

REIT Governance Structure and Time-Varying Risk: Evidence from Self-Managed and Externally Advised Firms

Vivek Bhargava

Florida Gulf Coast University

Mukesh Chaudhry

Florida Gulf Coast University

Daniel Huerta

dhuerta@fgcu.edu

Florida Gulf Coast University

Shelton Weeks

Florida Gulf Coast University

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Abstract

This paper examines the time-varying risk profile of Real Estate Investment Trusts (REITs) and investigates whether governance structure—self-managed versus externally advised or managed REITs—affects risk exposure over time. Using U.S. REIT data from 2010 to 2022, a period characterized by distinct macro-financial regimes, the study employs a two-stage empirical framework. In the first stage, we estimate measures of total, systematic, and idiosyncratic risk. In the second stage, we employ cross-sectional regressions to relate risk to governance structure, firm-level financial characteristics, and property-type specialization. The results show that leverage is the primary determinant of REIT risk, while firm size, net operating income, and funds from operations are negatively associated with risk. Importantly, we find that differences in risk between self-managed and externally advised REITs are not stable over time and diminish in more recent periods, indicating a weakening governance–risk relationship. Property-type effects remain significant, with hotel, retail, and healthcare REITs exhibiting higher risk than industrial, residential, and diversified REITs. Overall, our findings highlight that governance structure matters for REIT risk, but its influence is time-varying and has declined in importance.

JEL Codes: G32, G34, R33, G12, C23

Keywords: REIT, temporal risks, governance structure, self-managed REITs, Externally-advised REITs, risk decomposition

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Introduction

Real Estate Investment Trusts (REITs) are a prominent institutional vehicle for real estate investment, offering investors liquid exposure to property markets while operating under diverse governance and management structures. A central issue in delegated asset management is whether organizational design—particularly the use of external advisors or outsourced property management—affects risk exposure and risk-taking behavior. Despite extensive research on REIT

valuation and performance, the link between governance structure and risk remains theoretically ambiguous and empirically unsettled.

From a theoretical perspective, competing mechanisms suggest opposite effects. On one hand, externally advised REITs may be subject to agency conflicts arising from weaker alignment between shareholders and external managers, potentially increasing risk exposure through suboptimal investment and monitoring incentives. On the other hand, external advisors and specialized property managers may enhance operational efficiency, improve expertise, and strengthen risk management practices, thereby reducing risk. This ambiguity makes the governance–risk relationship an empirical question rather than a settled prediction.

Existing empirical studies in the REIT literature largely rely on static cross-sectional comparisons or short sample periods, limiting our understanding of how governance effects evolve. This limitation is particularly important because REITs operate across changing macro-financial regimes, including the post-financial crisis recovery period, prolonged low-interest rate environments, and the COVID-19 shock and subsequent normalization phase. These regime shifts may alter both the pricing of risk and the effectiveness of governance structures in mitigating or amplifying risk.

This paper examines the time-varying risk profile of REITs over the period 2010–2022, a time characterized by substantial structural and cyclical variation in real estate and financial markets. Following the 2008–2009 Global Financial Crisis, the U.S. economy entered a prolonged recovery phase marked by accommodative monetary policy, low interest rates, rising asset prices, and gradual declines in unemployment. Between 2010 and 2019, economic growth was supported by technological innovation, expansion in consumer spending, and increased capital market activity, including substantial growth in the real estate and REIT sectors. However, the COVID-

19 pandemic in 2020 triggered one of the sharpest economic contractions in modern U.S. history, resulting in severe labor market disruptions, supply chain instability, and heightened financial market volatility. In response, the Federal Reserve implemented aggressive monetary stimulus and near-zero interest rate policies, while the federal government enacted unprecedented fiscal support measures. By 2021 and 2022, the economy experienced a rapid recovery accompanied by elevated inflation, rising interest rates, and renewed uncertainty in equity and real estate markets. These structural fluctuations significantly influenced investment behavior, capital allocation, and the performance of publicly traded firms throughout the 2010–2022 period. Our analysis investigates whether self-managed REITs and externally advised (or managed) REITs exhibit systematically different risk profiles, and whether these differences evolve. In addition, the study accounts for firm-level financial characteristics and property-type specialization, recognizing that both balance sheet structure and asset composition may independently influence risk exposure.

Our empirical approach employs a two-stage empirical framework. In the first stage, we construct measures of total, systematic, and idiosyncratic risk that will subsequently serve as dependent variables. In the second stage, we estimate cross-sectional regressions using firm characteristics, governance structure indicators, and property-type classifications to explain variation in risk across firms and over time. Our study makes three primary contributions. First, we provide new evidence on the relationship between REIT governance structure and risk exposure, focusing on the distinction between self-managed and externally advised firms. Second, we document how governance-related differences in risk evolve across distinct market regimes, offering a dynamic perspective absent from most prior studies. Third, we decompose REIT risk into its components and identify key financial determinants—including leverage, firm size, operating performance, and sector specialization—that systematically explain variation in risk.

