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CLAREMONT McKENNA COLLEGE

DOES THE REIT TALE WAG THE DOG?
THE RELATIONSHIP BETWEEN TENANT OWNERSHIP AND THE VOLATILITY OF RETAIL REIT STOCK RETURNS

SUBMITTED TO

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AND

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BY

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FOR

SENIOR THESIS

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Abstract

This paper will assess the relationship between tenant characteristics and public REIT volatility. Specifically, we focus on the retail REIT subset of the industry. Given that retail REITs are one the most transparent asset classes, they provide an interesting landscape for evaluating the relationship between the firm and the customers, or in this case, the tenants. Specifically, we assess how major tenant ownership, public or private equity owned, impacts the volatility of the REIT's stock price using 2010 data on 30 retail REITs. Controlling for tenant credit quality, leverage, ROE, book-to-market, size, age, region and property focus, we find that a higher percentage of rental revenue from private equity owned tenants is associated with lower REIT stock volatility, and a higher percentage of rental revenue from publicly owned tenants is associated with higher REIT stock volatility.

I. Introduction

We analyze the relationship between tenant ownership and the volatility of the landlord REIT stock returns. Specifically, we focus on the retail REIT subset of the industry. Given the relative transparency of retail REITs and the increased risk-sharing relationship between the tenant and the landlord attributable to overage rent, they are an ideal sample for examining how tenant ownership impacts the volatility of the landlord REIT.

For REITs, rent paying tenants are what drive cash flows. For most real estate, the lease establishes a fixed rental payment between the tenant and the landlord. Thus, the property owner holds some of the risk inherent in the tenant's business. While the same can be said for the retail tenant and landlord relationship, retail leases are unique. Most retail leases establish both a fixed base rent and overage rent, or a percentage of sales as part of the rent. Brueckner (1993), Lee (1995), Miceli and Sirmans (1995) and Colwell and Munneke (1998)[1] consider overage rent a form of risk-sharing between the tenant and the landlord. In light of this lease structure, intuitively it would seem that retail REITs bear an even greater burden of risk. While tenant characteristics likely impact the performance of any REIT, we would expect tenant characteristics to have an even greater impact on retail REIT performance. This close relationship between performance of retail firms and retail REITs was confirmed by Myer and Webb (1994) who found a positive contemporaneous relationship between retail stocks and retail REITs, suggesting that retail stocks and retail REITs are subject to the same fundamentals.

This raises the question: how do tenant characteristics impact retail REITs? In the fiscal year 2010 rankings of top 100 retailers ranked by total U.S. sales, 67 of the 100 companies are

[1] Mejia, Luis C. Mejia and John D. Benjamin, *What Do We Know About the Determinants of Shopping Centers Sales? Spatial vs. Non-Spatial Factors*

publicly traded. Of the top 20 companies, 19 are publicly traded.[2] As these rankings demonstrate, the majority of the largest retail companies are publicly traded, while only 11 of the top 100 companies are owned by private equity firms. These firms include Leonard Green & Partners, CVC Capital Partners, Kohlberg Kravis Roberts, Bain Capital, 3G Capital, TPG Capital, Warburg Pincus, Blackstone Group, and Sun Capital Partners.[3] As the majority of the top 100 retail firms are public, there must be something distinguishing the private equity owned firms from the remaining companies.

This paper will primarily attempt to understand two key factors and their relationship to retail REIT stock price volatility: percentage of rental revenue derived from publicly traded tenants and percentage of rental revenue derived from private equity owned tenants. Controlling for retail REIT specific characteristics, we hope to understand if a relationship exists, and if so, try to understand why this relationship might exist.

I. Historical Background of REITs

Real Estate Investment Trusts, or more commonly known as REITs, were introduced in the United States under the Real Estate Investment Trust Act of 1960. The goal of this investment vehicle was to allow smaller investors the ability to incorporate the income yielding asset class into their portfolios.[4] Since the introduction of REITs into the U.S. market, multiple legislation shifts have led to an evolving industry.[5]

There are three categories of REITs: mortgage REITs, equity REITs, and hybrid REITs. Mortgage REITs lend money to developers and real estate owners which then invest directly in

[2] "2011 Top 100 Retailers," http://www.stores.org/2011/Top-100-Retailers
[3] 20 of the companies are completely privately owned. Two of the firms are government owned. Non-private equity firms with ownership stakes in these companies included Vornado Realty Trust (Toys R Us), Highfields Capital Management (Michaels Stores), and Kangaroo Holdings (OSI Restaurant Partners).
[4] Lee, Stephen L., *The Changing Benefits of REITs to the Mixed Asset Portfolio*, 204.
[5] Ibid.

the real estate assets. Equity REITs buy properties directly in the expectation of realizing capital appreciation. Hybrid REITs do a combination of both lending and purchasing the assets directly. During the 1960s, only ten REITs existed. By the mid-1970s, the REIT market expanded to approximately 50. At this time, most REITs were mortgage REITs involved in the funding of construction. In 1972, over 50% of all REITs were involved in the short-term construction and development loans. Thus, the earliest REITs were highly sensitive to changes in interest rates.[6]

The oil price shock of 1973 resulted in high interest rates and an inverted yield curve. Consequently, REITs took a major hit and between 1974 and 1976—REIT assets fell from $20 billion to $9.7 billion. Many REITs could not withstand the severe market conditions and consequently went bankrupt.[7] The year 1986 marked an important shift for the REIT sector—prior to the 1986 Tax Reform Act, REITs could not operate and manage their own real estate.[8] This change in tax code allowed REITs access to most types of income-producing real estate assets, and thus allowed REITs to increase their revenue generating capabilities and reduce their risk. This continued to attract institutional, corporate, and individual investors through the 1980s.[9]

Two key developments in the early 1990s marked a turning point in the growth of REITs: the 5/50 rule was relaxed and the Umbrella Partnership REIT (UPREIT) structure was introduced. Prior to the Revenue Reconciliation Act of 1993, the 5/50 rule prevented five or fewer individuals from holding more than 50% of a REIT's shares.[10] This policy prevented institutional investors from owning any significant holding in REITs as the institution was

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[6] Ibid.
[7] Ibid.
[8] Ibid., 205.
[9] Ibid.
[10] Luo, Trianjin. *Is China Ready for REITs? An examination of challenges and opportunities*.

considered one investor. The Revenue Reconciliation Act of 1993 allowed pension funds and mutual funds to count as the number of investors in the fund.[11]

The introduction of the UPREIT structure allowed properties to be owned through a partnership or a series of partnerships. These partnership units could be acquired and exchanged with no taxes on the transactions themselves. As it stands today, partners are only taxed on realized capital gains from REIT share transactions, and they can defer capital gain taxes until it is most tax-efficient to do so.[12]

These two legislative developments in the early 1990s made REIT investing much more attractive to institutional investors. According to one study done by Chan, Leung, and Wang (1998), prior to the Revenue Reconciliation Reform of 1993, institutional ownership in REITs ranged from 12 to 14%. By 1995, institutional ownership increased substantially to 30%.[13] Today, REITs must distribute 90% of their income to shareholders to uphold their tax-exempt status, have a minimum of 100 direct shareholders, earn at least 75% of gross income as rent from real property or interest from mortgages on real property, and invest at least 75% of total assets in real estate.[14]

Within the REIT space today, there are diversified REITs and specialized REITs. According to the National Association of Real Estate Investment Trusts Handbook (1997-2006), 10% of the REITs in the U.S. equity REIT sector are diversified by property type, while the remaining 90% specialize on one or two closely related property types.[15] REITs specialize by

[11] The Changing Benefits of REITs to the Mixed Asset Portfolio, Stephen L. Lee, p 205.
[12] Luo, Trianjin. *Is China Ready for REITs? An examination of challenges and opportunities*.
[13] Ibid.
[14] *National Association of Real Estate Investment Trusts* (NAREIT). NAREIT Timeline.
[15] National Association of Real Estate Investment Trusts (NAREIT). (1997-2006). *NAREIT Handbook.*

five broad categories: health care, industrial and office, lodging and resorts, residential, and retail.[16] This paper will focus on retail REITs, REITs that own or operate retail property.

