate and stock returns in concentrated industries. This evidence further confirms the importance of product market competition.

[31] The use of two-digit SICs results in 36 industry groups. The list of the 48 FF industry groups is published at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

6.4 Real Estate and Risk

The previous analysis accomplishes two things. It shows that the positive effect of real estate on stock returns documented in the literature applies to competitive industries and that the reverse is likely to be true in concentrated industries. Furthermore, it establishes that these effects persist in abnormal returns as well, potentially giving rise to arbitrage opportunities.

So far, little has been said about the impact of real estate on stock risk. Assuming that the pricing model is correctly specified and no data issues, the estimation of the model should normally produce insignificant alphas. Even though the documented abnormal returns could be sample-driven, comfort is driven from the long time period covered by this study (37 years) and the relatively low risk of sample selection bias. Assuming no data issues, a significant association between real estate intensity and abnormal returns does not necessary imply that the market is pricing some form of real estate risk either, for it is possible that real estate is correlated to an omitted risk factor.[32] The challenge is that any search for abnormal returns is conditional on the pricing model, the data used to test the model, and, to some extent, the selected conditioning variables if applicable, since the fundamental asset pricing equation is a conditional relationship. In terms of the conditioning information used in this study, there is no reason to believe that investors would disregard information regarding a firm's real estate intensity relative to its competitors when pricing stocks, while generally reacting to real estate investment decisions, as evidenced by event studies. This study also follows the literature in terms of model selection, even running the risk of sacrificing efficiency for consistency. Maybe real estate introduces a separate risk dimension along the line of that documented by Ling et al., 2010, for retail firms since real estate, as an important component of household wealth, affects consumption decisions. This remains an important research question.

[32]The omission of a risk factor orthogonal to the explanatory variables included in the model may lead to significant alphas, without jeopardizing the consistency of coefficient estimates, if its expected value is different from zero. In the event the omitted risk factor is not orthogonal to the explanatory variables, then endogeneity sets in, resulting in inconsistent coefficient estimates.

As far as the effect of real estate on systematic risk is concerned, Table 19 nicely summarizes the discussion started when reviewing abnormal returns. The *High-Low* arbitrage strategy, which is equivalent to going long real estate, also results in significant exposure to the risk factors included in the model. Independent of industry structure, real estate appears to reduce market beta and exposure the size risk factor, as evidenced by the significant negative coefficients of $r_m - r_f$ and *smb*, and to increase exposure to the book-to-market effect. The negative effect of real estate on market beta (which is also found by Brounen and Eichholtz, 1995, and Brounen et al., 2005) likely stems from the beta of real estate being lower than that of stocks. As noted in Table 4, real estate intensity increases with firm size; therefore, it reduces exposure to the size effect. Table 4 also shows that real estate-intensive firms have higher book-to-market, which explains the positive sign of *hml* in Table 19. As expected, these effects of real estate on systematic risk transcend industry considerations. This finding leads to the conclusion that the reversing effect of industry structure on the interaction between real estate intensity and stock returns is largely captured through the portfolios' alphas. Therefore, it is most likely due to factors not reflected in the model.

6.5 The Role of REITs

The recommendation that non-real estate firms should minimize real estate ownership is often rationalized by pointing to the tremendous growth of equity REITs over the last two decades. The number of equity REITs increased almost twofold from 107 in 1985 to 210 in 1997, with market capitalization growing almost 16.5 times to $132.3 billion (Chan et al., 2003).[33] REITs are certainly better equipped to extract more value from real estate assets than most corporations, at least for some types of real estate, and can now efficiently raise large amount of debt and equity financing in capital markets, which might have removed the

[33]The growth in REITs following the collapse of property prices in the early 1990s was due to several factors. The Omnibus Budget Reconciliation Act of 1993 opened REIT investing to pension funds, hence increasing market liquidity. The Internal Revenue Services allowed the treatment of umbrella partnership REIT (UPREIT) transactions as tax-deferred exchanges under rule 731. Finally, the REIT Simplification Act of 1997 and the REIT Modernization Act of 1999 streamlined regulations governing REIT operations.

funding advantage previously enjoyed by corporations in financing real estate acquisitions (Linneman, 1998). Furthermore, the reduction in product and corporate life cycles due to changing customer preferences, technological progress, globalization, and mergers may have reduced the attractiveness of real estate ownership, as far as shareholder value is concerned, for most corporations. Consequently, leasing has certainly become a viable alternative to owning real estate for some corporations.

This section cursorily examines the extent to which the documented abnormal returns have been affected by the growth in REIT assets, the expectation being that investors would impose a higher penalty (larger abnormal returns) on real estate-intensive firms during the modern REIT era. For this purpose, the following model is applied to monthly excess returns from the *High-Low* investment strategy in competitive and concentrated industries.

$$r_{i,t} - r_{f,t} = \alpha_i + reit\_dummy_t + \beta_i.(r_{m,t} - r_{f,t}) + \gamma_i.smb_t + \delta_i.hml_t + \varepsilon_{i,t} \qquad (2)$$

This model is a simple extension of model 1 with the addition of a REIT dummy variable (*reit_dummy*) set equal to 1 for the pre-1990 period and 0 for the period after that has witnessed a renaissance of equity REITs.

The results of this analysis are tallied in Table 20. The *High-Low* strategy results in abnormal returns during both periods. Although these returns appear to be sightly lower in the first period, as evidenced by the negative (positive) sign of *reit_dummy* coefficients in competitive (concentrated) industries, the difference is not statistically significant. Even though the emergence of stronger REITs might have only marginally altered investors' attitude toward real estate, REITs might have lowered exposure to systematic risk, which is not captured here. Obviously, REITs have still a long way to go and may certainly benefit firms operating in competitive markets. However, their impact may be limited since they mostly invest in general-purpose real estate, whereas the bulk of corporate real estate needs are firm-specific. Maybe, the future will witness the emergence of new classes of REITs

more specialized in industry-specific assets. This is where REITs can make a greater contribution by allowing firms to better adapt productive assets to changing product life cycles, technological progress, and increased competition due to globalization.

7 Conclusion

This study extends the literature by introducing product market competition as an important factor affecting the relation between real estate and stock returns. Approaching real estate from a technology perspective, rather than from the portfolio diversification motive favored by the earlier literature, and borrowing from the IO literature dealing with strategic capacity and output decisions, it is argued that the positive relation between real estate and stock returns documented in the literature applies to competitive industries. For firms operating in concentrated industries, investors are likely to view positively capacity investment decisions made by incumbent firms to protect oligopolistic rents, causing the relation between real estate and stock returns to be negative or non-positive at worst. Using a large sample of industrial firms spanning the 37-year period from 1973 to 2010, this study presents evidence supporting these predictions. These findings represent a significant contribution to the literature by pointing out that the often-recommended strategy consisting of minimizing real estate is not necessarily optimal for all firms. Managers must also carefully consider industry structure when framing real estate strategies. As noted, identification challenges may have led to inconclusive results in the past. The introduction of production market competition partly alleviates this problem.

Although this field has recently witnessed a renewed interest from researchers, there is more to learn about the impact of real estate on the characteristics of stock returns. For example, this study barely explores the effects of real estate intensity on risk; market efficiency, the foundation of neoclassical financial economics, predicts that returns and risk go hand in hand. Also, the interaction between real estate and product market competition

leads to a number of potentially interesting research questions in corporate governance, for instance.

References

Ambrose, Brent (1990). "Corporate Real Estate's Impact on the Takeover Market." *Journal of Real Estate Finance and Economics,* 3, 307-322.

Aguerrevere, Felipe (2003)."Equilibrium Investment Strategies and Output Price Behavior: A Real-Options Approach." *Review of Financial Studies,* 16(4), 1239-1272.

Aguerrevere, Felipe (2009). "Real Options, Product Market Competition, and Asset Returns." *Journal of Finance,* 64(2), 957-983.

Allen, Marcus, Ronald Rutherford and Thomas Springer (1993). "The Wealth Effects of Corporate Real Estate Leasing." *Journal of Real Estate Research,* 8(4), 567-578.

Berk, Jonathan, Richard Green, Vasant Naik (1999). "Optimal Investment, Growth Options, and Security Returns." *Journal of Finance,* 54:5, 1553-1607.

Brander, James and Tracy Lewis (1986). "Oligopoly and Financial Structure: The Limited Liability Effect." *American Economic Review,* 76(5), 956-970.

Brander, James and Tracy Lewis (1988). "Bankruptcy Costs and the Theory of Oligopoly." *Canadian Journal of Economics,* 21(2), 221-243.

Brounen, Dirk and Piet Echholtz (2005). "Corporate Real Estate Ownership Implications: International Performance Evidence." *Journal of Real Estate Finance and Economics,* 30(4), 429-445.

Brounen, Dirk, Gustaf Colliander and Piet Eichholtz (2005). "Corporate Real Estate and Stock Performance in the International Retail Sector." *Journal of Corporate Real Estate,* 7(4), 287-299.

Campbell, John, Martin Lettau and Burton Malkiel (2001). "Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk." *Journal of Finance,* 56(1), 1-43.

Carlson, Murray, Adlai Fisher, Ron Giammarino (2004). "Corporate Investment and Asset Price Dynamics: Implications for the Cross-section of Returns." *Journal of Finance,* 59(6), 2577-2603.