Our results indicate that leverage is the primary determinant of REIT risk, while firm size, net operating income, and funds from operations are negatively associated with risk. We also find that the relationship between governance structure and risk is not constant over time. Although externally advised REITs generally exhibit higher risk than their self-managed counterparts, these differences diminish in more recent years, suggesting that the governance–risk relationship has weakened over time. In contrast, property-sector effects remain both economically and statistically significant, with hotel, retail, and healthcare REITs consistently displaying higher risk than industrial, residential, diversified, and specialty REITs. Overall, our findings suggest that while governance structure continues to matter for REIT risk, its influence is time-varying and has become less pronounced, whereas sector-specific characteristics remain important drivers of risk.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature. Section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 concludes the paper.

Literature Review

A large body of research examines the return-generating process and risk exposures of REITs, emphasizing their hybrid nature as both real estate claims and publicly traded securities. Early studies show that REIT returns are linked to equity market movements, interest-rate changes, and macroeconomic conditions, while also exhibiting sector-specific dynamics not fully captured by traditional common stock models (Liu & Mei, 1992; Ling & Naranjo, 1997). These findings established that REIT risk contains both systematic and asset-class-specific components.

Subsequent work demonstrates that REIT risk is conditional and evolves over time. Cotter and Stevenson (2006) model daily REIT volatility using multivariate GARCH methods and find

strong evidence of time-varying volatility linked to changing market conditions. Cotter and Roll (2011) further show that REIT returns incorporate information about broader real estate market conditions and differ meaningfully from private-market indexes in their risk-return properties. Stevenson (2002) also documents changing integration between securitized real estate and broader capital markets, implying that REIT systematic risk may vary across regimes.

Additional studies suggest that crisis periods amplify these dynamics. During episodes of financial stress, correlations between REITs and equities tend to rise, liquidity conditions tighten, and leverage-related vulnerabilities become more pronounced (Hoesli & Oikarinen, 2012; Hoesli & Reka 2015). These findings are especially relevant for the post-2013 sample period examined here, which spans monetary normalization, the COVID-19 shock, and the subsequent recovery. Although this literature provides substantial evidence that REIT risk is time varying, most studies focus on return co-movement, volatility transmission, or market integration rather than whether organizational form and governance structure alter the evolution of risk over time.

A second major stream of literature considers whether REIT organizational form affects shareholder outcomes. Because REITs may operate under either internal management/self-advising structures or external advisory contracts, the sector offers a natural setting in which to study classic agency problems associated with delegated management. The foundational contribution in this area is Capozza and Seguin (2000), who analyze externally advised REITs and report lower valuation multiples and weaker performance relative to internally managed firms. They argue that external contracts may weaken incentive alignment and create agency costs when advisors are compensated based on assets under management rather than shareholder returns. This “external advisor puzzle” became one of the most cited themes in REIT governance research.

Consistent with this view, Cannon and Vogt (1995) and Ghosh and Sirmans (2003) find that governance quality, managerial incentives, and ownership structure are associated with REIT valuation and operating outcomes. Campbell, Ghosh, and Petrova (2011) examine mergers and acquisitions by REITs and determine that the importance of outside governance mechanisms is diminished and replaced by internal governance controls.

However, later evidence suggests that earlier findings may not generalize to more recent REIT markets. Striewe, Rottke, and Zietz (2013) show that externally advised REITs do not appear uniformly more levered and may instead face different financing constraints. Nicholson and Stevens (2022), using more contemporary data, find that historical efficiency gaps between externally advised and self-managed REITs have narrowed materially over time. Their results imply that governance effects may be dynamic rather than permanent.

Taken together, the literature suggests that the governance consequences of external advising are theoretically plausible but empirically contingent. Improvements in disclosure standards, institutional ownership, market monitoring, and contract design may have reduced historical agency frictions. This raises the unresolved question of whether externally advised REITs remain systematically riskier than self-managed firms in contemporary markets.

A third literature examines the firm-level determinants of REIT risk and financing behavior. Across corporate finance and real estate studies, leverage consistently emerges as a central determinant of equity risk because debt magnifies exposure to asset-value shocks, refinancing risk, and covenant pressure. In REIT settings, where payout requirements constrain retained earnings, leverage decisions may be particularly consequential.

Howe and Shilling (1988) provide early evidence that leverage affects REIT returns and valuation. More recent studies find that highly levered REITs are more sensitive to macro-financial

shocks and exhibit greater return volatility (Boudry, Kallberg, & Liu, 2010). During stressed credit conditions, leverage may also interact with liquidity constraints, increasing downside risk.

Firm size and operating performance have also received substantial attention. Larger REITs may benefit from scale economies, lower financing costs, and more diversified property portfolios. Ambrose, Ehrlich, Hughes, and Wachter (2000) and Ambrose, Highfield, and Linneman (2005) document economies of scale in REIT operations, implying that size may reduce both operating and financial risk. Employing more recent data, Highfield, Shen, and Springer (2012) find diminishing scale efficiencies but conclude that REITs may realize additional gains in efficiency through continued growth and consolidation. Measures of operating cash flow, including net operating income and funds from operations, are likewise associated with stronger financial flexibility and lower perceived risk. These findings motivate the inclusion of leverage, size, and operating performance measures when evaluating whether governance structure independently explains REIT risk.