II. Review of Related Literature

There is a substantial amount of literature devoted to examining various characteristics of REITs. A recent study examined the return and risk characteristics of specialized versus diversified REITs (Ro, Ziobrowski 2009). Examining abnormal returns using CAPM and Carhart's four-factor models with data from 1997 to 2006, the study found no evidence to suggest superior performance of REITs specializing in a specific property type suggesting no managerial advantage from gaining expertise in a specific property type. Additionally, consistent with market theory, the study found that specialized REITs exhibit higher market risk than do diversified REITs.[17]

Another recent study examined the stock price synchronicity of REITs between 1997 and 2006 (Chung, Fung, Shilling, Simmons-Mosley, 2010). In theory, as real estate assets can be insulated from market fluctuations, one might expect REIT returns to have low covariance with other assets, as well as other REITs. Contrary to market theory, the study found that REITs have high synchronicity. Larger, more liquid REITs, as measured by trading volume, exhibited higher synchronicity, as did industrial and retail REITs relative to apartment, health care, and mixed property REITs. This conclusion of relative synchronicity within property focus was expected given the greater exposure industrial and retail REITs have to economic fluctuations.[18]

Furthermore, the study examined REIT synchronicity relative to hedge fund, pension fund, and insurance company ownership. The study found that REIT stock price synchronicity

[16] Ro, SeungHan, and Alan J. Ziobrowski, "*Does Focus Really Matter? Specialized vs. Diversified REITs,"* p. 74.
[17] Ro, SeungHan, and Alan J. Ziobrowski, *Does Focus Really Matter? Specialized vs. Diversified REITs*
[18] Chung, Richard, Fund, Scott, Schilling, James D., and Tammie X. Simmons-Mosley, *What Determines Stock Price Synchronicity in REITs?*

was negatively related to hedge fund ownership, and conversely, synchronicity was positively related to pension fund and insurance company ownership. This conclusion may be a result of the high costs to shorting REITs, and thus hedge funds need to do more due diligence to find REITs with lower stock price synchronicity.[19]

Virtually no research has been done analyzing how tenant characteristics impact landlord performance with the exception of a recent study, *Is What's Bad for the Goose (Tenant), Bad for the Gander (Landlord): A Retail Real Estate Perspective* (C. Liu, P. Liu, 2011). The study utilized an event study approach to examine the impact tenant bankruptcies have on the risk and returns of their publicly traded landlord using a sample of retail REITs. The paper examined the abnormal returns of the landlord REIT for both the prior and post-bankruptcy announcement periods. The authors hypothesized that the market would react negatively or positively depending on whether the co-tenancy effect or the growth option effect dominated, respectively.[20]

As retail leases often have co-tenancy provisions that allow tenants to negotiate lower base rents or penalty-free pullout if core tenants leave the center or if the occupancy threshold is reached, one would expect a bankruptcy filing of an anchor or core tenant to negatively impact the abnormal returns of the landlord company. That being said, the bankruptcy may also allow the company to find a better tenant and negotiate a new lease at the higher market rate. Thus, depending on which effect dominates, the authors hypothesized that the REIT stock would react accordingly.[21]

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[19] Ibid.
[20] Liu, Crocker H., and Peng Liu, *Is What's Bad for the Goose (Tenant), Bad for the Gander (Landlord): A Retail Real Estate Perspective*
[21] Ibid.

Liu and Liu controlled for the quality location of the center, whether or not the bankrupted tenant was an anchor, market return on the REIT/Ziman index, firm size, and leverage. The study measured the location quality using the average industry diversification ratio of the REIT's top markets. Using the United States Office of Management and Budget's (OMB) data on Metropolitan Statistical Areas (MSA), the study estimated the REIT's level of exposure to other industries. Liu and Liu hypothesized that REITs with more access to local economies and diverse industries would respond more strongly to a tenant bankruptcy. Liu and Liu measured firm size using the logarithm of book asset value and measured leverage using the REIT's total debt over total capitalization.[22]

The study found significant negative abnormal returns following the bankruptcy of a tenant, suggesting that the market expects existing tenants to take advantage of the co-tenancy provisions. However, the study also found that there are some situations in which the growth option dominated. The location quality of the landlord—whether the malls or shopping centers are located in diverse economic markets—played a big role in determining the significance of the growth option.[23]

The Liu and Liu (2011) study suggests that under the extreme circumstances of a tenant bankruptcy, public REITs experience negative abnormal returns.[24] This study does not address how tenant characteristics impact REIT performance under normal circumstances. This paper will attempt to address this subject.

[22] Ibid.
[23] Ibid.
[24] Ibid.

III. Theory & Hypothesis

Past literature has addressed key differences between public companies and private equity owned companies. The theory that much of this debate focuses on is what is known as *agency theory*. Agency theory is directed at the agency relationship in which one party (the principal) delegates work to another (the agent), who performs the work. Agency theory uses the metaphor of a contract to describe this relationship (Jensen and Meckling, 1976).[25]

Agency theory focuses on the two problems that can occur in agency relationships. The first problem arises when (a) the desires or goals of the principal and agent conflict and (b) when it is difficult or expensive for the principal to verify what the agent is actually doing. The second problem arises when the principal and agent have different tolerances for risk, and therefore prefer different actions based on their differing attitudes toward risk.[26] Using the metaphor of a contract, the theory focuses on determining the most efficient contract to govern the principal-agent relationship given assumptions about people (self-interested, rationale, risk aversion), organizations (conflicting goals among members), and information (a commodity which can be purchased).[27]

Agency theory provides a theoretical framework in which we can understand differences between public companies and private equity owned firms. In a public corporation, it is the stockholder (principal) who bears the risk, while it is the manager (agent) who is contracted to make the decisions on behalf of the principal.[28] For private equity owned companies, agency theory contends that performance improvements observed following a buyout are the result of

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[25] Eisenhardt, Kathleen M., *Agency Theory: An Assessment and Review*, 58.
[26] Ibid.
[27] Ibid.
[28] Bruton, Garry D., J. Kay Keels, Elton L. Scifres, *Corporate restructuring and performance: An agency perspective on the complete buyout cycle*

management's increased ownership stake in the firm, and thus the principal-agent incentives become aligned (Jensen, 1989).[29]

Although the performance associated with reverse buyouts (the second half of the buyout cycle) is not as well understood, the research on the firm's performance during the private phase of the buyout cycle supports the improved performance.[30] Opler (1992) finds that operating profits divided by sales rise by an average of 16.5% from one year before until two years after the LBO.[31] After adjusting for industry trends, operating profits divided by sales rise by an average 11.6%. Opler's study shows that LBOs have little impact on R&D, but result in sharp declines in capital expenditures and income taxes paid.[32] Opler's results are largely consistent with the results of Kaplan (1989) and Smith (1990).[33]

These studies' results are in line with what agency theory would predict, and thus, we want to apply this theory to the context of retail REITs. A retail REIT derives rental revenue from four categories of tenants: publicly owned, private equity owned, privately owned, and government owned. Focusing on tenants who fall into the former two categories, agency theory would seem to suggest that buyout tenants suffer less from the principal-agent problem, and thus, REITs with more revenue derived from buyout tenants perform better, or are less volatile, than REITs with more publicly owned tenants.

In concurrence with agency theory, Opler and Titman (1988) propose in a later study that a firm's decision of whether or not to undertake a leveraged buyout can be understood as a trade-off between the incentive alignment and tax benefits and the financial costs of distress. Firms that choose to undertake an LBO will have many common characteristics including high, stable

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[29] Ibid.
[30] Ibid.
[31] The study examined a sample of 44 going-private transactions completed between 1985 and 1989.
[32] Opler, Tim C., *Operating Performance in Leveraged Buyouts: Evidence From 1985-1989*, 28.
[33] Ibid.

cash flows, collateralizability of assets, durability of the firm's products and high growth prospects. Given REITs' reliance on lease payments, stable cash flows is pertinent to their business model. Therefore, agency theory suggests that leveraged buyouts will improve operational performance by reducing principal-agent problems, and Opler and Titman's analysis of the trade-off of undertaking an LBO suggests that firms that LBO firms will have high cash flow characteristics. Both theories suggest the hypothesis that retail REITs with more rental revenue from private equity owned tenants (as a proxy for firms that have undergone buyouts) will exhibit lower volatility of stock returns.

Perhaps conflicting with agency theory and Opler and Titman's trade-off framework, the asymmetric information and volatility relationship may actually support a different hypothesis. As LeRoy and Porter (1981) and Shiller (1981) present evidence that the variability of stock prices cannot be accounted for by information about future dividends, their study suggests that asymmetric information increases stock price volatility. When an informed investor acts on private information, the uninformed investor does not know how to price in that trading into their model as the information motivating the trade is unknown. Thus, the private information acts like noise and increases stock price volatility. In the context of public and private equity owned tenants, a REIT's increased revenue from private equity ownership could increase the asymmetry of information amongst investors. Under this theory, we would expect private equity ownership to be associated with higher REIT stock price volatility.