Carney, William (2009). "Mergers and Acquisitions: The Essentials." *Aspen Publishers.*

Chan, Su Han, John Erickson and Ko Wang (2003). "Real Estate Investment Trusts: Structures, Performance, and Investment Opportunities." Oxford University Press.

Chevalier, Judith (1995). "Capital Structure and Product-market Competition: Empirical Evidence from the Supermarket Industry." *American Economic Review,* 85(3), 415-435.

Cooper, Ilan (2006). "Asset Pricing Implications of Nonconvex Adjustment Costs and Irreversibility of Investment." *Journal of Finance,* 61(1), 139-170.

Deng, Yongheng and Joseph Gyourko (2000). "Real Estate Ownership by Non-Real Estate Firms: An Estimate of the Impact on Firm Returns." *Working Paper.*

Dixit, Avinash (1980). "The Role of Investment in Entry-Deterrence." *Economic Journal,* 90(357), 95-106.

Dixit, Avinash and Robert Pindyck (1994). "Investment under uncertainty." *Princeton University Press.*

Du, Jan, Charles Leung and Derek Chu (2006). "Corporate Real Estate Holding and Corporate Governance: An Empirical Study." *Working Paper.*

Eaton, Curtis and Richard Lipsey (1979). "The Theory of Market Pre-emption: The Persistence of Excess Capacity and Monopoly in Growing Spatial Markets." *Economica'* 46(182), 149-158.

Fama, Eugene, Kenneth French (1992). "The Cross Section of Expected Stock Returns." *Journal of Finance,* 47(2), 427-465.

Fama, Eugene and James MacBeth (1973). "Risk, Return, and Equilibrium Tests." *Journal of Political Economy,* 81(3), 607-636.

Fisher, Lynn (2004). "The Wealth Effects of Sale and Leasebacks: New Evidence." *Real Estate Economics,* 32 (4), 619-643.

Gaspar, Jos-Miguel and Massimo Massa (2004). "Idiosyncratic Volatility and Product Market Competition." *Journal of Business,* 79, 3125-3152.

Giroud, Xavier and Holger Mueller (2011). "Corporate Governance, Product Market Competition, and Equity Prices." *Journal of Finance,* 66(2), 563-600.

Grenadier, Steven (2002). "Option Exercise Games: An Application of the Equilibrium Investment Strategies of Firms." *Review of Financial Studies,* 15(3), 691-721.

Hart, Oliver (1983). "The Market Mechanism as an Incentive Scheme." *Bell Journal of Economics,* 14(2), 366-382.

Hou, Kewei and David Robinson (2006). "Industry Concentration and Average Stock Returns." *Journal of Finance,* 61(4), 1927-1955.

Imrohoroglu, Ayse and Selale Tuzel (2010). "Firm Level Productivity, Risk, and Return." *Working Paper.*

Irvine, Paul and Jeffrey Pontiff (2008). "Idiosyncratic Return Volatility, Cash Flows, and Product Market Competition." *Review of Financial Studies,* 22(3), 1149-1177.

Jensen, Michael (1986). "Agency Costs of Free Cash Flow, Corporate Governance, and Takeovers." *American Economic Review,* 76, 323-329.

Jensen, Michael and William Meckling (1976). "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics,* 3, 305-360.

Kahle, Kathleen and Ralph Walkling (1996). "The Impact of Industry Classifications on Financial Research." *Journal of Financial and Quantitative Analysis,* 31(3), 309-335.

Karuna, Christo (2007). "Industry Product Market Competition and Managerial Incentives." *Journal of Accounting and Economics,* 43, 275-297.

Ling, David, Andy Naranjo, Michael Ryngaert (2010). "Real Estate Ownership, Leasing Intensity, and Value: Do Stock Returns Reflect a Firm's Real Estate Holdings?" *Journal of Real Estate Finance and Economics,* upcoming

Linneman, Peter (1998). "The Coming Disposal of Corporate Real Estate." *University of Pennsylvania Wharton Working Paper, 302.*

Lipton, Martin (2006). "Merger Waves in the 19^{th}, 20^{th} and 21^{st} Centuries." *The Davies Lecture Osgoode Hall Law School, York University,* September 14.

Myers, Stewart (1984). " The Capital Structure Puzzle." *Journal of Finance,* 39(3), 575-592.

Myers, Stewart and Nicholas Majluf (1984). "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have." *Journal of Financial Economics,* 13, 187-221.

Nourse, Hugh (1990). "Managerial Real Estate. Corporate Real Estate Asset Management." *Prentice-Hall.*

Nourse, Hugh and Stephen Roulac (1993). "Linking Real Estate Decision to Corporate Strategy." *Journal of Real Estate Research,* 8(4), 475-494.

Novy-Marx, Robert (2007). "An Equilibrium Model of Investment Under Uncertainty." *Review of Financial Studies,* 20(3), 1461-1502.

Peress, Joel (2010). "Product Market Competition, Insider Trading, and Stock Market Efficiency." *Journal of Finance,* 55(1), 1-43.

Rodriguez, Mauricio and C.F. Sirmans (1996). "Managing Corporate Real Estate: Evidence from the Capital Markets." *Journal of Real Estate Literature,* 4, 13-33.

Rutherford, Ronald and Hugh Nourse (1988). "The Impact of Corporate Real Estate Unit Formation on the Parent Firm's Value." *Journal of Real Estate Research,* 3(3), 73-84.

Rutherford, Ronald (1990). "Empirical Evidence on Shareholder Value and the Sale-Leaseback of Corporate Real Estate." *AREUEA Journal,* 18(4), 522-529.

Seiler, Michael, Arjun Chatrath and James Webb (2001). "Real Asset Ownership and the Risk and Return to Stockholders." *Journal of Real Estate Research,* 22(1-2), 199-212.

Scharfstein, David (1988). "Product-market Competition and Managerial Slack." *Rand Journal of Economics,* 19(1), 147-155.

Sing, Tien Foo and CF Sirmans (2008). "Does Real Estate Ownership Matter in Corporate Governance?" *Journal of Property Research,* 25(1), 23-43.

Spence, Michael (1977). "Entry, Capacity, Investment and Oligopolistic Pricing." *The Bell Journal of Economics,* 8(2), 534-544.

Spulber, Daniel (1981). "Capacity, Output, and Sequential Entry." *American Economic Review,* 71(3), 503-514.

Slovin, Myron, Marie Sushka and John Poloncheck (1990). "Corporate Sale-and-Leaseback and Shareholder Wealth." *Journal of Finance,* 45(1), 289-299.

Tirole, Jean (1997). "The Theory of Industrial Organization." *MIT Press.*

Titman, Sheridan (1985). "Urban Land Prices Under Uncertainty." *American Economic Review,* 75(3), 505-514.

Tuzel, Selale (2010). "Corporate Real Estate Holdings and the Cross-Section of Stock Returns." *Review of Financial Studies,* 23(6), 2268-2302.

Wenders, John (1971). "Excess Capacity as a Barrier to Entry." *Journal of Industrial Economics,* 20(1), 14-19

Williams, Joseph (1993). "Equilibrium and Options on Real Assets." *Review of Financial Studies,* 6(4), 825-850.

Yu, Ming and Kim Liow (2009). "Do Retail Firms Benefits from Real Estate Ownership?" *Journal of Property Research,* 26(1), 25-60.

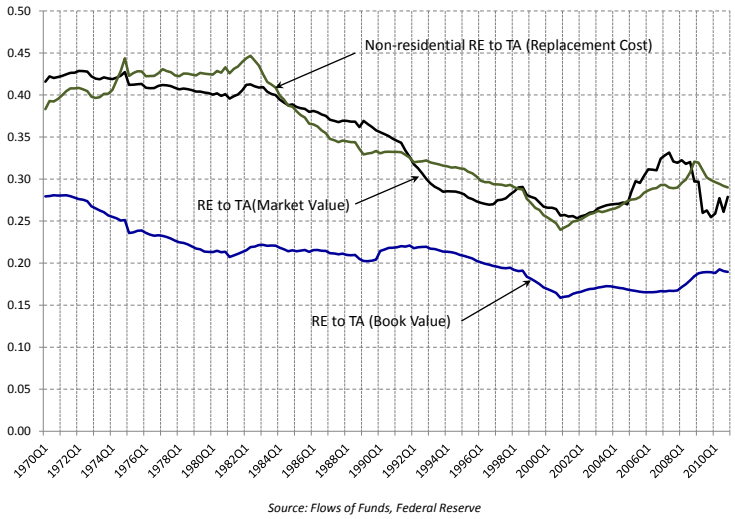

Figure 1: Real estate ownership by nonfarm nonfinancial corporations (*Source: Federal Reserve*)

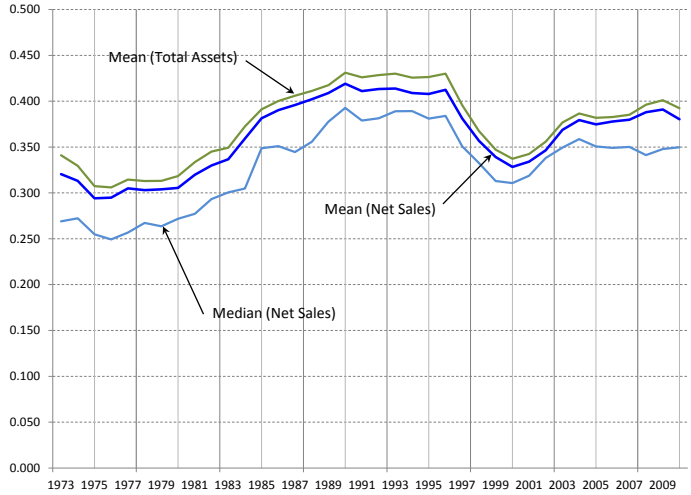

Figure 2: Trends in mean and median 3-year average industry concentrations based on net sales and total assets from 1973 to 2010