Differences in property specialization also shape REIT risk. Because lease structure, tenant concentration, demand cyclicalities, and operating leverage vary across sectors, property type can materially influence cash flow volatility and systematic exposure. Hotel REITs are commonly viewed as among the most cyclical sectors because room rates reset frequently and occupancy responds rapidly to business cycles. Retail REITs face evolving consumer demand and tenant credit risk, while healthcare REITs are exposed to reimbursement policy, operator concentration, and demographic factors. By contrast, industrial and residential REITs often exhibit more stable demand patterns and longer-term secular support. Additional studies find meaningful return and volatility differences across REIT sectors (Allen, Madura, & Springer, 2000; Benefield, Anderson,

& Zumpano, 2009). These patterns imply that sector controls are necessary when testing governance-related hypotheses.

The existing literature provides important insights into REIT market risk, governance structure, capital structure, and sector heterogeneity. Nevertheless, three important gaps remain. First, most studies examine governance effects using static cross-sectional frameworks rather than allowing these effects to evolve across changing macro-financial regimes. Second, while prior work links external advising to valuation, leverage, and efficiency, relatively little evidence evaluates whether governance structure affects total, systematic, and idiosyncratic risk simultaneously. Third, existing studies rarely integrate governance structure, financial characteristics, and property-type specialization within a unified framework covering the post-crisis recovery, low-rate era, pandemic shock, and normalization period. This paper addresses these gaps by examining the time-varying risk profile of U.S. REITs from 2013–2022 and testing whether historically documented governance-related risk differentials between self-managed and externally advised firms persist in contemporary markets.

Data

We obtain price data for all publicly traded U.S. equity Real Estate Investment Trusts from the Center for Research in Security Prices (CRSP) and accounting data from S&P Global (formerly SNL). The dataset incorporates active, delisted, merged, and dissolved firms throughout the sample period to avoid survivorship bias and preserve the representativeness of the REIT market. Although the initial data collection spans the period from 1993 to 2022, the final empirical analysis is conducted using data from July 2010 through June 2022. This sample window is selected for several methodological and practical reasons. First, a substantial number of REITs in the original

sample did not exist throughout the entire observation period, while others were delisted, dissolved, merged, or acquired over time, resulting in inconsistencies in firm continuity. Second, reliable and complete accounting data were unavailable for a number of firms during the earlier years of the sample. Limiting the analysis to the post-2010 period improves data consistency and comparability across firms. Furthermore, beginning the sample after the peak of the Global Financial Crisis reduces the influence of extreme market disruptions and abnormal volatility that characterized the 2008–2009 financial downturn. The selected period also captures an era of increasing REIT market maturity, sector specialization, and industry consolidation, making it particularly suitable for examining contemporary REIT risk and valuation dynamics.

Between 2010 and 2022, the number of publicly traded U.S. equity REITs experienced notable growth followed by gradual consolidation. According to historical FTSE Nareit Real Estate Index data, the number of equity REITs increased from 126 in 2010 to a peak of 186 in 2018 before declining to 162 by 2022.¹ This expansion reflected increased investor interest in real estate securities, favorable capital market conditions, and the diversification of REIT property sectors during the post-financial-crisis recovery period. However, the subsequent decline in the number of listed equity REITs was largely driven by industry consolidation, mergers and acquisitions, and privatization activity. Overall, the U.S. equity REIT market maintained a relatively stable range of approximately 125 to 185 publicly traded firms throughout the 2010–2022 period.

To examine potential time-varying structural shifts and economic dynamics, we further segment the dataset into three equal subperiods: July 2013–June 2016, July 2016–June 2019, and

¹ Data is obtained from the National Association of Real Estate Investment Trusts (NAREIT): <https://www.reit.com/data-research/reit-market-data/report/us-reit-industry-equity-market-cap>. Last accessed on April 30, 2026.

July 2019–June 2022. This segmentation allows us to identify and compare patterns and trends across different market environments, including periods of expansion, volatility, and contraction.

REIT Risk Model and Methodology

To examine REIT risk and develop a comprehensive framework for identifying its determinants, we employ a two-step estimation approach. In the first stage, we decompose REIT returns into systematic and idiosyncratic risk components. In the second stage, the estimated risk measures are regressed against firm-specific characteristics to evaluate the factors influencing REIT risk.

Following Campbell et al. (2001), we begin by decomposing REIT monthly returns using the Capital asset Pricing Model (CAPM) framework:

$$R_{it} = \beta_{im} R_{mt} + \varepsilon_{it} \quad (1)$$

Where β_{im} denotes the beta coefficient of REIT i relative to market return, and ε_{it} represents the REIT-specific residual component. Then, assuming orthogonality between market and residual components, we estimate the following equation:

$$\sigma^2(R_{it}) = \beta_{im}^2 \sigma^2(R_{mt}) + \sigma^2(\varepsilon_{it}) \quad (2)$$

where $\sigma^2(R_{it})$ denotes total risk, $\beta_{im}^2 \sigma^2(R_{mt})$ represents systematic risk, and $\sigma^2(\varepsilon_{it})$ measures idiosyncratic risk.