Thus, we propose 2 hypotheses:

A) Retail REIT stock volatility is negatively related to percentage of rental revenue derived from private equity owned tenants. Retail REIT stock volatility is positively related to percentage of rental revenue derived from publicly owned tenants.

a. Reason: Agency theory implies that buyouts reduce principal-agent problem and improve operational performance. Conversely, agency theory implies that public firms suffer more from the principal-agent problem.

b. Reason: Trade-off between incentive alignment and tax benefits and financial distress costs results in firms with higher, more stable cash flows undertaking buyouts. Conversely, firms, such as public companies, whose financial distress costs exceed potential benefits from an LBO lack some key characteristics such as stable cash flows, durability of firm's products, and high growth prospects that make for an ideal tenant for a retail REIT.

B) Retail REIT stock volatility is positively related to percentage of rental revenue derived from private equity owned tenants. Retail REIT stock volatility is negatively related to percentage of rental revenue derived from publicly owned tenants.

a. Reason: Asymmetric information and opacity, arising from private equity owned tenants, results in increased volatility, in part attributable to noise trading.

IV. Data

Table 1 shows the list of 30 publicly traded retail REITs that were included in this study, along with relevant characteristics. This list reflects almost all of the companies used in the Liu and Liu bankruptcy event study with the exception of Feldman Mall Properties, Inc. (FMLP), which filed for bankruptcy in 2008, and Getty Realty Corp. (GTY), which strictly owns and operates gas stations and convenience stores.

Rubin and Smith (2010) compile past literature that has been done on firm-specific variables and volatility to devise a model. Adjusting their approach for our analysis, we use control variables including tenant credit quality, leverage, ROE, book-to-market, size, age,

region and property focus. Our variables of interests are percentage of rental revenue from publicly owned tenants and percentage of rental revenue from private equity owned tenants. The primary dependent variable tested was stock price volatility (VOLATILITY), calculated using annualized standard deviation of monthly returns obtained from CRSP from January 1, 2010 to March 31, 2011. Consistent with the notion that stock prices could take time to price in data released in the 10-K, this additional three-month window allows for the 2010 annual report data to be fully priced in to the REIT's stock price.

Additionally, we run regressions using return on equity (ROE), return on assets (ROA) and occupancy (OCCUPANCY) as dependent variables. ROE measures a corporation's profitability by demonstrating how much profit a firm generates with the money shareholders have invested. ROE was calculated as the trailing 12-month net income available for common shareholders divided by the average total common equity. ROE was obtained from Bloomberg as of fiscal year end 2010. ROA indicates the profitability of a firm relative to its assets. ROA reflects the trailing 12-month net income divided by the average total assets. ROA was obtained from Bloomberg as of fiscal year end 2010.

Occupancy represents the percentage of the REIT's square footage that is leased. OCCUPANCY was calculated using average property occupancy, weighted according to the gross leasable assets (GLA) of the property and adjusted for ownership interest. OCCUPANCY was calculated using information in the 2010 10-K filing, as well as the Q4 2010 Financial Supplemental, available on most company websites. Ideally, we would have access to every tenant of each REIT. However, in light of reporting differences across companies, tenant characteristics were based on the top ten tenants. In most cases, companies reported the top ten tenants as a percentage of annualized base rent (ABR) or of rental revenue. A select group of

companies reported major tenants as a percentage of GLA, in which case estimations were needed based on average per square foot (PSF) annualized base rent for the year. Tenant credit quality (INVESTMENT_GRADE) was measured looking at the top ten major tenants of each REIT. This variable reflects the percentage of ABR attributable to investment grade quality tenants, BBB-/Baa2[34] and above.

Leverage (LEVERAGE was measured using the total short and long-term debt to market capitalization ratio obtained from Bloomberg as of fiscal year end 2010. Book-to-market (BOOKTOMKT) was calculated as the book value of equity divided by the market value of equity, obtained from Bloomberg as of fiscal year end 2010. Cao et al. (2008) believe that growth options explain the increasing trend in firm-specific risk. Therefore, growth options have a positive relationship with idiosyncratic risk. BOOKTOMKT is capturing the growth options of the firm. SIZE was the natural log of the market value of equity. Although Liu and Liu (2011) control for size as the logarithm of book value of assets, given the hire variability in total assets in my sample, we believed Rubin and Smith's (2010) method of controlling for size using equity would be a better alternative.

AGE was estimated using the date of IPO as a proxy. We calculated months since IPO and then divided by 12 for estimation in years. AGE is the natural log of estimation of years of age.[35] Region was categorized as NORTHEAST, MIDWEST, SOUTH, or WEST. When possible, this represented where the majority of rental revenue came from. When this was not available, we used where the majority of square footage was located. When this was not available, we used the number of properties as an estimate. In the regressions, these variables

[34] S&P/Moody's rating obtained from Bloomberg.
[35] Rubin and Smith (2010) estimated age using the date that the company first appeared on CRSP. This is likely a more accurate method although this information as unavailable for our use.

were used as dummy variables taking on the value of 1 if the REIT is concentrated in that region. WEST was omitted from the regression to avoid the problem of multicollinearity.

The last control, property focus, was categorized as SHOPPING_CENTER, SINGLE_TENANT, REGIONAL_MALL, or OUTLET_CENTER. These four categorizations are consistent with those of Liu and Liu (2011). A shopping center is a group of retail and commercial establishments that is developed and managed as a single property. On-site parking is provided and the common anchors include supermarkets, drugstores, and discount department stores (e.g. Safeway, CVS, and TJMaxx). Retail REITs with a single tenant focus own stand-alone space or own space within a larger retail center. Regional malls are typically enclosed and climate-controlled. Stores are connected through common walkways and parking surrounds the perimeter of the mall. Regional mall stores include fashion apparel (e.g. The Gap, Abercrombie & Fitch, and Express) and large department stores (e.g. Sears, Macy's, and Kohl's). Outlet centers are the manufacturers' outlet stores and can vary from high-end designer to discount apparel. Stores typically carry discounted merchandise and use their outlets as a means to create room for new inventory. The International Council of Shopping Centers (ICSC) publishes definitions of each type of retail centers. Table 7 summarizes this data.

Finally, the variables of interest are public ownership tenants (TOP10_PUBLIC) and private equity ownership tenants (TOP10_PE). TOP10_PUBLIC was accounted for by calculating the percentage of ABR attributable to publicly traded companies, and likewise, TOP10_PE was accounted for by calculating the percentage of ABR attributable to tenants owned by private equity firms. This data was obtained through the companies' 2010 10-K filing and the Q4 2010 Financial Supplemental. See table 2 for summary statistics, table 3 for the correlation matrix, and table 4 for REIT specific data.

V. Results & Analysis

Investigating the impact of major tenant ownership on REIT volatility, we run twelve regressions of the following forms:

(i) $VOLATILITY_i=\alpha_i+\beta_1 TOP10_PUBLIC_i+ \beta_2\ TOP10_PE_i + \beta_3 INVESTMENT_GRADE_i + \beta_4 LEVERAGE_i+ \beta_5 ROE_i+\beta_6 BOOKTOMKT_i+ \beta_7 SIZE_i + \beta_8 AGE_i+ \beta_9 NORTHEAST_i+ \beta_{10} MIDWEST_i+ \beta_{11} SOUTH_i+ \beta_{12} SHOPPING_CENTER_i+ B_{13} SINGLE_TENANT_i+ \beta_{14} REGIONAL_MALL_i+\varepsilon_i$

(ii) $ROE_i= \alpha_i+\beta_1 TOP10_PUBLIC_i+ \beta_2\ TOP10_PE_i + \beta_3 INVESTMENT_GRADE_i + \beta_4 LEVERAGE_i+ \beta_5 ROE_i+\beta_6 BOOKTOMKT_i+ \beta_7 SIZE_i + \beta_8 AGE_i+ \beta_9 NORTHEAST_i+ \beta_{10} MIDWEST_i+ \beta_{11} SOUTH_i+\varepsilon_i$

(iii) $ROA_i= \alpha_i+\beta_1 TOP10_PUBLIC_i+ \beta_2\ TOP10_PE_i + \beta_3 INVESTMENT_GRADE_i + \beta_4 LEVERAGE_i+ \beta_5 ROE_i+\beta_6 BOOKTOMKT_i+ \beta_7 SIZE_i + \beta_8 AGE_i+ \beta_9 NORTHEAST_i+ \beta_{10} MIDWEST_i+ \beta_{11} SOUTH_i+\varepsilon_i$

(iv) $OCCUPANCY_i= \alpha_i+\beta_1 TOP10_PUBLIC_i+ \beta_2\ TOP10_PE_i + \beta_3 INVESTMENT_GRADE_i + \beta_4 LEVERAGE_i+ \beta_5 ROE_i+\beta_6 BOOKTOMKT_i+ \beta_7 SIZE_i + \beta_8 AGE_i+ \beta_9 NORTHEAST_i+ \beta_{10} MIDWEST_i+ \beta_{11} SOUTH_i+\varepsilon_i$

These regressions are run using robust standard errors to control for heteroskedasticity—when the data lacks constant variance. One of the assumptions of OLS is that the error term has constant variance. When this is not the case, heteroskedasticty will increase the probability of Type I error. Using robust standard errors controls for this potential skew in the data.