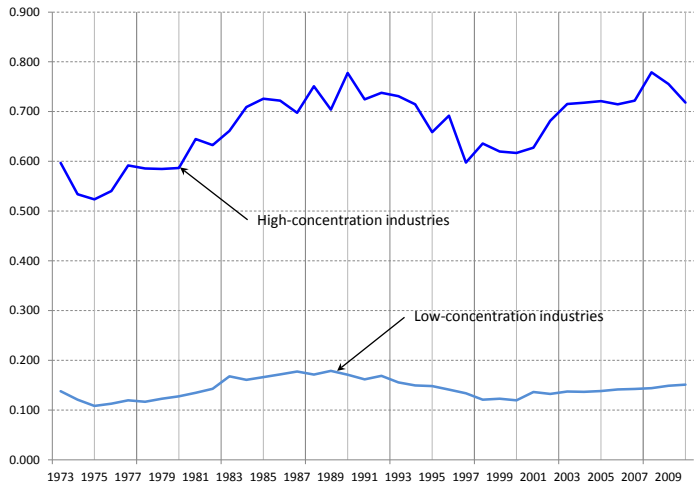

Figure 3: Trends in mean 3-year average concentrations based on net sales in the low-concentration and high-concentration groups from 1973 to 2010

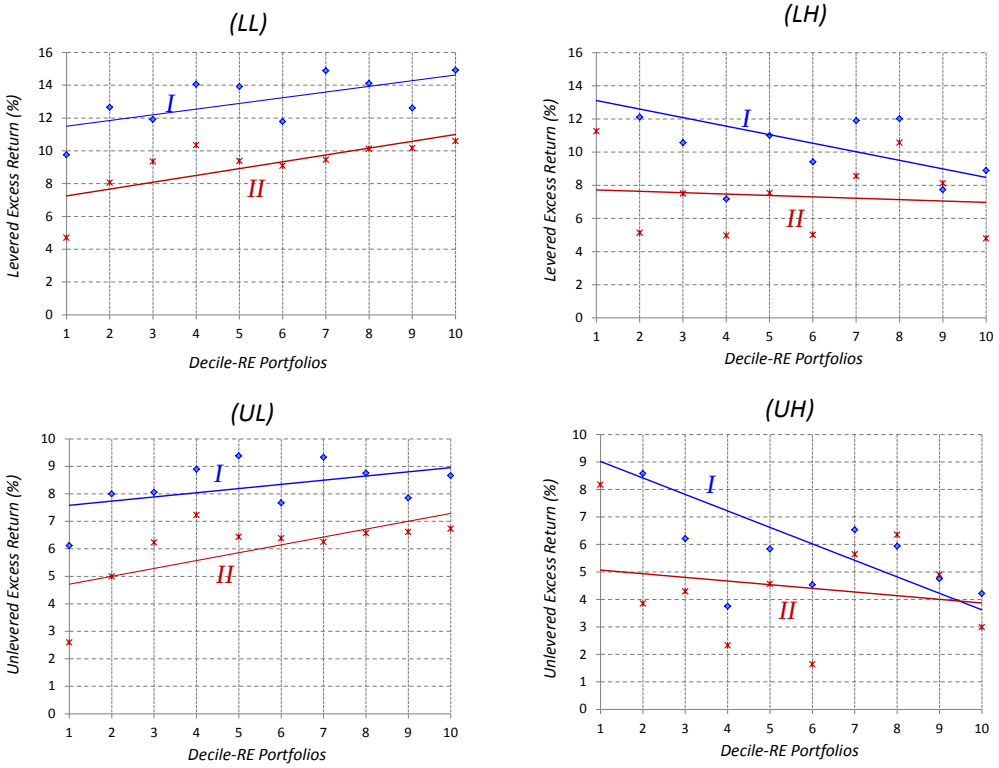

Figure 4: The two top quadrants, *LL* and *LH*, show respectively *average levered excess portfolio returns* in low-concentration industries and high-concentration industries. The bottom quadrants, *UL* and *UH*, show the *average unlevered excess portfolio returns* in low-concentration and high-concentration industries, respectively. The graphs labeled *I* (*II*) depict equally-weighted (value-weighted) average returns from 1973 to 2010.

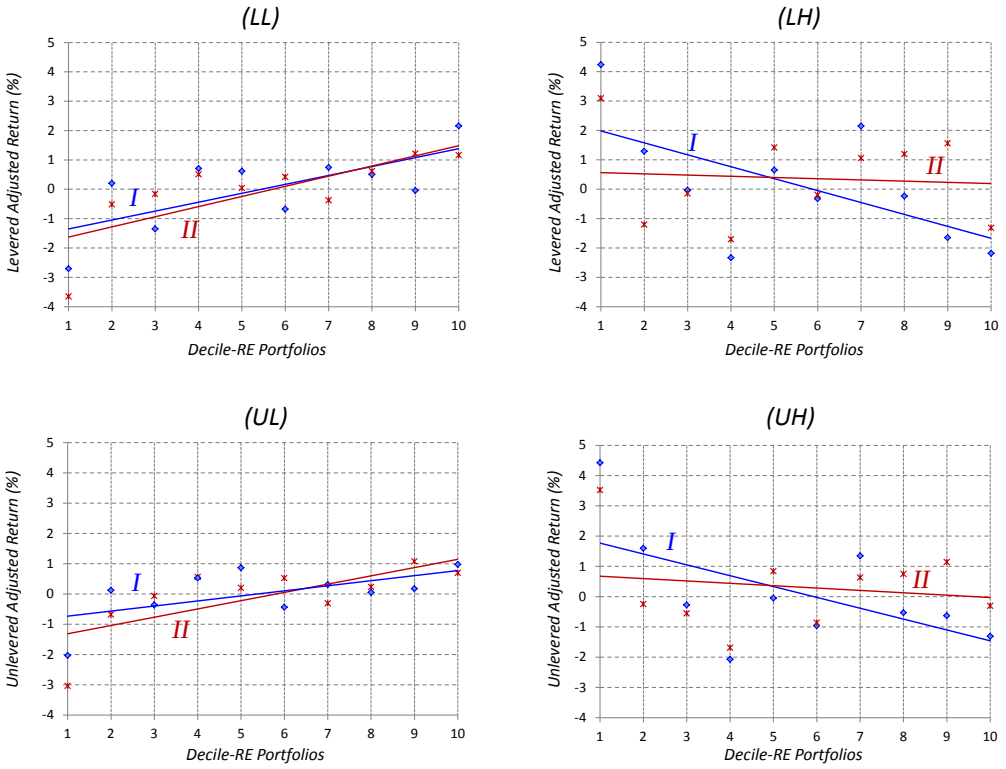

Figure 5: The two top quadrants, *LL* and *LH*, show respectively *average levered industry-adjusted portfolio returns* in low-concentration industries and high-concentration industries. The bottom quadrants, *UL* and *UH*, show the *average unlevered industry-adjusted portfolio returns* in low-concentration and high-concentration industries, respectively. The graphs labeled *I* (*II*) depict equally-weighted (value-weighted) average returns from 1973 to 2010.

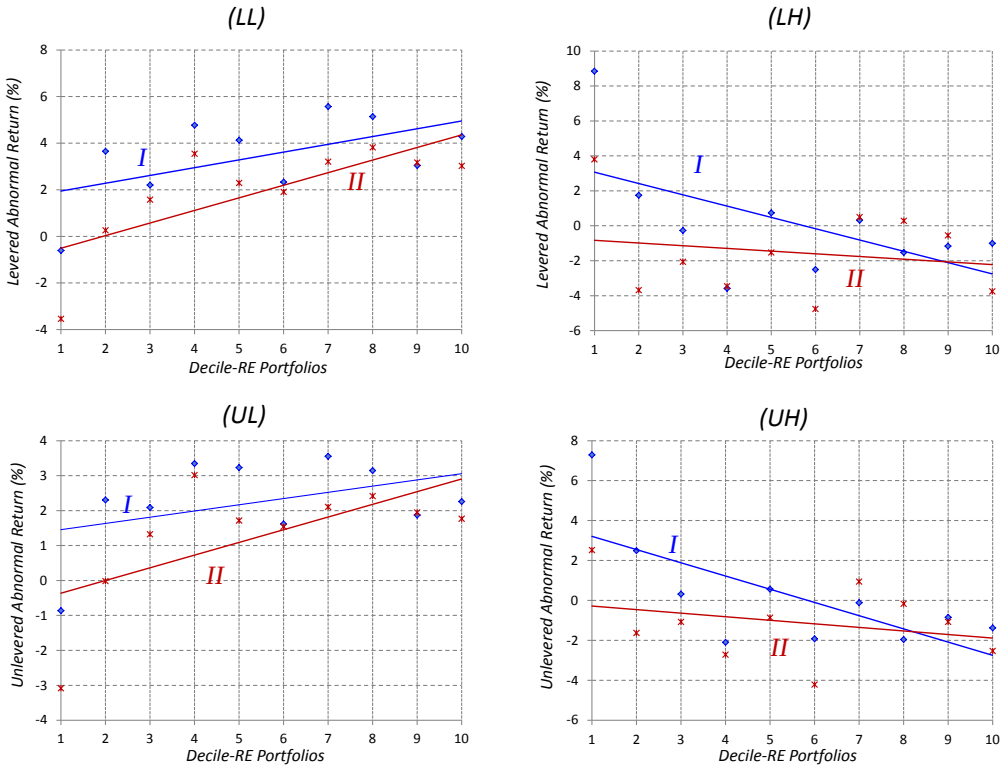

Figure 6: The two top quadrants, *LL* and *LH*, show respectively *abnormal returns (alphas) from levered excess portfolio returns* in low-concentration industries and high-concentration industries. The bottom quadrants, *UL* and *UH*, show *abnormal returns from unlevered excess portfolio returns* in low-concentration and high-concentration industries, respectively. The graphs labeled *I* (*II*) depict abnormal returns from equally-weighted (value-weighted) returns from 1973 to 2010.