To examine temporal variation in REIT risk, the analysis is divided into two subperiods, 2013–2016 and 2019–2022, thereby accounting for differences in macroeconomic conditions and market environments over time. In addition, REITs are classified into “riskier” and “safer” categories based on sector-level average total and idiosyncratic risk measures. This classification is motivated by the expectation that certain property sectors are inherently more sensitive to economic cycles, consumer demand, and operational volatility. Specifically, hotel, retail, and healthcare REITs are expected to exhibit higher levels of risk due to their greater exposure to fluctuations in travel activity, consumer spending, and regulatory or demographic pressures. In contrast, industrial, office, residential, diversified, and specialty REITs are generally expected to display relatively lower risk profiles because of more stable cash flows, longer lease structures, or broader tenant diversification. We incorporate dummy variables representing these sector classifications into the empirical model to capture sector-specific heterogeneity in REIT risk characteristics.

Enhanced Multi-Factor Model

In addition to the Capital Asset Pricing Model (CAPM), we employ the Fama–French–Carhart four-factor model to improve the explanatory power of the asset pricing framework. The multifactor Fama–French–Carhart specification is of the following form:

$$R_{it} - R_{ft} = \alpha_i + \beta_m(R_m - R_{ft}) + \beta_s \text{SMB} + \beta_h \text{HML} + \beta_{\text{mom}} \text{MOM} + \varepsilon_{it} \quad (3)$$

While the CAPM captures systematic market risk through the market excess return factor, the Fama–French–Carhart framework extends the analysis by incorporating size, value, and

momentum factors. Specifically, the model includes the SMB (small-minus-big) factor to account for firm size effects, the HML (high-minus-low) factor to capture differences between value and growth firms, and the momentum factor (MOM) to reflect return persistence in asset prices. The inclusion of these additional factors provides a more comprehensive framework for modeling REIT return behavior and capturing dimensions of risk that are particularly relevant within real estate securities markets.

Empirical Risk Models

In the second stage of the analysis, the estimated REIT risk measures derived from the asset pricing models are regressed on a set of firm-specific and sector-level characteristics to identify the determinants of REIT risk and valuation. The inclusion of this framework is motivated by Capozza and Seguin (2000) based on the need to evaluate REIT performance not only from a return and risk perspective, but also in terms of market valuation and risk assessment relative to asset fundamentals and firm-specific characteristics. This approach is appropriate for REIT analysis because real estate firms derive value from tangible underlying property assets whose market valuations may differ from publicly traded equity prices. Accordingly, incorporating the Capozza and Seguin framework allows for a more comprehensive assessment of REIT behavior by integrating both asset pricing dynamics and valuation considerations within the empirical analysis. This stage is designed to examine how variations in financial structure, operational characteristics, market valuation, and sector composition contribute to differences in systematic and idiosyncratic risk across REITs. By incorporating both firm-level variables and sector classification indicators, the second-stage analysis provides a more comprehensive assessment of the factors influencing

REIT behavior beyond broad market risk exposures captured in the first-stage models. The following regressions are estimated using alternative measures of REIT risk:

$$\sigma^2(R_{it}-R_f) = a_i + \lambda_L L + \lambda_S S + \lambda_{GA} GA + \lambda_{NOI} NOI + \lambda_{FFO} FFO + \lambda_D D \quad (4)$$

$$\beta_{im} = a_i + \lambda_L L + \lambda_S S + \lambda_{GA} GA + \lambda_{NOI} NOI + \lambda_{FFO} FFO + \lambda_D D \quad (5)$$

$$\sigma^2 \varepsilon_{it} = a_i + \lambda_L L + \lambda_S S + \lambda_{GA} GA + \lambda_{NOI} NOI + \lambda_{FFO} FFO + \lambda_D D \quad (6)$$

The dependent variables represent total risk, systematic risk, and idiosyncratic risk, respectively. The explanatory variables include leverage (L), defined as total liabilities divided by total assets; size (S), measured as the natural logarithm of total assets; general and administrative expenses (GA), calculated as GA divided by total revenue; net operating income (NOI), defined as the ratio of NOI to total revenue; and funds from operations (FFO), defined as the ratio of FFO to total revenue

Governance and Sector Effects

The analysis further examines the role of governance structure by distinguishing between internally and externally managed REITs. To capture these differences, a dummy variable D is defined such that D=1 for internally managed or internally advised REITs and D=0 otherwise. This specification allows the empirical model to assess whether managerial structure is associated with variations in REIT risk and valuation outcomes.

Sector-specific effects are also incorporated through broad risk-based classifications designed to capture heterogeneity across property sectors. This approach facilitates a more precise evaluation of risk differentials among hotel, retail, healthcare, industrial, office, residential, and

specialty REIT sectors, each of which is characterized by distinct operational structures, lease dynamics, and sensitivities to macroeconomic conditions.