Table 5 reports the results of model (i). (1) We first regress REIT VOLATILITY on TOP10_PUBLIC and TOP10_PE. TOP10_PUBLIC is not significant suggesting that it does not explain any of the variance in VOLATILITY, while TOP10_PE is negative and statistically significant at the 1% level implying that firms with a higher percentage of private equity owned tenants exhibit lower stock price volatility. According to the adjusted-R^2 of (1), TOP10_PUBLIC and TOP10_PE explain only 3% of the variation in volatility across our sample of retail REITs.

Adding INVESTMENT_GRADE to control for tenant credit risk characteristics (2), we find that TOP10_PE remains statistically significant at the 1% level and

INVESTMENT_GRADE is also negative and statistically significant at the 1% level. The magnitude of the coefficient on INVESTMENT_GRADE is -0.63. As we add more control variables, this coefficient falls, in magnitude, to as low as -0.34. Adding INVESTMENT_GRADE makes the coefficient on TOP10_PUBLIC positive and statistically significant suggesting that a higher percentage of annualized base rent derived from public companies may actually increase volatility of retail REIT returns. Controlling for tenant credit characteristics increases the explanatory power of the model—the adjusted R^2 suggests that (2) explains 24% of the variation in VOLATILITY.

In line with our expectations, LEVERAGE has a positive, statistically significant relationship with volatility (3). Holding all else equal, firms with higher leverage will exhibit higher volatility. After adding LEVERAGE, the model explains 45% of the variation in VOLATILITY. Adding ROE to the model further increases our explanatory power. ROE has a negative and statistically significant coefficient suggesting that higher ROE is associated with slightly lower volatility. This result is slightly counterintuitive given that leverage generally increases ROE. We would therefore expect ROE to have a positive coefficient when regressed against VOLATILITY. However, this coefficient is only statistically significant at the 10% level.

BOOKTOMKT does not explain any of the variation in VOLATILITY. Given that the variable is supposed to control for the growth options of the firm that contribute to idiosyncratic risk, we would expect this to have a positive, statistically significant effect on volatility. Similarly, SIZE does not explain any of the variation in volatility, contrary to the results of Sias (1996) who finds a negative relationship between firm size and stock volatility. We attribute these results to a small sample size, a limitation in our analysis. AGE has a positive, statistically significant coefficient in regressions (7) to (8). This is counter to the research of Pastor and

Veronesi (2003), which shows that younger firms are associated with greater uncertainty and thus exhibit higher stock volatility. As we use IPO date as a proxy for age, this may have significantly inaccurately estimated the firm's age. Past studies have used the date the firm starts appearing on the CRSP database to estimate age, although this data was unfortunately unavailable for our research.

Property focus does not explain any of the variance in VOLATILITY. This may be due to the narrow focus of our sample set, as past findings show key differences attributable to property focus across the broader REIT industry.[36] NORTHEAST has a negative statistically significant coefficient in (7). While we cannot interpret direct causality, this suggests that the retail REITs with more properties in the NORTHEAST are less volatile. REITs with a regional focus in the Northeast include Acadia Realty Trust, Alexander's, Inc., Cedar Realty Trust, Pennsylvania REIT, and Urstadt Biddle Properties, Inc. One explanation for this result is that the Northeast region has significant barriers to entry and limited sites. With strong demographics in the Northeast region, there has been significant competition amongst buyers to gain access to this market, indicative of how attractive the Northeast region is to investors. In the case of these REITs with focus in the Northeast, they are less exposed to the economic climate given the demographics and location in a densely populated region. This could explain why the NORTHEAST dummy variable has a negative, statistically significant coefficient.

In regressions (2) though (8), TOP10_PUBLIC, TOP10_PE, INVESTMENT_GRADE, and LEVERAGE had statistically significant coefficients. Holding all else constant, our data implies the following conclusions: a higher percentage of ABR from public tenants is associated with higher volatility, a higher percentage of ABR from private equity owned tenants is

[36] Chung, Richard, Fund, Scott, Schilling, James D., and Tammie X. Simmons-Mosley, *What Determines Stock Price Synchronicity in REITs?*

associated with lower volatility, a higher percentage of revenue from investment grade quality tenants is associated with lower volatility, and higher leverage is associated with higher volatility.

While the focus of this paper is to understand the relationship between volatility and tenant ownership, to test the strength of our dependent variable we regress ROE, ROA, and OCCUPANCY on our control variables and variables of interest. While ROE and ROA are both commonly used performance metrics, they are really quite different.[37] If a company had no debt, its ROE and ROA would be the same, as shareholders' equity would equal total assets. As a company takes on debt, shareholders' equity gets smaller and thus increases ROE. In other words, ROE is highly sensitive to leverage. While ROE reveals how effectively a company uses its shareholders' invested capital, it does not indicate how efficiently a firm utilizes borrowed funds. ROA is arguably a more critical metric then ROE. That being said, as past literature uses both ROE and ROA as dependent variables, we decided it would be appropriate to display the results of both regressions.[38] Table 6 shows the results of model regressions (ii), (iii), and (iv). Again, the LEVERAGE relation to ROE yields surprising results (10).

LEVERAGE exhibits a negative, statistically significant coefficient when regressed on ROE. While leverage generally increases ROE, as a simple DuPont decomposition reveals, this does not hold true in our data.[39] One possible explanation for this is that when REIT leverage increases enough that the cost of debt becomes very high, this will reduce the firm's profit margin and in turn reduce ROE. Further research would need to be done to really explore this relationship. BOOKTOMKT likewise exhibits a negative, statistically significant coefficient

[37] The Pearson correlation coefficient between ROE and ROA in our sample is 0.82.
[38] Rhoades, Dawna L., Paula L. Rechner, and Chamu Sundaramurthy, *A Meta-analysis of Board Leadership Structure and Financial Performance: are "two heads better than one"?*
[39] ROE=Net Income/Sales x Sales/Assets x Assets/BVEquity or ROE=Profit Margin x Asset Turnover x Leverage

when regressed on ROE. This logically follows as firms with large book values of equity to market value of equity will have lower growth prospects and presumably lower ROE.

Using ROA as the dependent variable, regression (11) results in a positive coefficient on TOP10_PE, suggesting that more private equity owned tenants is associated with higher ROA. As ROA is the 2010 trailing 12-month net income divided by the average total assets, this suggests private equity ownership is positive for firm profitability, as well as volatility. Similar to ROE, ROA and leverage appear to have an inverse relationship. After controlling for tenant ownership characteristics, credit risk, leverage, book-to-market, firm size, age, and region, regression (11) explains 63% of the variation in ROA. The last model (12) assesses the determinants of REIT occupancy. These results were minimal, however we don't find this surprising given how little variation there is in occupancy rates. Excluding RPI with an occupancy rate of 47.1%, the mean occupancy rate of the retail REITs is 92.7%, with a standard deviation of 3.2%. We believe this lack of variation in the data inhibited the data from detecting a relationship. Overall, we do not believe ROE, ROA, and OCCUPANCY are better dependent variables than VOLATILITY.

VI. Conclusion

This paper attempts to understand the relationship between tenant ownership and retail REIT stock volatility. Controlling for tenant credit quality, leverage, ROE, book-to-market, size, age, region and property focus, we find that a higher percentage of rental revenue from private equity owned tenants is associated with lower REIT stock volatility and a higher percentage of rental revenue from publicly owned tenants is associated with higher REIT stock volatility.