Table 1: Distributional Characteristics of Industry Concentrations

	Mean	*Median*	*SDV*	*Min.*	*Max.*	*P25*	*P75*
Hsales	0.363	0.325	0.203	0.043	0.997	0.211	0.472
Hsales_ma	0.361	0.327	0.194	0.043	0.996	0.216	0.469
Hassets	0.375	0.331	0.208	0.037	0.997	0.217	0.487
Hassets_ma	0.373	0.334	0.199	0.039	0.997	0.222	0.487

The sample consists of 7,736 industrial firms spanning the 37-year period from 1973 to 2010. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their concentration Herfindahl values. *Hsales* and *Hassets* measure industry concentration using net sales and total assets, respectively, with $Hsales\_ma$ and $Hassets\_ma$ representing their respective 3-year moving averages. *SDV*, *P25*, and *P75* stand for standard deviation, 25^{th} percentile, and 75^{th} percentile, respectively.

Table 2: Concentration Characteristics of Quintile Industry Concentration Groups

	(I) Industry-level			*(II) Firm-level*		
	Herfindahl	*Industries*	*Indus.-yrs*	*Market Power*	*Firms*	*Firm-yrs*
Low-con. Indus.	0.142	26	988	0.004	869	33,025
2	0.238	27	1,015	0.016	392	14,884
3	0.329	27	1,012	0.031	287	10,902
4	0.434	27	1,015	0.058	200	7,583
High-con. Indus.	0.663	26	995	0.121	145	5,491
DMT	*(115.32)*			*(33.77)*		

The sample consists of 7,736 industrial firms spanning the 37-year period from 1973 to 2010. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. The above statistics are the 37-year averages at the industry level in section (*I*) and at the firm level in section (*II*). The column headings *Industries*, *Indus.-yrs*, and *Firm-yrs* stand for number of industries, industry-years, and firm-years, respectively. *Market Power* is the average squared values of net-sales over aggregate industry net-sales. *Low-con.* and *High-con.* are respectively abbreviations of *Low-concentration* and *High-concentration*. The *DMT* row reports the t-statistics of the tests of difference in means between the low-concentration and high-concentration groups.

Table 3: Characteristics of Firms in the Low and High Industry Concentration Groups

	SALES	*TA*	*MV*	*BM*	*LEV*	*LTDR*	*REI1*	*REI2*	*REI3*	*PPEI*
Low-con. Indus.	1,275	1,062	1,654	0.783	0.332	0.177	0.300	0.365	0.246	0.283
High-con. Indus.	2,889	2,460	2,425	1.043	0.435	0.251	0.288	0.359	0.274	0.304
DMT	*(8.27)*	*(9.03)*	*(4.03)*	*(13.18)*	*(28.30)*	*(22.39)*	*(-4.50)*	*(-2.05)*	*(8.71)*	*(7.71)*

The sample consists of 7,736 industrial firms spanning the 37-year period from 1973 to 2010. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. The above statistics are the 37-year averages. *SALES*, *TA*, and *MV*, stand respectively for net sales, total assets, and market value of equity (share price times number of shares outstanding), in 2010 U.S. dollars (millions). Book to market (*BM*) is the ratio of book value of equity (*TA* minus total liabilities plus balance sheet deferred taxes and investment tax credit minus book value of preferred stocks) to market value of equity. *LEV* is the ratio of book value of total liabilities (*TA* minus book equity) to total market value of firm (market value of equity plus book value of total liabilities). *LTDR* is the ratio of book value of long-term debt to *MV* plus book value of long-term debt. *REI1*, *REI2*, and *REI3* are respectively the ratio of buildings and capitalized leases to properties, plants, and equipment (PPE); the ratio of buildings, capitalized leases, construction in progress, and land to PPE; and the ratio of buildings and land to PPE. On the other hand, *PPEI* is the ratio PPE to *TA*. The data is from Compustat and CRSP for firms with missing *MV* data in Compustat. *Low-con. Indus.* and *High-con. Indus.* are respectively abbreviations of *Low-concentration Industries* and *High-concentration Industries*. The *DMT* row reports the t-statistics of the tests of difference in means between the low-concentration and high-concentration groups.

Table 4: Characteristics of Firms in the Low and High Real Estate Stock Portfolios in the Low-concentration and High-concentration Industry Groups

	Firm-yrs	*TA*	*SALES*	*MV*	*BM*	*LTDR*	*LEV*	*REI1*	*REI2*	*REI3*	*PPEI*
Low-con. Indus.											
Low-RE Firms (1a)	3,285	331	373	301	0.647	0.126	0.267	0.031	0.076	0.031	0.206
High-RE Firms (2a)	3,287	703	905	931	0.818	0.213	0.358	0.651	0.716	0.401	0.387
DMT		*(7.60)*	*(9.90)*	*(8.32)*	*(5.67)*	*(16.15)*	*(14.31)*	*(321.29)*	*(206.41)*	*(64.47)*	*(32.73)*
High-con. Indus.											
Low-RE Firms (1b)	531	900	701	823	0.807	0.211	0.366	0.028	0.098	0.045	0.322
High-RE Firms(2b)	535	3,059	6,011	4,580	1.201	0.252	0.438	0.678	0.754	0.531	0.324
DMT		*(3.27)*	*(3.43)*	*(3.03)*	*(4.00)*	*(2.83)*	*(4.49)*	*(93.98)*	*(70.19)*	*(32.29)*	*(0.21)*
Cross-indus. DMT											
(1b) vs (1a)		*(5.16)*	*(2.83)*	*(3.95)*	*(2.45)*	*(7.71)*	*(8.33)*	*(-2.27)*	*(3.12)*	*(2.84)*	*(10.08)*
(2b) vs (2a)		*(3.61)*	*(3.31)*	*(2.95)*	*(4.81)*	*(3.52)*	*(6.42)*	*(3.89)*	*(5.27)*	*(8.45)*	*(-7.08)*

The sample consists of 7,736 industrial firms spanning the 37-year period from 1973 to 2010. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1* defined below). The above statistics are the portfolios' 37-year averages. *SALES*, *TA*, and *MV*, stand respectively for net sales, total assets, and market value of equity (share price times number of shares outstanding), in 2010 U.S. dollars (millions). Book to market (*BM*) is the ratio of book value of equity (*TA* minus total liabilities plus balance sheet deferred taxes and investment tax credit minus book value of preferred stocks) to market value of equity. *LEV* is the ratio of book value of total liabilities (*TA* minus book equity) to total market value of firm (market value of equity plus book value of total liabilities). *LTDR* is the ratio of book value of long-term debt to *MV* plus book value of long-term debt. *REI1*, *REI2*, and *REI3* are respectively the ratio of buildings and capitalized leases to properties, plants, and equipment (PPE); the ratio of buildings, capitalized leases, construction in progress, and land to PPE; and the ratio of buildings and land to PPE. On the other hand, *PPEI* is the ratio PPE to *TA*. The data is from Compustat and CRSP for firms with missing *MV* data in Compustat. *Low-con. Indus.* and *High-con. Indus.* are respectively abbreviations of *Low-concentration Industries* and *High-concentration Industries*. *Low-RE* and *High-RE* are abbreviations of *Low-real estate* and *High-real estate*, respectively. The *DMT* rows report the t-statistics of the tests of difference in means between the low-real estate and high-real estate portfolios in their respective industry concentration group. *Cross-indus.* stands form *Cross-industry*.