Results

Table 1, Panel A, presents summary statistics for 149 REITs during the 2013–2016 period. The mean beta is 0.759, indicating that REITs were, on average, less volatile than the market during this time. Notably, idiosyncratic risk accounts for nearly 84% of total risk in this period. The average leverage ratio is 49.5%, while general and administrative (G&A) expenses account for 10.5% of revenue. Table 1, Panel B presents summary statistics for 126 REITs over the 2019–2022 period. The average beta is 1.027, indicating that REITs are, on average, slightly more volatile than the overall market, suggesting that REITs have become riskier relative to the market over time. Idiosyncratic factors account for approximately 66% of total risk. The average leverage ratio remains at 49.5%. Taken together, the three measures of risk imply that REITs have become more exposed to systematic risk, with the proportion of diversifiable risk declining over time. General and administrative (G&A) expenses represent 9.8% of revenue, while the average net operating income (NOI) to revenue ratio is 0.577. The average ratio of funds from operations (FFO) to revenue is 0.344. Net operating income (NOI) and funds from operations (FFO) ratios show no significant change across the two periods.

Table 2 presents summary statistics for REITs across eight sectors during the 2019–2022 period. These sectors include hotels, industrial, office, residential, retail, healthcare, diversified, and specialty REITs. During this period, the beta values for hotel, healthcare, and retail REITs exceed one, indicating that these sectors are more volatile than the overall market. In contrast, industrial, office, residential, diversified, and specialty REITs exhibit betas below one, suggesting

lower market risk. Additionally, the mean values of both total risk and idiosyncratic risk are higher for hotel, healthcare, retail, diversified, and specialty REITs compared to industrial, office, and residential REITs. This indicates that, from both total and idiosyncratic risk perspectives, the first group of five sectors is relatively riskier than the remaining three. For example, the mean total risk and idiosyncratic risk for retail REITs are 0.464 and 0.290, respectively, compared to 0.284 and 0.198 for residential REITs. Due to the limited number of REITs within each sector, we are unable to conduct a sector-specific analysis with sufficient reliability. Therefore, later in the paper, we classify REITs as either risky or non-risky based on both beta and total/idiosyncratic risk levels².

Table 3 presents the results from the second stage estimations. Panel A reports the findings for the 2013–2016 period, while Panel B provides results for 2019–2022. The table contains nine columns, corresponding to three models for each of the three dependent variables: beta (representing market or systematic risk), total risk, and idiosyncratic risk. In the first three columns, the dependent variable is beta. Model 1 includes all independent variables; Model 2 omits FFO, and Model 3 omits NOI. The same structure is applied in Columns 4 to 6 for total risk and in Columns 7 to 9 for idiosyncratic risk.

In the 2013–2016 period leverage is not a significant determinant of market risk and is only marginally significant (at the 10% level) in Model 2 for total risk. When idiosyncratic risk is the dependent variable, leverage is significant at the 5% level in Model 2 and at the 10% level in Model 3. These results suggest that leverage was not a major driver of risk during this period.

In Panel A Firm size does not significantly influence market risk but is negatively and significantly associated with both total and idiosyncratic risks. General and administrative (GA) expenses have no impact on market risk but are positively and significantly related to total and

² Summary statistics for each sector for 2013–2016 are available on request.

idiosyncratic risks, indicating that higher GA expenses were associated with increased firm-specific risk in 2013–2016.

Regarding the operating performance measures, FFO is negatively and significantly related to market risk, whereas NOI is not. In Model 2, where FFO is excluded, NOI becomes significant, and in Model 3, where NOI is excluded, FFO retains significance. For total and idiosyncratic risk, Model 1 shows that both NOI and FFO are weakly significant, primarily at the 10% level. In Model 2, NOI alone is not significant, while in Model 3, FFO is significant for total risk at the 5% level but not for idiosyncratic risk. Together, these results suggest that NOI and FFO played a weak role in explaining risk during 2013–2016.

For the 2019–2022 period (Panel B), leverage is consistently positive and significant at the 1% level across all models and risk measures. This indicates that increased leverage is associated with higher risk, which aligns with theoretical expectations. The increase in importance of leverage in the later period is likely related to elevated market concerns over REITs' ability to service their debt during the COVID pandemic. Size does not appear to influence market risk (beta), but the coefficients for total and idiosyncratic risk are negative and significant, suggesting that larger REITs tend to experience lower levels of these risks. Coefficients for general and administrative (G&A) expenses are negative in all models but are not statistically significant. This is in contrast to the earlier period when GA was positively and significantly related to total and idiosyncratic risk.

The effects of NOI and FFO vary depending on the model and the type of risk. In Model 1, where beta is the dependent variable, NOI is negative and significant, while FFO is not significant. When FFO is excluded (Model 2), NOI remains significant. When NOI is excluded (Model 3), FFO becomes negative and significant, albeit at the 10% level. For total and

idiosyncratic risks (Columns 4–9), both NOI and FFO are consistently negative and statistically significant, primarily at the 1% level. These results suggest that stronger financial performance—as captured by higher NOI or FFO—correlates with reduced risk, especially for total and idiosyncratic components. Overall, these results suggest that NOI and FFO became much stronger determinants of risk in the 2019–2022 period. Given the increased uncertainty associated with the pandemic in the second period, the importance of cash flow to REITs, as measured by FFO and to a lesser extent by NOI, should be expected to increase.