As agency theory suggests that buyout firms will experience improved operational performance due to the reduction of the principal-agent problem, this theory supports the

hypothesis that REITs with more rental revenue derived from buyout firms, or private equity owned firms as a proxy, will have lower volatility of stock returns. The trade-off firms face between incentive alignment and tax benefits and the costs of financial distress when deciding whether or not to undertake a buyout, suggests that firms that undertake buyouts with have certain characteristics that will make them an ideal tenant for a REIT. These characteristics include stable cash flows, durability of firm's products, and high growth prospects. Therefore, this trade-off supports the same hypothesis as agency theory, that REITs with more rental revenue from private equity owned firms will have reduced volatility of stock returns.

On the contrary, private equity owned tenants could increase the asymmetric information present amongst REIT investors and thus increase stock volatility, in accordance with the literature of LeRoy, Porter, and Shiller (1981). This research supports the former hypothesis that increased revenue from private equity owned tenants may reduce REIT stock volatility. Unfortunately, we cannot break down whether agency theory or the predetermined characteristics of a firm that undergoes a buyout is driving the relationship we observe.

The primary limitation of this study is the size of the sample we examine—we examine 30 retail REITs. Given the relative transparency of retail REITs, we felt this was an ideal subset sample for our research. However, for future research we hope to examine how this relationship holds in the broader REIT industry. Another limitation of our study is that not all tenants were disclosed by the retail REIT. We had to use the top ten tenants as a proxy for the characteristics of all of the REIT's tenants, which may have resulted in estimation error. Similarly, some tenants reported top tenants as a percentage of gross leasable assets, rather than a percentage of annualized base rent. We had to make assumptions about the base rent per square foot of these tenants to then estimate the rent from the top tenants. This likely resulted in estimation error that

may have skewed the data. And lastly, we were unable to account for the overage rents negotiated into the leases into our analysis. We propose this area for future study.

Despite these limitations, our research furthers the rather limited literature done assessing how tenant characteristics impact REIT volatility and finds evidence to suggest that a higher percentage of rental revenue from private equity owned tenants is associated with lower REIT stock volatility and a higher percentage of rental revenue from publicly owned tenants is associated with higher REIT stock volatility.

VII. APPENDIX

Table 1—Sample of Retail REITs

Real Estate Investent Trust	Ticker	Property Focus	Regional Focus[2]	IPO Date	Total GLA[3]
Acadia Realty Trust	AKR	Shopping Center	Northeast	5/27/1993	6,834,617
Agree Realty Corporation	ADC	Single Tenant	Midwest	4/22/1994	3,848,464
Alexander's, Inc.	ALX	Regional Mall	Northeast	7/19/1984	3,394,000
CBL & Associates Properties, Inc.	CBL	Regional Mall	Midwest	10/27/1993	69,427,195
Cedar Realty Trust	CDR	Shopping Center	Northeast	11/25/1986	14,535,000
Developers Diversified Realty Trust	DDR	Shopping Center	South	2/3/1993	55,612,082
Equity One, Inc.	EQY	Shopping Center	South	5/13/1998	19,560,461
Excel Trust, Inc.	EXL	Shopping Center	South	4/22/2010[1]	2,595,303
Federal Realty Investment Trust	FRT	Shopping Center	South	9/10/1962	18,604,000
General Growth Properties, Inc.	GGP	Regional Mall	West	4/8/1993	157,609,069
Glimcher Realty Trust	GRT	Regional Mall	Midwest	1/19/1994	18,945,426
Inland Real Estate Corporation	IRC	Shopping Center	Midwest	8/14/2002	13,497,552
Kimco Realty Corporation	KIM	Shopping Center	South	11/22/1991	80,694,853
Kite Realty Group Trust	KRG	Shopping Center	Midwest	8/10/2004	5,714,230
Macerich Company	MAC	Regional Mall	West	3/9/1994	24,687,392
National Retail Properties, Inc.	NNN	Single Tenant	South	10/9/1984	12,972,000
One Liberty Properties	OLP	Single Tenant	South	12/20/1982	3,996,196
Pennsylvania REIT	PEI	Regional Mall	Northeast	12/27/1960	24,416,624
Ramco-Gershenson Properties Trust	RPT	Shopping Center	Midwest	5/31/1996	11,151,199
Realty Income	O	Single Tenant	South	8/15/1994	21,215,800
Regency Centers	REG	Shopping Center	South	10/29/1993	29,329,820
Retail Opportunity Investments Corporation	ROIC	Shopping Center	West	10/17/2007	1,555,437
Roberts Realty Investors, Inc.	RPI	Shopping Center	South	12/9/1997	150,186
Saul Centers, Inc.	BFS	Shopping Center	South	8/19/1993	8,900,813
Simon Property Group, Inc.	SPG	Regional Mall	South	12/13/1993	304,806,797
Tanger Factory Outlet Centers, Inc.	SKT	Outlet Center	South	6/4/1993	9,550,553
Taubman Centers, Inc.	TCO	Regional Mall	South	11/20/1992	19,073,770
Urstadt Biddle Properties, Inc.	UBA	Shopping Center	Northeast	7/6/1969	3,839,226
Weingarten Realty Investors	WRI	Shopping Center	West	8/16/1985	59,945,629
Whitestone REIT	WSR	Shopping Center	South	8/25/2010[1]	3,162,020

1. Annualized standard deviation is shorter as it went public later.
2. Calculated where the majority of rental revenue came from whenever possible. When this was not available, we used where the majority of square footage was located. When this was not available, we used the number of properties as an estimate.
3. Gross Leasable Assets (GLA) reflects ownership adjusted GLA. When total GLA was not available used %GLA occupied by major tenants to solve for total GLA. For most companies, this value will differ from company stated total GLA.

Table 2—Summary Statistics

Variable	Obs	Mean	SD	Min	Max
TOP10_PUBLIC	30	0.210	0.105	0.038	0.620
TOP10_PE	30	0.021	0.033	0	0.157
INVESTMENT_GRADE	30	0.109	0.131	0	0.672
LEVERAGE	30	1.016	0.626	0.231	2.763
ROE	30	0.017	0.125	-0.272	0.408
ROA	30	0.006	0.034	-0.117	0.055
BOOKTOMKT	30	0.731	0.491	-0.191	2.414
SIZE	30	7.057	1.586	2.715	10.280
AGE	30	19.622	11.801	0.583	51.000
NORTHEAST	30	0.167	0.379	0	1
MIDWEST	30	0.200	0.407	0	1
SOUTH	30	0.500	0.509	0	1
WEST	30	0.133	0.346	0	1
SHOPPING_CENTER	30	0.567	0.504	0	1
SINGLE_TENANT	30	0.133	0.346	0	1
REGIONAL_MALL	30	0.267	0.450	0	1
OUTLET_CENTER	30	0.033	0.183	0	1