Table 5: *Levered Excess Returns* of Real Estate-sorted Stock Portfolios from July 1973 to June 2010

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*	*DMT*
Low-con. Indus.												
ew_exret	9.76	12.66	11.92	14.06	13.92	11.79	14.89	14.11	12.61	14.92	5.16	*(0.79)*
	(1.95)	*(2.85)*	*(2.73)*	*(3.65)*	*(3.51)*	*(3.21)*	*(3.91)*	*(3.72)*	*(3.29)*	*(3.57)*	*(2.25)*	
vw_exret	4.70	8.06	9.35	10.34	9.39	9.09	9.46	10.12	10.17	10.59	5.89	*(0.99)*
	(1.02)	*(2.00)*	*(2.43)*	*(2.96)*	*(2.74)*	*(2.83)*	*(3.01)*	*(2.98)*	*(3.05)*	*(2.82)*	*(2.72)*	
High-con. Indus.												
ew_exret	17.15	12.11	10.57	7.18	11.00	9.41	11.89	12.02	7.74	8.89	-8.26	*(-1.09)*
	(2.82)	*(1.95)*	*(2.38)*	*(1.75)*	*(2.79)*	*(2.40)*	*(2.78)*	*(2.45)*	*(1.93)*	*(1.99)*	*(-1.65)*	
vw_exret	11.26	5.13	7.51	4.96	7.54	5.01	8.55	10.57	8.12	4.79	-6.46	*(-1.00)*
	(2.12)	*(1.02)*	*(2.01)*	*(1.36)*	*(2.16)*	*(1.44)*	*(2.55)*	*(2.92)*	*(2.24)*	*(1.28)*	*(-1.45)*	

The above figures represent annualized average monthly levered excess returns (in percents) earned by the real estate-sorted decile stock portfolios in the low-concentration industries (*Low-con. Indus.*) and the high-concentration industries (*High-con. Indus.*) for the 444-month period from July 1973 to June 2010 and their *t*-statistics (italicized figures in parentheses). Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). The rows labeled *ew_exret* and *vw_exret* stand respectively for equally-weighted and value-weighted levered excess returns over the risk-free rate, proxied by the 1-month Treasury bill rates from Ibbotson and Associates. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*). Stock return and accounting data are from CRSP and Compustat, respectively. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The *DMT* column reports the t-statistics of the tests of difference in mean returns between *Low* and *High* real estate portfolios.

Table 6: *Levered Industry-adjusted Returns* of Real Estate-sorted Stock Portfolios from July 1973 to June 2010

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*	*DMT*
Low-con. Indus.												
ew_adjret	-2.71	0.20	-1.35	0.71	0.62	-0.68	0.74	0.50	-0.04	2.16	4.86	*(2.69)*
	(-1.86)	*(0.18)*	*(-1.36)*	*(0.76)*	*(0.59)*	*(-0.67)*	*(0.73)*	*(0.51)*	*(-0.05)*	*(2.01)*	*(2.80)*	
vw_adjret	-3.65	-0.51	-0.16	0.51	0.04	0.42	-0.37	0.62	1.22	1.16	4.81	*(2.73)*
	(-2.48)	*(-0.53)*	*(-0.20)*	*(0.65)*	*(0.06)*	*(0.51)*	*(-0.40)*	*(0.78)*	*(1.67)*	*(1.20)*	*(3.06)*	
High-con. Indus.												
ew_adjret	4.24	1.29	-0.03	-2.33	0.65	-0.33	2.15	-0.24	-1.65	-2.18	-6.42	*(-1.73)*
	(1.47)	*(0.44)*	*(-0.02)*	*(-1.08)*	*(0.34)*	*(-0.18)*	*(1.03)*	*(-0.09)*	*(-0.69)*	*(-0.93)*	*(-1.72)*	
vw_adjret	3.09	-1.21	-0.14	-1.70	1.42	-0.19	1.06	1.20	1.56	-1.31	-4.41	*(-1.65)*
	(1.46)	*(-0.52)*	*(-0.09)*	*(-1.19)*	*(1.14)*	*(-0.15)*	*(0.86)*	*(0.88)*	*(0.96)*	*(-0.81)*	*(-1.58)*	

The above figures represent annualized average monthly levered industry-adjusted returns (in percents) earned by the real estate-sorted decile stock portfolios in the low-concentration industries (*Low-con. Indus.*) and the high-concentration industries (*High-con. Indus.*) for the 444-month period from July 1973 to June 2010 and their t-statistics (italicized figures in parentheses). Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). The rows labeled *ew_adjret* and *vw_adjret* stand respectively for equally-weighted and value-weighted levered industry-adjusted returns. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*). Stock return and accounting data are from CRSP and Compustat, respectively. Equally-weighted industry-adjusted returns (*ew_adjret*) and value-weighted industry-adjusted returns (*vw_adjret*) refer to respectively the annualized equally-weighted and value-weighted average monthly stock returns minus the equally-weighted or value-weighted average monthly returns on the industry portfolio regrouping firms sharing the same 3-digit SIC code. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The *DMT* column reports the t-statistics of the tests of difference in mean returns between *Low* and *High* real estate portfolios.

Table 7: *Unlevered Excess Returns* of Real Estate-sorted Stock Portfolios from July 1973 to June 2010

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*	*DMT*
Low-con. Indus.												
ew_exuret	6.11	8.00	8.05	8.89	9.38	7.67	9.33	8.75	7.85	8.66	2.55	*(0.53)*
	(1.12)	*(1.79)*	*(1.89)*	*(2.51)*	*(2.58)*	*(2.17)*	*(2.74)*	*(2.54)*	*(2.15)*	*(2.20)*	*(1.38)*	
vw_exuret	2.59	5.00	6.23	7.23	6.43	6.38	6.25	6.57	6.61	6.73	4.14	*(0.88)*
	(0.25)	*(0.98)*	*(1.45)*	*(2.02)*	*(1.79)*	*(1.92)*	*(1.92)*	*(1.91)*	*(1.91)*	*(1.64)*	*(2.23)*	
High-con. Indus.												
ew_exuret	12.86	8.58	6.21	3.75	5.84	4.53	6.53	5.94	4.75	4.21	-8.65	*(-1.73)*
	(2.53)	*(1.48)*	*(1.26)*	*(0.43)*	*(1.34)*	*(0.80)*	*(1.51)*	*(1.07)*	*(0.93)*	*(0.60)*	*(-2.45)*	
vw_exuret	8.17	3.85	4.29	2.32	4.56	1.64	5.64	6.35	4.90	2.99	-5.18	*(-1.16)*
	(1.61)	*(0.44)*	*(0.71)*	*(-0.06)*	*(0.93)*	*(-0.35)*	*(1.56)*	*(1.65)*	*(1.17)*	*(0.31)*	*(-1.65)*	

The above figures represent annualized average monthly unlevered excess returns (in percents) earned by the real estate-sorted decile stock portfolios in the low-concentration industries (*Low-con. Indus.*) and the high-concentration industries (*High-con. Indus.*) for the 444-month period from July 1973 to June 2010 and their t-statistics (italicized figures in parentheses). Unlevered return calculations assume no take taxes and a cost of the debt of 7% across the board. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). The rows labeled *ew_exuret* and *vw_exuret* stand respectively for equally-weighted and value-weighted unlevered excess returns over the risk-free rate, proxied by the 1-month Treasury bill rates from Ibbotson and Associates. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*). Stock return and accounting data are from CRSP and Compustat, respectively. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The *DMT* column reports the t-statistics of the tests of difference in mean returns between *Low* and *High* real estate portfolios.

Table 8: *Unlevered Industry-adjusted Returns* of Real Estate-sorted Stock Portfolios from July 1973 to June 2010

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*	*DMT*
Low-con. Indus.												
ew_adjuret	-2.03	0.12	-0.36	0.53	0.87	-0.44	0.31	0.05	0.17	0.98	3.01	*(2.20)*
	(-1.64)	*(0.22)*	*(-0.58)*	*(0.77)*	*(1.08)*	*(-0.64)*	*(0.37)*	*(0.02)*	*(0.27)*	*(1.12)*	*(2.24)*	
vw_adjuret	-3.04	-0.68	-0.07	0.56	0.20	0.52	-0.31	0.23	1.07	0.69	3.73	*(2.47)*
	(-2.22)	*(-0.81)*	*(-0.25)*	*(0.90)*	*(0.36)*	*(0.78)*	*(-0.36)*	*(0.38)*	*(1.98)*	*(0.83)*	*(2.85)*	
High-con. Indus.												
ew_adjuret	4.42	1.60	-0.28	-2.07	-0.05	-0.96	1.35	-0.53	-0.63	-1.31	-5.74	*(-2.15)*
	(2.25)	*(0.80)*	*(-0.20)*	*(-1.60)*	*(-0.20)*	*(-0.94)*	*(0.97)*	*(-0.34)*	*(-0.35)*	*(-0.71)*	*(-2.11)*	
vw_adjuret	3.52	-0.24	-0.55	-1.69	0.84	-0.87	0.63	0.75	1.14	-0.30	-3.83	*(-1.96)*
	(2.27)	*(-0.12)*	*(-0.67)*	*(-1.69)*	*(0.84)*	*(-1.05)*	*(0.72)*	*(0.79)*	*(1.19)*	*(-0.10)*	*(-1.88)*	

The above figures represent annualized average monthly unlevered industry-adjusted returns (in percents) earned by the real estate-sorted decile stock portfolios in the low-concentration industries (*Low-con. Indus.*) and the high-concentration industries (*High-con. Indus.*) for the 444-month period from July 1973 to June 2010 and their t-statistics (italicized figures in parentheses). Unlevered return calculations assume no taxes and a cost of the debt of 7% across the board. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). The rows labeled *ew_adjuret* and *vw_adjuret* stand respectively for equally-weighted and value-weighted unlevered industry-adjusted returns. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*). Stock return and accounting data are from CRSP and Compustat, respectively. Equally-weighted industry-adjusted returns (*ew_adjret*) and value-weighted industry-adjusted returns (*vw_adjret*) refer to respectively the annualized equally-weighted and value-weighted average monthly stock returns minus the equally-weighted or value-weighted average monthly returns on the industry portfolio regrouping firms sharing the same 3-digit SIC code. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The *DMT* column reports the t-statistics of the tests of difference in mean returns between *Low* and *High* real estate portfolios.