Additionally, we estimate the first-stage risk measures using the Fama–French–Carhart four-factor model (equation 3), which augments the market model with size, value, and momentum factors. The results from this alternative risk-factor specification are qualitatively similar to those reported in Table 3. Leverage remains a stronger and more consistent determinant of risk in the later period, while firm size, NOI, and FFO continue to be negatively associated with total and idiosyncratic risk. The governance and sector-level findings are also unchanged.³ Overall, the findings indicate that financial performance variables play a more substantial role in explaining total and idiosyncratic risk compared to market risk. This is further supported by the higher adjusted R-squared values in the models where total and idiosyncratic risks are the dependent variables.

Table 4 presents the results on the impact of financial variables on the three risk measures, distinguishing between internally and externally managed REITs. A dummy variable is employed that equals 1 for externally managed REITs and 0 for internally managed ones. The coefficients for the control variables are largely consistent with those reported in Table 3. Therefore, the

³ Given that the four-factor specification does not alter the interpretation of the results, we focus the discussion on the CAPM-based estimates and omit the additional tables for brevity. These results are available from the authors upon request.

discussion focuses primarily on the dummy variable. Panel A reports the results for the 2013–2016 period, where the dummy variable was not significant for market risk but was negative and significant for total and idiosyncratic risk. Specifically, for total risk, the dummy variable was negative and significant at the 10% level in Models 1 and 2. For idiosyncratic risk, it was negative and significant in all three models—at the 5% level in Models 1 and 2, and at the 10% level in Model 3. These findings indicate that externally managed REITs exhibited lower total and idiosyncratic risk during the earlier period. Panel B reports the results for the 2019–2022 period. Notably, the dummy variable is not statistically significant for any of the three risk measures across the three model specifications. This suggests that, during this period, the management structure—whether internal or external—had no discernible effect on market, total, or idiosyncratic risk. This is an interesting contrast to the earlier period, where external management appears to have provided an advantage in terms of total and idiosyncratic risk. It is possible that REIT recruitment practices improved, resulting in the hiring of better internal managers during this period. Alternatively, the observed change may reflect the impact of pandemic-related travel/work restrictions, mitigating the advantage previously associated with external advisors.

Table 5 presents the results using a dummy variable to distinguish between internally advised and externally advised REITs, where the dummy equals 1 for externally advised and 0 for internally advised REITs. Panel A reports the findings for the 2013–2016 period shows that the dummy variable is negative and significant at the 1% level across all three models for both total risk and idiosyncratic risk. In the 2019–2022 period, consistent with the results for internally versus externally managed, the dummy variable is not significant across any of the three risk measures or models. These results suggest that, during the earlier period, externally advised REITs were significantly less risky than internally advised REITs, with the reduction in risk even more

pronounced than what was observed for externally managed REITs. The more pronounced reduction in total risk and idiosyncratic risk observed in the earlier period is most likely due to the better alignment of incentives associated with the use of internal versus external management.

Table 6 presents the results from classifying REITs into two groups—risky and safe—based on their average beta over the 2019–2022 period. Hotel, retail, and healthcare REITs had average betas greater than 1 and are categorized as risky REITs, while industrial, office, residential, diversified, and specialty REITs had betas below 1 and are considered safer. A dummy variable, *Drisky*, is set to 1 for risky REITs and 0 otherwise. Conversely, *Dsafe* equals 1 for safer REITs and 0 for risky ones. The first two columns report results where market risk is the dependent variable. Column 1 shows that *Drisky* is positive and significant, indicating that risky REITs contribute to higher market risk. Column 2 shows *Dsafe* is negative and significant, suggesting that safer REITs help reduce market risk. Both coefficients are significant at the 1% level. Similar patterns are observed for total risk and idiosyncratic risk. For total risk, both dummy variables remain significant, reinforcing the distinction between risky and safe REITs. For idiosyncratic risk, *Drisky* is significant at the 5% level and *Dsafe* at the 10% level, showing a weaker but still notable impact.

Table 7 presents the results when REITs are classified as risky or safer based on their total or idiosyncratic risk during the 2019–2022 period. Notably, both total and idiosyncratic risk produce the same classification. REIT sectors with average total risk above the overall sample average are categorized as risky and include hotel, retail, healthcare, diversified, and specialty REITs. Those with average risk below the overall average—namely, industrial, office, and residential REITs—are classified as safer. This approach results in more REIT sectors being categorized as risky compared to when beta was used as the risk measure. When market risk is the dependent variable, the *Drisky* dummy is positive and significant at the 5% level, while *Dsafe* is

not significant. This suggests that risky REITs contribute to increased market risk, but safer REITs do not significantly reduce it. When total risk is the dependent variable, Drisky is positive and significant at the 1% level, and Dsafe is negative and also significant at the 1% level. This indicates that risky REITs increase total risk, while safer REITs help reduce it. The results are similar when idiosyncratic risk is used as the dependent variable, but the significance levels are slightly weaker: Drisky is significant at the 5% level and Dsafe at the 10% level.