Table 3—Correlation Matrix

	VOLATILITY	TOP10_PUBLIC	TOP10_PE	INVESTMENT_GRADE	LEVERAGE	ROE	BOOKTOMKT	SIZE	AGE	NORTHEAST	MIDWEST	SOUTH	WEST	SHOPPING_CENTER	REGIONAL_MALL	SINGLE_TENANT	OUTLET_CENTER	OCCUPANCY	ROA
VOLATILITY	1																		
TOP10_PUBLIC	0.066	1																	
TOP10_PE	-0.307	-0.123	1																
INVESTMENT_GRADE	-0.328	0.584	-0.117	1															
LEVERAGE	0.615	-0.161	-0.219	-0.323	1														
ROE	-0.530	0.079	-0.007	0.185	-0.480	1													
BOOKTOMKT	0.427	0.037	0.002	-0.079	0.483	-0.612	1												
SIZE	-0.249	-0.266	0.030	-0.062	-0.339	0.196	-0.688	1											
AGE	0.254	0.135	-0.075	0.017	-0.010	0.101	-0.242	0.425	1										
NORTHEAST	-0.066	0.111	-0.027	0.049	0.244	0.058	0.113	-0.113	0.335	1									
MIDWEST	0.152	0.185	-0.020	-0.033	0.310	-0.058	0.057	-0.199	-0.072	-0.224	1								
SOUTH	-0.101	-0.090	0.022	0.074	-0.321	0.161	-0.122	0.070	-0.155	-0.447	-0.500	1							
WEST	0.041	-0.208	0.022	-0.124	-0.160	-0.233	-0.011	0.256	-0.054	-0.175	-0.196	-0.392	1						
SHOPPING_CENTER	-0.274	-0.267	-0.103	0.059	-0.060	-0.071	0.423	-0.344	-0.326	0.030	-0.067	0.067	-0.053	1					
REGIONAL_MALL	0.294	-0.185	-0.201	-0.428	0.322	-0.095	-0.365	0.427	0.230	0.135	0.075	-0.302	0.207	-0.690	1				
SINGLE_TENANT	0.129	0.481	0.475	0.043	-0.227	0.167	-0.034	-0.091	0.155	-0.175	0.049	0.196	-0.154	-0.449	-0.237	1			
OUTLET_CENTER	-0.214	0.284	-0.120	0.809	-0.198	0.111	-0.203	0.069	0.038	-0.083	-0.093	0.186	-0.073	-0.212	-0.112	-0.073	1		
OCCUPANCY	-0.345	0.142	0.181	0.276	-0.260	0.444	-0.627	0.510	0.171	0.061	0.127	-0.166	0.028	-0.304	0.067	0.295	0.118	1	
ROA	-0.553	0.188	0.165	0.245	-0.552	0.821	-0.747	0.363	0.209	0.106	0.005	0.039	-0.179	-0.260	-0.030	0.353	0.124	0.746	1

Table 4—Top 10 Major Tenant Data

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Acadia Realty Trust (AKR)[3]			
A&P[1]			B-/B3
TJX Companies	4.2%		A/A3
Supervalu	4.7%		B+/B1
Sears	2.8%		CCC+/B3
Wal-Mart	2.9%		AA/Aa2
Ahold	2.6%		BBB/Baa3
The Home Depot	2.1%		A-/A3
Barnes & Noble	2.0%		
Sleepy's			
Pier 1 Imports	1.1%		
Agree Realty Corporation (ADC)[3]			
Borders	20.0%		
Walgreens	31.0%		A/A3
Kmart	11.0%		CCC+/B3
Alexander's, Inc. (ALX)[2]			
Sears	23.4%		CCC+/B3
Bloomberg LP			
The Home Depot	0.8%		A-/A3
Costco	1.5%		A+/A1
The Container Store		0.3%	NR/B3
Century 21			
Kohl's	1.4%		BBB+/Baa1
Hennes & Mauritz	0.3%		
Lowe's	1.2%		A-/A3
New World Mall LLC			
CBL & Associates Properties (CBL)[3]			
Limited Brands	3.2%		BB+/Ba1
Foot Locker	2.5%		BB/Ba3
Abercrombie & Fitch, Co.	2.2%		
The Gap	2.2%		BB+/NR
American Eagle Outfitters	2.2%		
Signet Jewelers	1.9%		
Dick's Sporting Goods	1.6%		
Genesco Inc.[1]			BB-/NR
Luxottica Group, S.P.A.	1.5%		BBB+/NR
Zale Corporation	1.3%		

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Cedar Realty Trust (CDR)[3]			
Giant Foods	17.8%		BBB/Baa3
Stop & Shop	2.7%		BBB/Baa3
Farm Fresh	2.4%		
LA Fitness		2.4%	
Discount Drug Mart			
Staples	1.9%		BBB/Baa2
Shaw's	1.7%		B+/B1
CVS	1.5%		BBB+/Baa2
Best Buy	1.5%		BBB- /Baa2
Lowe's	1.5%		A-/A3
Developers Diversified Realty Trust (DDR)[4]			
Wal-Mart	4.1%		AA/Aa2
TJX Companies	2.2%		A/A3
PetSmart	1.9%		BB+/NR
Bed, Bath & Beyond	1.8%		BBB+/NR
Kohl's	1.6%		BBB+/Baa1
Michael's		1.5%	A/A3
Lowe's	1.4%		A-/A3
Rite Aid	1.3%		B-/Caa2
The Gap	1.2%		BB+/NR
OfficeMax	1.2%		B-/B1
Equity One, Inc. (EQY)[3]			
Publix			
Supervalu	2.0%		B+/B1
Kroger	4.3%		BBB/Baa2
TJX Companies	1.8%		A/A3
Bed, Bath & Beyond	1.4%		BBB+/NR
LA Fitness		1.0%	
Costco	0.8%		A+/A1
Winn Dixie	2.1%		
Office Depot	1.3%		B-/B2
Dollar Tree	1.4%		

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Excel Trust, Inc. (EXL)[3]			
Lowe's	7.1%		A-/A3
Walgreens	6.0%		A/A3
Publix Supermarkets, Inc.			
Supervalu	4.4%		B+/B1
Dick's Sporting Goods	2.6%		
Jo-Ann		2.5%	B/B2
Rave Motion Pictures			
Giant Foods.	2.4%		BBB/Baa3
Ross Stores	2.2%		
Safeway	2.2%		BBB/Baa3
Federal Realty Investment Trust (FRT)[4]			
Bed, Bath & Beyond	2.6%		BBB+/NR
Ahold	2.5%		BBB/Baa3
TJX Companies	2.1%		A/A3
The Gap	1.7%		BB+/NR
CVS	1.6%		BBB+/Baa2
Safeway	1.6%		BBB/Baa3
Barnes & Noble	1.4%		
LA Fitness		1.1%	
OPNET Tech	1.0%		
Best Buy	0.9%		BBB- /Baa2
General Growth Properties, Inc. (GGP)[4]			
The Gap	2.9%		BB+/NR
Limited Brands	2.9%		BB+/Ba1
Abercrombie & Fitch	2.3%		
Foot Locker	2.3%		BB/Ba3
Golden Gate Capital		1.7%	
American Eagle Outfitters	1.6%		
Forever 21			
Macy's	1.4%		BBB/Baa3
Luxottica Group, S.P.A.	1.3%		BBB+/NR
Genesco, Inc			BB-/NR

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Glimcher Realty Trust (GRT)[4]			
The Gap	2.4%		BB+/
Limited Brands	2.1%		BB+/Ba1
Foot Locker	2.0%		BB/Ba3
Signet Jewelers	1.9%		
AMC		1.8%	B/NR
Bain Capital (Burlington Coat Factory, Cohoes Fashion, Guitar Center, Gymboree)		1.7%	
Forever 21			
Sears	1.6%		CCC+/B3
Bon-Ton	1.5%		B-/NR
JCPenney	1.5%		BB/NR
Inland Real Estate Corporation (IRC)[4]			
Supervalu	7.3%		B+/B1
Roundy's	4.6%		
Dominick's	4.0%		BBB/Baa3
TJX Companies	3.2%		A/A3
Carmax	2.6%		
PetSmart	2.4%		BB+/
Kroger	1.9%		BBB/Baa2
Best Buy	1.6%		BBB-/Baa2
Sports Authority		1.5%	B-/NR
Michael's		1.5%	A/A3
Kimco Realty Corporation (KIM)[4]			
The Home Depot	3.0%		A-/A3
TJX Companies	2.8%		A/A3
Wal-Mart	2.4%		AA/Aa2
Kmart	2.3%		CCC+/B3
Best Buy	1.6%		BBB-/Baa2
Kohl's	1.6%		BBB+/Baa1
Royal Ahold	1.5%		BBB/Baa3
Bed, Bath & Beyond	1.5%		BBB+/
Costco	1.3%		A+/A1
Petsmart	1.3%		BB+/NR

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Kite Realty Group Trust (KRG)[3]			
Publix			
PetSmart	2.8%		BB+/NR
Bed, Bath & Beyond	2.4%		BBB+/NR
Lowe's	2.4%		A-/A3
Ross Stores	2.3%		
State of Indiana			
Marsh Supermarkets		2.2%	
Dick's Sporting Goods	1.9%		
Indiana Supreme Court			
Staples	1.7%		BBB/Baa2
Macerich Company (MAC)[4]			
The Gap	2.6%		BB+/NR
Limited Brands	2.4%		BB+/Ba1
Forever 21			
Foot Locker	1.6%		BB/Ba3
Abercrombie & Fitch	1.5%		
AT&T Mobility LLC	1.4%		A-/A2
Golden Gate Capital (Eddie Bauer, Express, J. Jill)		1.3%	
Luxottica Group, S.P.A.	1.3%		BBB+/NR
American Eagle Outfitters	1.1%		
Macy's	1.0%		BBB/Baa3
National Retail Properties, Inc. (NNN)[6]			
The Pantry, Inc	6.6%		B+/B2
Susser Holdings	6.4%		
Speedy Stop Food Stores, LLC	5.4%		
AMC		4.3%	B/NR
BJ's Wholesale Club		4.0%	B+/B1
Best Buy	3.4%		BBB- /Baa2
Mister Car Wash			
Road Ranger, LLC			
Gander Mountain Company			
Pull-A-Part			