Table 9: Abnormal Returns on Equally-weighted Levered Excess Returns (*ew_exret*) in *Low-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	-0.61	3.65	2.20	4.76	4.13	2.33	5.57	5.14	3.04	4.28	4.90
	(-0.24)	*(1.75)*	*(1.25)*	*(3.15)*	*(2.63)*	*(1.66)*	*(3.73)*	*(3.58)*	*(1.86)*	*(2.27)*	*(2.21)*
r_m-r_f	1.089	1.041	1.085	1.032	1.087	1.044	1.017	0.989	0.978	1.015	-0.0737
	(23.31)	*(26.77)*	*(33.03)*	*(36.53)*	*(37.16)*	*(39.92)*	*(36.48)*	*(36.93)*	*(32.08)*	*(28.75)*	*(-1.79)*
smb	1.379	1.119	1.132	0.936	0.927	0.824	0.933	0.966	1.003	1.165	-0.214
	(20.70)	*(20.18)*	*(24.17)*	*(23.23)*	*(22.22)*	*(22.09)*	*(23.46)*	*(25.28)*	*(23.05)*	*(23.13)*	*(-3.64)*
hml	-0.0626	-0.102	-0.0162	0.0913	0.137	0.187	0.112	0.0533	0.158	0.216	0.279
	(-0.89)	(-1.75)	(-0.33)	(2.15)	(3.12)	(4.76)	(2.67)	(1.32)	(3.44)	(4.07)	(4.49)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.762*	*0.790*	*0.845*	*0.853*	*0.851*	*0.861*	*0.853*	*0.863*	*0.827*	*0.805*	*0.115*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from equally-weighted monthly levered excess portfolio returns (*ew_exret*) in low-concentration industries. The italicized figures in parentheses are the *t*-statistics of the coefficient estimates. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 10: Abnormal Returns on Value-weighted Levered Excess Returns (*vw_exret*) in *Low-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	-3.54	0.25	1.57	3.54	2.29	1.91	3.20	3.82	3.17	3.02	6.56
	(-1.90)	*(0.17)*	*(1.23)*	*(2.90)*	*(2.08)*	*(1.72)*	*(2.80)*	*(3.17)*	*(2.35)*	*(2.01)*	*(3.20)*
r_m-r_f	1.084	1.072	1.083	0.967	1.012	0.998	0.904	0.943	0.906	0.952	-0.132
	(31.13)	*(37.92)*	*(45.46)*	*(42.46)*	*(49.46)*	*(48.26)*	*(42.38)*	*(41.99)*	*(36.01)*	*(33.88)*	*(-3.45)*
smb	1.143	0.852	0.759	0.688	0.601	0.483	0.547	0.632	0.691	0.885	-0.258
	(23.00)	*(21.14)*	*(22.33)*	*(21.18)*	*(20.57)*	*(16.37)*	*(17.99)*	*(19.74)*	*(19.25)*	*(22.07)*	*(-4.72)*
hml	-0.315	-0.190	-0.142	-0.163	-0.0924	0.0194	-0.106	-0.196	-0.0612	-0.130	0.185
	(-6.02)	(-4.47)	(-3.96)	(-4.76)	(-3.00)	(0.63)	(-3.32)	(-5.81)	(-1.62)	(-3.07)	(3.22)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.844*	*0.866*	*0.895*	*0.884*	*0.902*	*0.887*	*0.874*	*0.881*	*0.844*	*0.847*	*0.143*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from value-weighted monthly levered excess portfolio returns (*vw_exret*) in low-concentration industries. The italicized figures in parentheses are the t-statistics of the coefficient estimates. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 11: Abnormal Returns on Equally-weighted Unlevered Excess Returns (*ew_exuret*) in *Low-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	-0.87	2.30	2.09	3.35	3.23	1.62	3.55	3.14	1.87	2.26	3.12
	(-0.42)	*(1.33)*	*(1.46)*	*(2.87)*	*(2.48)*	*(1.51)*	*(3.09)*	*(3.01)*	*(1.56)*	*(1.57)*	*(1.82)*
$r_{m,t} - r_{f,t}$	0.789	0.702	0.698	0.670	0.729	0.709	0.685	0.661	0.651	0.641	-0.147
	(20.59)	*(21.69)*	*(26.22)*	*(30.75)*	*(30.02)*	*(35.46)*	*(31.98)*	*(33.95)*	*(29.20)*	*(23.92)*	*(-4.61)*
smb	1.001	0.803	0.784	0.617	0.610	0.542	0.601	0.642	0.648	0.794	-0.207
	(18.31)	*(17.37)*	*(20.62)*	*(19.85)*	*(17.60)*	*(19.02)*	*(19.68)*	*(23.14)*	*(20.39)*	*(20.75)*	*(-4.53)*
hml	-0.152	-0.177	-0.107	-0.0444	0.0183	0.0655	-0.00274	-0.0390	0.0411	0.0355	0.187
	(-2.64)	(-3.65)	(-2.67)	(-1.36)	(0.50)	(2.18)	(-0.09)	(-1.33)	(1.23)	(0.88)	(3.90)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.724*	*0.733*	*0.792*	*0.815*	*0.793*	*0.832*	*0.819*	*0.847*	*0.800*	*0.761*	*0.181*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from equally-weighted monthly unlevered excess portfolio returns (*ew_exuret*) in low-concentration industries. The italicized figures in parentheses are the *t*-statistics of the coefficient estimates. Unlevered return calculations assume no taxes and a cost of the debt of 7% across the board. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 12: Abnormal Returns on Value-weighted Unlevered Excess Returns (*vw_exuret*) in *Low-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	-3.08	-0.02	1.32	3.01	1.72	1.54	2.10	2.41	1.94	1.76	4.85
	(-1.76)	*(-0.01)*	*(1.12)*	*(2.85)*	*(1.86)*	*(1.74)*	*(2.23)*	*(2.51)*	*(1.81)*	*(1.31)*	*(2.80)*
$r_{m,t} - r_{f,t}$	0.801	0.736	0.736	0.661	0.715	0.710	0.652	0.675	0.629	0.654	-0.147
	(24.44)	*(29.03)*	*(33.53)*	*(33.60)*	*(41.48)*	*(43.07)*	*(37.06)*	*(37.62)*	*(31.40)*	*(26.16)*	*(-4.56)*
smb	0.894	0.657	0.562	0.507	0.429	0.338	0.375	0.432	0.516	0.679	-0.215
	(19.12)	*(18.17)*	*(17.95)*	*(18.06)*	*(17.43)*	*(14.38)*	*(14.92)*	*(16.88)*	*(18.06)*	*(19.06)*	*(-4.66)*
hml	-0.349	-0.248	-0.204	-0.221	-0.127	-0.0327	-0.136	-0.199	-0.104	-0.184	0.164
	(-7.08)	(-6.51)	(-6.19)	(-7.48)	(-4.91)	(-1.32)	(-5.13)	(-7.36)	(-3.47)	(-4.91)	(3.39)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.787*	*0.813*	*0.838*	*0.843*	*0.872*	*0.864*	*0.844*	*0.859*	*0.817*	*0.791*	*0.171*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from value-weighted monthly unlevered excess portfolio returns (*vw_exuret*) in low-concentration industries. The italicized figures in parentheses are the t-statistics of the coefficient estimates. Unlevered return calculations assume no taxes and a cost of the debt of 7% across the board. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 13: Abnormal Returns on Equally-weighted Levered Excess Returns (*ew_exret*) in *High-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	8.84	1.74	-0.27	-3.59	0.73	-2.51	0.31	-1.54	-1.17	-1.00	-9.84
	(1.96)	*(0.37)*	*(-0.09)*	*(-1.35)*	*(0.28)*	*(-1.09)*	*(0.11)*	*(-0.44)*	*(-0.41)*	*(-0.30)*	*(-2.01)*
$r_{m,t} - r_{f,t}$	1.078	1.089	1.050	0.949	0.903	1.046	1.082	1.113	0.898	0.863	-0.215
	(12.83)	*(12.30)*	*(18.67)*	*(19.17)*	*(18.21)*	*(24.36)*	*(20.82)*	*(16.96)*	*(17.13)*	*(13.78)*	*(-2.36)*
smb	1.152	1.245	0.826	0.921	0.827	0.763	0.770	0.911	0.758	0.934	-0.218
	(9.61)	*(9.86)*	*(10.29)*	*(13.03)*	*(11.69)*	*(12.45)*	*(10.39)*	*(9.73)*	*(10.13)*	*(10.45)*	*(-1.68)*
hml	-0.302	0.0285	0.452	0.480	0.496	0.715	0.603	0.863	0.279	0.392	0.694
	(-2.39)	(0.21)	(5.35)	(6.45)	(6.65)	(11.07)	(7.71)	(8.75)	(3.54)	(4.16)	(5.06)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.479*	*0.442*	*0.560*	*0.602*	*0.567*	*0.671*	*0.596*	*0.512*	*0.533*	*0.461*	*0.106*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from equally-weighted monthly levered excess portfolio returns (*ew_exret*) in high-concentration industries. The italicized figures in parentheses are the *t*-statistics of the coefficient estimates. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 14: Abnormal Returns on Value-weighted Levered Excess Returns (*vw_exret*) in *High-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	3.79	-3.68	-2.06	-3.47	-1.54	-4.76	0.50	0.28	-0.56	-3.76	-7.56
	(1.07)	*(-1.15)*	*(-0.91)*	*(-1.51)*	*(-0.76)*	*(-2.44)*	*(0.25)*	*(0.12)*	*(-0.24)*	*(-1.51)*	*(-1.75)*
$r_{m,t} - r_{f,t}$	1.183	1.194	1.085	0.969	0.999	1.062	0.979	0.977	0.925	0.929	-0.254
	(17.79)	*(20.01)*	*(25.53)*	*(22.55)*	*(26.31)*	*(29.16)*	*(26.48)*	*(22.32)*	*(21.28)*	*(19.94)*	*(-3.15)*
smb	0.748	0.828	0.419	0.522	0.496	0.397	0.363	0.517	0.614	0.608	-0.140
	(7.89)	*(9.73)*	*(6.91)*	*(8.51)*	*(9.16)*	*(7.64)*	*(6.88)*	*(8.27)*	*(9.90)*	*(9.15)*	*(-1.22)*
hml	-0.305	-0.104	0.444	0.271	0.385	0.524	0.295	0.634	0.306	0.279	0.584
	(-3.05)	(-1.16)	(6.94)	(4.19)	(6.74)	(9.57)	(5.31)	(9.63)	(4.68)	(3.99)	(4.82)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.569*	*0.616*	*0.647*	*0.618*	*0.676*	*0.701*	*0.666*	*0.600*	*0.607*	*0.576*	*0.109*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from value-weighted monthly levered excess portfolio returns (*vw_exret*) in high-concentration industries. The italicized figures in parentheses are the *t*-statistics of the coefficient estimates. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 15: Abnormal Returns on Equally-weighted Unlevered Excess Returns (*ew_exuret*) in *High-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	7.28	2.50	0.32	-2.10	0.56	-1.92	-0.11	-1.96	-0.85	-1.38	-8.65
	(2.29)	*(0.76)*	*(0.15)*	*(-1.33)*	*(0.37)*	*(-1.36)*	*(-0.06)*	*(-0.85)*	*(-0.50)*	*(-0.62)*	*(-2.57)*
$r_{m,t} - r_{f,t}$	0.710	0.633	0.636	0.534	0.519	0.614	0.625	0.676	0.543	0.518	-0.191
	(11.98)	*(10.33)*	*(16.34)*	*(18.05)*	*(18.19)*	*(23.29)*	*(19.22)*	*(15.72)*	*(17.22)*	*(12.63)*	*(-3.05)*
smb	0.789	0.801	0.483	0.541	0.439	0.391	0.433	0.472	0.489	0.486	-0.303
	(9.33)	*(9.17)*	*(8.70)*	*(12.82)*	*(10.79)*	*(10.39)*	*(9.34)*	*(7.69)*	*(10.87)*	*(8.30)*	*(-3.38)*
hml	-0.199	-0.0265	0.153	0.215	0.187	0.350	0.347	0.514	0.190	0.216	0.415
	(-2.24)	(-0.29)	(2.62)	(4.82)	(4.36)	(8.82)	(7.09)	(7.95)	(4.01)	(3.50)	(4.40)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.452*	*0.383*	*0.499*	*0.585*	*0.561*	*0.637*	*0.554*	*0.453*	*0.544*	*0.393*	*0.132*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from equally-weighted monthly unlevered excess portfolio returns (*ew_exuret*) in high-concentration industries. The italicized figures in parentheses are the t-statistics of the coefficient estimates. Unlevered return calculations assume no taxes and a cost of the debt of 7% across the board. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 16: Abnormal Returns on Value-weighted Unlevered Excess Returns (*vw_exuret*) in *High-concentration Industries*