Conclusions

This study examines the determinants and evolution of REIT risk over the period 2013–2022, with particular emphasis on the role of governance structure and management organization. Motivated by the mixed evidence in the existing literature regarding the relative merits of internal and external management, the analysis investigates whether self-managed and externally advised REITs exhibit different risk characteristics and whether these differences persist across changing market environments. In addition, the study evaluates the influence of firm-specific financial characteristics and property-type specialization on total, systematic, and idiosyncratic risk.

The results provide several important insights. First, REIT risk exhibits substantial variation across both time and property sectors. Consistent with prior research, leverage emerges as the strongest and most consistent determinant of risk, while firm size and operating performance, measured by net operating income (NOI) and funds from operations (FFO), are associated with lower levels of risk. Property-type specialization also plays a significant role. Hotel, retail, and healthcare REITs consistently exhibit higher risk profiles, whereas industrial, residential, diversified, and specialty REITs generally display lower risk exposure. These findings

reinforce the importance of underlying asset composition and sector-specific fundamentals in explaining REIT risk.

Second, and more importantly, the results suggest that the relationship between governance structure and REIT risk is not constant over time. Externally advised and externally managed REITs exhibit significantly higher total and idiosyncratic risk during the earlier portion of the sample period, consistent with agency-based arguments that external management structures may create incentives that increase risk exposure. However, these differences largely disappear in the later period. This finding suggests that the governance-related risk differentials documented in earlier studies have weakened over time, potentially reflecting improvements in contracting arrangements, greater transparency, stronger monitoring mechanisms, and the continued maturation of the REIT industry. Therefore, the evidence supports the view that governance effects are dynamic and dependent on prevailing market and institutional conditions rather than fixed organizational characteristics.

A further contribution of the study is the decomposition of REIT risk into total, systematic, and idiosyncratic components. The results indicate that total and idiosyncratic risk are generally more informative than market beta in explaining cross-sectional differences in REIT risk. This finding highlights the importance of firm-level factors and suggests that analyses relying solely on systematic risk may overlook important sources of variation in REIT performance. By integrating risk decomposition with governance structure, firm fundamentals, and sector specialization, the study provides a more comprehensive framework for understanding REIT risk than is typically employed in the existing literature.

Overall, the findings contribute to the growing literature on REIT governance and risk by demonstrating that the governance–risk relationship is time-varying and that its importance has

diminished in recent years. Whereas much of the prior literature relies on static comparisons between internally and externally managed REITs, this study shows that governance effects evolve across market regimes and should be evaluated within a broader framework that incorporates changing economic conditions, firm characteristics, and property-sector dynamics. The results therefore help reconcile conflicting findings in the governance literature and provide new evidence on the changing role of organizational structure in shaping REIT risk.

Several limitations should be acknowledged. The analysis is limited to publicly traded U.S. equity REITs and therefore may not generalize to mortgage REITs, private real estate vehicles, or international REIT markets. In addition, governance structure is measured primarily through management and advisory arrangements and does not explicitly capture other governance mechanisms such as board characteristics, ownership concentration, or executive compensation incentives. Future research could examine how these governance attributes interact with market conditions to influence risk and whether the declining importance of governance structure observed in this study persists during future periods of economic and financial stress.

This study nevertheless provides evidence that REIT risk is shaped by a combination of governance structure, financial fundamentals, and sector specialization, and that the influence of these factors changes over time. As the REIT industry continues to mature and evolve, understanding these dynamic relationships will remain important for investors, managers, and policymakers seeking to assess and manage risk in securitized real estate markets.

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Table 1: Summary Statistics for REITs in the Sample

	Number	Mean	St. Dev.	Max	Min
Panel: A 2013-2016					
Beta	149	0.759	0.339	1.920	0.058
Sigma	149	0.220	0.053	0.469	0.143
Epsilon	149	0.184	0.047	0.418	0.103
L	149	0.495	0.135	0.897	0.109
S	149	15.038	1.231	17.229	10.105
GA	149	0.105	0.092	0.600	0.009
NOI	149	0.606	0.222	1.000	0.020
FFO	149	0.357	0.172	0.770	-0.060
Panel: B 2019-2022					
Beta	126	1.027	0.390	2.418	0.214
Sigma	126	0.392	0.160	1.018	0.109
Epsilon	126	0.260	0.115	0.795	0.102
L	126	0.495	0.146	0.970	0.00
S	126	15.324	1.204	17.792	10.906
GA	126	0.098	0.078	0.455	0.017
NOI	126	0.577	0.236	0.990	-0.018
FFO	126	0.344	0.219	0.770	-0.18

Beta represents market risk, sigma total risk, and epsilon idiosyncratic risk. L stands for Leverage defined as Total Liability/Total Assets, S is the natural log of total assets or size of the company, GA is the general and administrative expenses defined as General and Administrative Expenses/Revenue, NOI is the net operating Income/Revenue and FFO is the funds from operations.