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
One Liberty Properties (OLP)[9]			
Haverty	11.6%		
Office Depot	10.6%		B-/B2
Ferguson Enterprises			
DSM Nutritional	5.8%		A/A3
L-3	4.2%		BBB-/BBB-
Pennsylvania Real Estate Investment Trust (PEI)[3]			
The Gap	3.7%		BB+/NR
Foot Locker	2.4%		BB/Ba3
JCPenney	2.4%		BB/NR
Limited Brands	2.1%		BB+/Ba1
American Eagle Outfitters	1.8%		
Sears Holding Corporation	1.7%		CCC+/B3
Zale Corporation	1.4%		
Signet Jewelers	1.2%		
Dick's Sporting Goods, Inc.	1.3%		
Bain Capital (Burlington Coat Factory, Gymboree)(3)		1.3%	
Ramco-Gershenson Properties Trust (RPT)[4]			
TJX Companies	4.4%		A/A3
The Home Depot	2.0%		A-/A3
Dollar Tree	1.9%		
Publix			
OfficeMax	1.7%		B-/B1
Jo-Ann		1.6%	B/B2
Burlington Coat Factory		1.5%	B-/B3
PetSmart	1.5%		BB+/NR
Bed, Bath & Beyond	1.4%		BBB+/NR
Best Buy	1.4%		BBB- /Baa2

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Realty Income (O)[7]			
AMC		5.3%	B/NR
Diageo	5.0%		A-/NR
LA Fitness		4.6%	
Northern Tier Energy/Super America	4.4%		
Hometown Buffet[1]			
Regal Cinemas	3.4%		B+/B3
Friendly's Ice Cream (Sun Capital Partners)		3.2%	
The Pantry	3.1%		B+/B2
NPC International/Pizza Hut	2.7%		
BJ's Wholesale Club		2.6%	B+/B1
Regency Centers (REG)[3]			
Kroger	4.4%	7.3%	BBB/Baa2
Publix			
Safeway	3.8%	5.9%	BBB/Baa3
Supervalu	2.4%	3.2%	B+/B1
CVS	1.7%	1.8%	BBB+/Baa2
Whole Foods	1.4%	0.8%	BB+/NR
TJX Companies	1.3%	1.7%	A/A3
Ahold	1.0%	1.2%	BBB/Baa3
Blockbuster Video	1.0%	0.7%	
Ross Stores	0.9%	1.0%	
Retail Opportunity Investments Corporation (ROIC)[3]			
Safeway	10.4%		BBB/Baa3
Haggen (Comvest has majority stake)		3.8%	
Rite Aid	3.8%		B-/Caa2
New Seasons Market	0.0%		
Henry's Market Place (Apollo Global Management)		2.3%	B+/NR
Office Depot	2.2%		B-/B2
Kroger	2.0%		BBB/Baa2
Fresh & Easy	2.0%		
Buy Buy Baby (Bed, Bath & Beyond)	1.9%		BBB+/NR
Viva Market	0.0%		

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Roberts Realty Investors, Inc. (RPI)[5]			
Bassett Furniture	25.3%		
Saul Centers, Inc. (BFS)[3]			
Lowe's	2.8%		A-/A3
The Home Depot	2.8%		A-/A3
Giant Food	2.6%		BBB/Baa3
Safeway	2.2%		BBB/Baa3
Publix			
Harris Teeter	1.1%		
Big Lots	0.9%		BBB/NR
Trader Joe's			
Marshalls	0.7%		A/A3
Ross Stores	0.7%		
Simon Property Group, Inc. (SPG)[4]			
The Gap	2.9%		BB+/NR
Limited Brands	2.0%		BB+/Ba1
Abercrombie & Fitch Co	1.6%		
Foot Locker	1.3%		BB/Ba3
Luxottica Group, S.P.A.	1.1%		BBB+/NR
Phillip-Van Heusen Corporation	1.0%		BB+/Ba2
Zale Corporation	1.0%		
American Eagle Outfitters	1.0%		
Genesco, Inc.	0.9%		BB-/NR
Express	0.9%		BB/NR
Tanger Factory Outlet Centers, Inc. (SKT)[8]			
The Gap	8.0%		BB+/NR
Phillips-Van Heusen Corporation	6.2%		BB+/Ba2
Dress Barn, Inc.	3.5%		
Nike	3.4%		A+/A1
VF Outlet Inc.	3.1%		A-/A3
Adidas	3.0%		
Carter's	2.6%		BB+/NR
Liz Claiborne	2.4%		B/B2
Polo Ralph Lauren	2.3%		A-/A3
Hanesbrands Direct, LLC	2.2%		BB-/Ba3

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Taubman Centers, Inc. (TCO)[3]			
Forever 21	5.2%		
The Gap	4.8%		BB+/NR
Limited Brands	3.4%		BB+/Ba1
Abercrombie & Fitch	3.0%		
Williams-Sonoma	2.3%		
Hennes & Mauritz	2.2%		
Ann Taylor	2.1%		
Foot Locker	2.1%		BB/Ba3
Express	2.0%		BB/NR
American Eagle Outfitters	1.6%		
Urstadt Biddle Properties, Inc. (UBA)[3]			
Stop & Shop Supermarket	8.7%		BBB/Baa3
Bed, Bath & Beyond	4.1%		BBB+/NR
TJX Companies	2.9%		A/A3
A&P[1]			B-/B3
ShopRite			
Staples	2.4%		BBB/Baa2
Big Y			
Toys R Us		2.1%	B/B1
BJ's Wholesale Club		2.0%	B+/B1
Sports Authority		1.4%	B-/NR
Weingarten Realty Investors (WRI)[4]			
Kroger	2.3%		BBB/Baa2
TJX Companies	1.9%		A/A3
Ross Stores	1.8%		
Safeway	1.2%		BBB/Baa3
PetSmart	1.1%		BB+/NR
The Home Depot	1.1%		A-/A3
Office Depot	1.0%		B-/B2
H E Butt Grocery			
Barnes & Noble	0.9%		
The Gap	0.9%		BB+/NR

Table 4 Cont.

	Public % ABR	Private Equity % ABR	Credit Rating (S&P/Moody's)
Whitestone REIT (WSR)[3]			
Sports Authority		1.9%	B-/NR
Compass Insurance			
Brockett Davis Drake Inc.			
Air Liquide America, L.P.			
Kroger	1.0%		BBB/Baa2
X-Ray X-Press Corporation			
PetSmart	1.0%		BB+/NR
Marshalls	0.9%		A/A3
Rock Solid Images	0.9%		
Merrill Corporation			

1. Company was delisted or filed for Chapter 11.
2. Source: 10-K. ALX is managed by Vornado Realty Trust. ALX gave property tenants with square footage occupied and average property base rents. Used these rents and total rental revenue of $166,403,000 (Bloomberg) to calculate an average PSF base rent of $17.02 to calculate percent of ABR.
3. Source 10-K
4. Source Q42010 Financial Supplement
5. Source: 10-K. To estimate Bassett, used the ABR per square foot (PSF) times the occupied GLA divided by the total rental revenue, $1,545,000 (Bloomberg).
6. Data came from Chris Barry in Investor Relations at NNN.
7. Only the 2011 data was available on the company website.
8. Q42010 Financial Supplement indicated top tenants as percentage of GLA. Used the average PSF rent of $19.45 to estimate ABR as a % of rental revenue of $186,890,000 (Bloomberg).
9. Source: 10-K. Only indicated top 5 largest tenants suggesting that remaining tenants represent a very small percentage of ABR.