RE-sorted Portf.	*Low*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*High*	*High-Low*
alpha	2.52	-1.63	-1.08	-2.71	-0.87	-4.21	0.94	-0.17	-1.08	-2.53	-5.05
	(0.96)	*(-0.73)*	*(-0.72)*	*(-1.69)*	*(-0.61)*	*(-3.20)*	*(0.77)*	*(-0.10)*	*(-0.72)*	*(-1.39)*	*(-1.65)*
$r_{m,t} - r_{f,t}$	0.792	0.731	0.654	0.601	0.630	0.677	0.583	0.633	0.594	0.627	-0.165
	(16.13)	*(17.67)*	*(23.49)*	*(20.04)*	*(23.96)*	*(27.65)*	*(25.32)*	*(20.27)*	*(21.38)*	*(18.42)*	*(-2.87)*
smb	0.515	0.540	0.236	0.338	0.295	0.208	0.198	0.265	0.438	0.327	-0.188
	(7.35)	*(9.14)*	*(5.94)*	*(7.89)*	*(7.85)*	*(5.94)*	*(6.04)*	*(5.95)*	*(11.04)*	*(6.73)*	*(-2.29)*
hml	-0.0856	-0.0702	0.200	0.121	0.195	0.289	0.168	0.429	0.245	0.197	0.282
	(-1.16)	(-1.13)	(4.78)	(2.67)	(4.94)	(7.84)	(4.85)	(9.13)	(5.86)	(3.84)	(3.26)
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.505*	*0.564*	*0.609*	*0.570*	*0.633*	*0.672*	*0.642*	*0.537*	*0.618*	*0.513*	*0.083*

This table reports estimated abnormal returns (*alpha* in percents and annualized) and other coefficient estimates from value-weighted monthly unlevered excess portfolio returns (*vw_exuret*) in high-concentration industries. The italicized figures in parentheses are the t-statistics of the coefficient estimates. Unlevered return calculations assume no taxes and a cost of the debt of 7% across the board. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Column 2 (labeled *Low*) to column 11 (labeled *High*) are the stock portfolios sorted in increasing order of real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*). $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The column labeled *High-Low* reports returns on an investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*).

Table 17: Robustness Checks - *Unlevered Returns* on *High-Low* Strategy from July 1973 to June 2010 using Alternative Real Estate Measures

	(1) *Base Case*	*(2)* *REI2*	*(3)* *PPEI*	*(4)* *AREI*
Low-con. Industries				
ew_exuret	2.55	1.71	-1.22	3.52**
	(1.38)	*(0.79)*	*(-0.41)*	*(2.37)*
vw_exuret	4.14**	4.70**	4.33	4.01***
	(2.23)	*(2.18)*	*(1.56)*	*(2.69)*
ew_adjuret	3.01**	2.74*	2.33	3.74**
	(2.24)	*(1.88)*	*(1.58)*	*(2.53)*
vw_adjuret	3.73***	4.28***	4.86***	4.53***
	(2.85)	*(2.84)*	*(2.92)*	*(3.26)*
High-con. Industries				
ew_exuret	−8.65**	−9.14**	-3.37	−5.71*
	(-2.45)	*(-2.25)*	*(-1.12)*	*(-1.88)*
vw_exuret	−5.18*	-5.01	-3.02	-1.03
	(-1.65)	*(-1.52)*	*(-0.99)*	*(-0.41)*
ew_adjuret	−5.74**	−6.11**	-1.50	−5.42*
	(-2.11)	*(-2.08)*	*(-0.60)*	*(-1.85)*
vw_adjuret	−3.83*	-2.78	-0.36	-1.11
	(-1.88)	*(-1.33)*	*(-0.17)*	*(-0.47)*

The above figures represent annualized average monthly unlevered excess and industry-adjusted returns (in percents) generated by the *High-Low* investment strategy in the low-concentration (*Low-con.*) and high-concentration (*High-con.*) industries during the 444-month period from July 1973 to June 2010 and their t-statistics (italicized figures in parentheses). The *High-Low* investment strategy consists of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity. In column (*1*), *Base Case*, firms are sorted into decile portfolios according to *REI1*, the ratio of buildings and capitalized leases to properties, plants, and equipment (PPE). The figures in columns (*2*) to (*4*) are based on different measures of real estate intensity. *REI2* and *PPEI* are respectively the ratio of buildings, capitalized leases, construction in progress, and land to PPE, and the ratio PPE to total assets (TA). *AREI*, on the other hand, is firm *REI1* minus the average industry *REI* (i.e., firms belonging to the same 3-digit Compustat SIC). The rows labeled *ew_exuret* and *vw_exuret* stand respectively for equally-weighted and value-weighted unlevered excess returns over the risk-free rate, proxied by the 1-month Treasury bill rates from Ibbotson and Associates. Unlevered return calculations assume no taxes and a cost of debt of 7% across the board. The rows labeled *ew_adjuret* and *vw_adjuret* are respectively equally-weighted and value-weighted unlevered industry-adjusted returns. Equally-weighted and value-weighted industry-adjusted returns refer to respectively the annualized equally-weighted and value-weighted average monthly stock returns minus the equally-weighted or value-weighted average monthly returns on the industry portfolio regrouping firms sharing the same 3-digit SIC. Stock return and accounting data are from CRSP and Compustat, respectively. The superscripts *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Table 18: Robustness Checks - *Unlevered Returns* on *High-Low* Strategy from July 1973 to June 2010 on Quintile Portfolios and using Alternative Industry Concentration Measures