Table 5—Regression Results Using Volatility as Dependent Variable

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TOP10_PUBLIC	0.04	0.49*	0.48**	0.46**	0.46**	0.48**	0.29*	0.37*	-0.08
	(0.204)	(0.274)	(0.218)	(0.219)	(0.216)	(0.208)	(0.164)	(0.182)	(0.303)
TOP10_PE	-1.31***	-1.43***	-0.87**	-1.03**	-1.05**	-1.04**	-1.03**	-0.76**	-2.17***
	(0.454)	(0.416)	(0.342)	(0.402)	(0.429)	(0.435)	(0.457)	(0.347)	(0.706)
INVESTMENT_GRADE		-0.63***	-0.43**	-0.42**	-0.42**	-0.42**	-0.38**	-0.34***	-0.30
		(0.208)	(0.163)	(0.151)	(0.159)	(0.164)	(0.142)	(0.104)	(0.390)
LEVERAGE			0.11***	0.08**	0.07**	0.08**	0.06*	0.11***	0.08**
			(0.025)	(0.029)	(0.029)	(0.031)	(0.032)	(0.038)	(0.031)
ROE				-0.37*	-0.35	-0.33	-0.41*	-0.26	-0.50**
				(0.181)	(0.229)	(0.229)	(0.217)	(0.185)	(0.186)
BOOKTOMKT					0.01	0.02	-0.00	-0.00	
					(0.048)	(0.068)	(0.065)	(0.064)	
SIZE						0.00	-0.02	-0.03	
						(0.018)	(0.020)	(0.019)	
AGE							0.05**	0.07***	0.03**
							(0.019)	(0.022)	(0.012)
NORTHEAST								-0.19**	
								(0.087)	
MIDWEST								-0.10	
								(0.077)	
SOUTH								-0.04	
								(0.055)	
SHOPPING_CENTER									-0.09
									(0.172)
SINGLE_TENANT									0.13
									(0.222)
REGIONAL_MALL									-0.09
									(0.213)
Constant	0.30***	0.28***	0.13***	0.18***	0.18***	0.13	0.23	0.22	0.29
	(0.045)	(0.044)	(0.045)	(0.051)	(0.061)	(0.188)	(0.174)	(0.156)	(0.186)
Observations	30	30	30	30	30	30	30	30	30
R-squared	0.10	0.31	0.52	0.60	0.60	0.60	0.68	0.79	0.78
Adj. R-Squared	0.03	0.24	0.45	0.52	0.50	0.48	0.56	0.67	0.68

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Table 6—Regression Results Using ROE, ROA, and Occupancy as Dependent Variable

	(10)	(11)	(12)
VARIABLES	ROE	ROA	OCCUPANCY
TOP10_PUBLIC	-0.12	0.01	0.14
	(0.204)	(0.054)	(0.132)
TOP10_PE	-0.20	0.12*	0.81*
	(0.431)	(0.068)	(0.464)
INVESTMENT_GRADE	0.06	0.01	0.18
	(0.163)	(0.039)	(0.173)
LEVERAGE	-0.05**	-0.02**	0.05*
	(0.024)	(0.007)	(0.027)
ROE			0.18
			(0.150)
BOOKTOMKT	-0.20**	-0.05***	-0.07
	(0.077)	(0.014)	(0.056)
SIZE	-0.04	-0.00	0.02*
	(0.023)	(0.005)	(0.011)
AGE		0.00	
		(0.005)	
NORTHEAST		0.03*	
		(0.017)	
MIDWEST		0.02	
		(0.018)	
SOUTH		0.01	
		(0.011)	
Constant	0.49*	0.06*	0.69***
	(0.249)	(0.03)	(0.113)
Observations	30	30	30
R-squared	0.52	0.76	0.60
Adj. R-Squared	0.40	0.63	0.47

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Table 7—International Council of Shopping Centers Retail Specifications

TYPE	CONCEPT	SQ. FT. (Inc. Anchors)	ACREAGE	TYPICAL NUMBER OF ANCHOR(S)	TYPE	% GLA ANCHOR
NEIGHBORHOOD CENTER	Convenience	30,000 - 150,000	3 - 15	1 or more	Supermarket	30 - 50%
COMMUNITY CENTER	General Merchandise; Convenience	100,000 - 350,000	10 - 40	2 or more	Discount dept. store; super-market; drug; home improvement; large specialty/discount apparel	40 - 60%
REGIONAL CENTER	General Merchandise; Fashion (Mall, typically enclosed)	400,000 - 800,000	40 - 100	2 or more	Full-line dept. store; jr. dept. store; mass merchant; disc. dept. store; fashion apparel	50 - 70%
SUPERREGIONAL CENTER	Similar to Regional Center but has more variety and assortment	800,000+	60 - 120	3 or more	Full-line dept. store; jr. dept. store; mass merchant; fashion apparel	50 - 70%
FASHION/SPECIALTY CENTER	Higher end, fashion oriented	80,000 - 250,000	5 - 25	N/A	Fashion	N/A
POWER CENTER	Category-dominant anchors; few small tenants	250,000 - 600,000	25 - 80	3 or more	Category killer; home im-provement; disc. dept. store; warehouse club; off-price	75 - 90%
THEME/FESTIVAL CENTER	Leisure; tourist-oriented; retail and service	80,000 - 250,000	5 - 20	N/A	Restaurants; entertainment	N/A
OUTLET CENTER	Manufacturers' outlet stores	50,000 - 400,000	10 - 50	N/A	Manufacturers' outlet stores	N/A

1. Source: International Council of Shopping Centers

Table 8—Top 100 Retail Companies by Sales

	Public	Private Equity	Private	Government	Ownership Details
Wal-Mart	X				
Kroger	X				
Target	X				
Walgreens	X				
The Home Depot	X				
Costco	X				
CVS	X				
Lowe's	X				
Best Buy	X				
Sears Holdings	X				
Safeway	X				
Supervalu	X				
Rite Aid	X				
Publix					
Macy's	X				
Ahold USA/Royal Ahold	X				
McDonald's	X				
Delhaize America	X				
Amazon.com	X				
Kohl's	X				
Apple Stores	X				
JC Penney	X				
Yum!	X				
TJX	X				
True Value			X		
Meijer			X		
HEB			X		
Dollar General	X				
ShopRite			X		
Gap	X				

Table 8 Cont.

	Public	Private Equity	Private	Government	Ownership Details
BJ's		X			Leonard Green & Partners and CVC Capital Partners
Subway			X		
Wendy's/Arby's	X				
Nordstrom	X				
Staples	X				
Ace Hardware		X			
Toys R Us		X			Kohlberg Kravis Roberts, Bain Capital Partners LLC, Vornado Realty Trust
Whole Foods	X				
Bed Bath & Beyond	X				
7-Eleven	X				
Burger King Holdings		X			3G Capital
Aldi			X		
Army Air Force Exchange				X	
Limited Brands	X				
A&P			X		
Menard		X			
Verizon Wireless	X				
Family Dollar	X				
Ross Stores	X				
Darden Restaurants	X				
Starbucks	X				
Office Depot	X				
Winn-Dixie Stores	X				
Hy-Vee			X		

Table 8 Cont.

	Public	Private Equity	Private	Government	Ownership Details
Trader Joe's			X		
GameStop	X				
Giant Eagle			X		
AutoZone	X				
Dillard's	X				
DineEquity	X				
Advance AutoParts	X				
DollarTree	X				
Barnes & Noble	X				
Office Max	X				
Wegmans Food Markets			X		
O'Reilly Automotive	X				
QVC	X				
Defense Commisary Agency				X	
AT&T Wireless	X				
Save Mart			X		
Dell	X				
Big Lots	X				
PetSmart	X				
RadioShack	X				
Alimentation Couche-Tard			X		
Dick's Sporting Goods	X				
Albertsons	X				
WinCo Foods			X		
Sherwin-Williams	X				
Ruddick Corp. (Harris Teeter)	X				
Neiman Marcus		X			TPG Capital, Warburg Pincus
Michaels Stores		X			Bain Capital, Blackstone Group, Highfields Capital Management

Table 8 Cont.

	Public	Private Equity	Private	Government	Ownership Details
Burlington Coat Factory		X			Bain Capital
Tractor Supply Co.	X				
Stater Bros Holdings			X		
Foot Locker	X				
Belk			X		
Price Chopper Supermarkets			X		
IKEA North America			X		
Williams-Sonoma	X				
Sports Authority		X			Leonard Green & Partners
SonyStyle	X				
Raley's			X		
OSI Restaurant Partners		X			Kangaroo Holdings, Bain Capital
Ingles Markets	X				
Brinker International	X				
HSN	X				
Bon-Ton Stores	X				
Abercrombie & Fitch	X				
ShopKo Stores		X			Sun Capital Partners
Total	67	11	19	2	

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