	(1) *Base Case*	*(2)* *Quintile Portf.*	*(3)* *2-digit SIC*	*(4)* *FF Indus.*	*(5)* *Hassets*
Low-con. Industries					
ew_exuret	2.55	1.19	1.94	0.67	3.20*
	(1.38)	*(0.79)*	*(0.99)*	*(0.39)*	*(1.83)*
vw_exuret	4.14**	2.47	3.44*	3.45**	4.17**
	(2.23)	*(1.60)*	*(1.79)*	*(2.22)*	*(2.25)*
ew_adjuret	3.01**	1.52	2.09	1.08	2.66*
	(2.24)	*(1.63)*	*(1.20)*	*(0.84)*	*(1.90)*
vw_adjuret	3.73***	2.42***	3.62**	3.02***	4.07***
	(2.85)	*(2.92)*	*(2.39)*	*(2.58)*	*(2.95)*
High-con. Industries					
ew_exuret	−8.65**	−5.79**	-0.62	−9.64*	−5.07*
	(-2.45)	*(-2.17)*	*(-0.17)*	*(-1.94)*	*(-1.65)*
vw_exuret	−5.18*	-3.21	-4.46	−12.15**	-4.06
	(-1.65)	*(-1.43)*	*(-1.46)*	*(-2.30)*	*(-1.45)*
ew_adjuret	−5.74**	−3.62**	-0.66	−7.61*	-2.77
	(-2.11)	*(-1.96)*	*(-0.22)*	*(-1.83)*	*(-1.02)*
vw_adjuret	−3.83*	-1.85	-1.67	−9.31*	-1.85
	(-1.88)	*(-1.42)*	*(-0.68)*	*(-1.91)*	*(-0.93)*

The above figures represent annualized average monthly unlevered excess and industry-adjusted returns (in percents) generated by the *High-Low* investment strategy in the low-concentration (*Low-con.*) and high-concentration (*High-con.*) industries during the 444-month period from July 1973 to June 2010 and their t-statistics (italicized figures in parentheses). The *High-Low* investment strategy consists of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC (except in columns (*3*) and (*4*)), resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales (except in column (*5*)). Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios (except in column (*2*)) according to real estate intensity, proxied by *REI1*, the ratio of buildings and capitalized leases to properties, plants, and equipment (PPE). Column (*1*) represents the *Base Case*. Column (*2*) lists returns on quintile, rather than decile, portfolios based on *REI1*. In columns (*3*), firms are assigned to industries according to their 2-digit Compustat SICs, whereas column (*4*) uses the 48 Fama and industry groups. In column (*5*), industry concentrations are based on total assets, rather than net sales. The rows labeled *ew_exuret* and *vw_exuret* stand respectively for equally-weighted and value-weighted unlevered excess returns over the risk-free rate, proxied by the 1-month Treasury bill rates from Ibbotson and Associates. Unlevered return calculations assume no taxes and a cost of debt of 7% across the board. The rows labeled *ew_adjuret* and *vw_adjuret* are respectively equally-weighted and value-weighted unlevered industry-adjusted returns. Equally-weighted and value-weighted industry-adjusted returns refer to respectively the annualized equally-weighted and value-weighted average monthly stock returns minus the equally-weighted or value-weighted average monthly returns on the industry portfolio regrouping firms sharing the same 3-digit SIC. Stock return and accounting data are from CRSP and Compustat, respectively. The superscripts *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Table 19: Risk Exposure on *High-Low* Strategy in Low-concentration and High-concentration Industries

	Low-concentration Industries				Low-concentration Industries			
	(1)	*(2)*	*(3)*	*(4)*	*(1')*	*(2')*	*(3')*	*(4')*
Dependent variable	*ew_exret*	*vw_exret*	*ew_exuret*	*vw_exuret*	*ew_exret*	*vw_exret*	*ew_exuret*	*vw_exuret*
alpha	4.90**	6.56***	3.12*	4.85***	−9.84**	−7.56*	−8.65**	−5.05*
	(2.21)	*(3.20)*	*(1.82)*	*(2.80)*	*(-2.01)*	*(-1.75)*	*(-2.57)*	*(-1.65)*
$r_{m,t} - r_{f,t}$	−0.074*	−0.132***	−0.147***	−0.147***	−0.215**	−0.254***	−0.191***	−0.165***
	(-1.79)	*(-3.45)*	*(-4.61)*	*(-4.56)*	*(-2.36)*	*(-3.15)*	*(-3.05)*	*(-2.87)*
smb	−0.214***	−0.258***	−0.207***	−0.215***	−0.218*	−0.140	−0.303***	−0.188**
	(-3.64)	*(-4.72)*	*(-4.53)*	*(-4.66)*	*(-1.68)*	*(-1.22)*	*(-3.38)*	*(-2.29)*
hml	0.279***	0.185***	0.187***	0.164***	0.694***	0.584***	0.415***	0.282***
	(4.49)	*(3.22)*	*(3.90)*	*(3.39)*	*(5.06)*	*(4.82)*	*(4.40)*	*(3.26)*
N	*444*	*444*	*444*	*444*	*444*	*444*	*444*	*444*
Adj. R-squared	*0.115*	*0.143*	*0.181*	*0.171*	*0.106*	*0.109*	*0.132*	*0.083*

This table reports coefficient estimates from regression of levered and unlevered excess returns on the *High-Low* investment strategy consisting of holding the high-real estate stocks and simultaneously shorting the low-real estate stocks within the same industry concentration group. Columns (*1*) to (*4*) apply to competitive industries, whereas columns (*1'*) to (*4'*) are for concentrated industries. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity, proxied by the ratio of buildings and capitalized leases to properties, plants, and equipment (*REI1*), with the bottom-decile and top-decile portfolios in each group take as its low-real estate and high-real estate portfolios. *ew_exret* and *vw_exret* are respectively the levered equally-weighted and value-weighted levered monthly excess returns, with*ew_exuret* and *vw_exuret* coming the unlevered returns. Unlevered return calculations assume no taxes and a cost of the debt of 7% across the board. These estimates are based on the 3-factor model 1 consisting of the excess market return ($r_{m,t} - r_{f,t}$) and the two Fama and French stock risk factors, *smb* and *hml*. Abnormal returns (alphas) are annualized values. $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* being from Kenneth French's website. The italicized figures in parentheses are the t-statistics of the coefficient estimates. The superscripts *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Table 20: Impact of REITs on Abnormal Returns from the *High-Low* Investment Strategy

	Low-concentration Industries		High-concentration Industries	
	(1)	*(2)*	*(1')*	*(2')*
	vw_exret	*vw_exuret*	*vw_exret*	*vw_exuret*
alpha	6.48**	6.26***	−10.15*	−6.77*
	(2.39)	*(2.74)*	*(-1.78)*	*(-1.66)*
reit_dummy	0.19	-3.22	5.9	3.89
	(0.05)	*(-0.95)*	*(0.69)*	*(0.64)*
$r_{m,t} - r_{f,t}$	−0.132***	−0.147***	−0.255***	−0.166***
	(-3.45)	*(-4.55)*	*(-3.15)*	*(-2.88)*
smb	−0.258***	−0.213***	-0.143	−0.190**
	(-4.71)	*(-4.63)*	*(-1.24)*	*(-2.31)*
hml	0.185***	0.167***	0.580***	0.279***
	(3.21)	*(3.43)*	*(4.78)*	*(3.22)*
N	*444*	*444*	*444*	*444*
Adj. R-squared	*0.141*	*0.171*	*0.108*	*0.081*

This table presents the results of the estimation of model 2 using as dependent variables monthly excess returns generated by the *High-Low* investment strategy in the low-concentration and high-concentration. The *High-Low* strategy consists of holding high-real stocks and simultaneously shorting low-real estate stocks. *vw_exret* and *vw_exuret* are respectively the strategy's value-weighted levered and unlevered monthly excess returns. Unlevered return calculations assume no taxes and a cost of the debt of 7% across the board. Columns (*1*) and (*2*) apply to competitive industries, whereas columns (*1'*) and (*2'*) are for concentrated industries. The explanatory variables in model 2 consist of the excess market return ($r_{m,t} - r_{f,t}$), the two Fama and French stock risk factors (*smb* and *hml*), and a REIT dummy variable (*reit_dummy*), whose value is set to 1 during the period pre-1990 and 0 otherwise. $r_{m,t} - r_{f,t}$ represents the value-weighted monthly returns on CRSP-listed stocks minus the 1-month Treasury bill rates from Ibbotson and Associates. *smb* and *hml* are the average returns on small-stock portfolios minus the average return on big-stock portfolios and the average return on value-stock portfolios minus the average return on growth-stock portfolios, respectively. Monthly stock return data are from CRSP, with $r_{m,t}$, $r_{f,t}$, *smb* and *hml* coming from Kenneth French's website. The sample consists of 7,736 industrial firms spanning the 37-year period. Each firm is assigned to an industry according to its 3-digit Compustat SIC, resulting in 171 industries in total. At the end of June each year, the industries are then grouped into quintiles according to their 3-year average concentration Herfindahl values based on net sales. Firms in the high-concentration and low-concentration industry groups are then sorted into decile portfolios according to their real estate intensity (*REI1*). The italicized figures in parentheses are the *t*-statistics of the coefficient estimates. The superscripts *, **, and *** indicate statistical significance at 10%, 5%, and 1%.