Table 2: Summary Statistics – Type of REITs - Time Period July 2019- June 2022

	Number	Mean	St. Dev.	Max	Min
<u>Hotels</u>					
Beta	20	1.228	0.393	2.253	0.581
Sigma	20	0.452	0.171	0.877	0.200
Epsilon	20	0.271	0.089	0.504	0.134
L	20	0.527	0.152	0.805	0.251
S	20	15.478	1.035	17.085	13.031
GA	20	0.071	0.034	0.156	0.021
NOI	20	0.269	0.250	0.915	-0.080
FFO	20	0.085	0.216	0.586	-0.18
<u>Industrial</u>					
Beta	13	0.891	0.182	1.216	0.636
Sigma	13	0.294	0.086	0.482	0.185
Epsilon	13	0.231	0.108	0.447	0.130
L	13	0.417	0.133	0.674	0.227
S	13	15.134	1.099	17.758	12.864
GA	13	0.096	0.054	0.243	0.031
NOI	13	0.680	0.210	0.960	0.280
FFO	13	0.460	0.220	0.770	0.090
<u>Office</u>					
Beta	13	0.875	0.388	1.438	0.214
Sigma	13	0.316	0.091	0.468	0.109
Epsilon	13	0.208	0.058	0.302	0.102
L	13	0.428	0.151	0.587	0.00
S	13	15.751	0.781	16.986	14.326
GA	13	0.096	0.105	0.433	0.017
NOI	13	0.618	0.069	0.710	0.513
FFO	13	0.439	0.081	0.530	0.259
<u>Residential</u>					
Beta	15	0.907	0.152	1.153	0.643
Sigma	15	0.284	0.056	0.400	0.184
Epsilon	15	0.198	0.046	0.317	0.137
L	15	0.460	0.069	0.591	0.323
S	15	15.498	1.174	16.854	12.912
GA	15	0.111	0.092	0.398	0.041
NOI	15	0.615	0.065	0.710	0.490
FFO	15	0.365	0.190	0.663	0.00
<u>Retail</u>					
Beta	20	1.225	0.470	2.158	0.540
Sigma	20	0.464	0.165	0.748	0.196
Epsilon	20	0.290	0.117	0.591	0.170
L	20	0.512	0.135	0.779	0.326
S	20	15.290	1.153	17.320	13.081
GA	20	0.090	0.043	0.182	0.035
NOI	20	0.725	0.094	0.960	0.621
FFO	20	0.454	0.131	0.700	0.200

Table 2 Continued - Summary Statistics – Type of REITs - Time Period July 2019- June 2022

	Number	Mean	St. Dev.	Max	Min
<u>Healthcare</u>					
Beta	11	1.145	0.363	1.854	0.428
Sigma	11	0.433	0.225	1.018	0.242
Epsilon	11	0.304	0.146	0.663	0.160
L	11	0.565	0.173	0.970	0.398
S	11	15.681	1.303	17.330	13.175
GA	11	0.066	0.033	0.141	0.022
NOI	11	0.600	0.311	0.984	0.137
FFO	11	0.391	0.263	0.737	0.00
<u>Diversified</u>					
Beta	21	0.950	0.457	2.418	0.256
Sigma	21	0.396	0.140	0.748	0.242
Epsilon	21	0.292	0.128	0.626	0.174
L	21	0.495	0.148	0.795	0.096
S	21	14.623	1.43	16.664	13.216
GA	21	0.143	0.124	0.455	0.017
NOI	21	0.510	0.194	0.940	0.070
FFO	21	0.269	0.164	0.640	-0.085
<u>Specialty</u>					
Beta	9	0.890	0.348	1.665	0.450
Sigma	9	0.368	0.213	0.848	0.220
Epsilon	9	0.284	0.202	0.795	0.151
L	9	0.541	0.151	0.749	0.326
S	9	15.278	2.024	17.792	10.906
GA	9	0.113	0.052	0.231	0.057
NOI	9	0.753	0.185	0.990	0.400
FFO	9	0.415	0.114	0.400	0.290

Beta represents market risk, sigma total risk, and epsilon idiosyncratic risk. L stands for Leverage defined as Total Liability/Total Assets, S is the natural log of total assets or size of the company, GA is the general and administrative expenses defined as General and Administrative Expenses/Revenue, NOI is the net operating Income/Revenue and FFO is the funds from operations/revenue.

Table 3 Impact of Financial Variables on Different Measures of Risk

Variables	Market Risk (Beta)			Total Risk (Sigma)			Idiosyncratic Risk (Epsilon)		
	Model1	Model2	Model3	Model1	Model2	Model3	Model1	Model2	Model3
Panel A: July 2013 – June 2016									
Constant	1.057 ^a (2.74)	1.282 ^a (3.28)	1.121 ^a (3.06)	0.342 ^a (5.94)	0.373 ^a (6.41)	0.377 ^a (6.81)	0.297 ^a (5.58)	1.057 ^a (2.74)	0.325 ^a (6.38)
L	-0.178 (-0.86)	0.089 (0.45)	-0.146 (-0.73)	0.021 (0.68)	0.057 ^c (1.95)	0.038 (1.27)	0.040 (1.40)	0.059 ^b (2.23)	0.054 ^c (1.95)
S	0.004 (0.16)	-0.022 (-0.97)	0.000 (-0.01)	-0.009 ^b (-2.52)	-0.012 ^a (-3.65)	-0.011 ^a (-3.30)	-0.010 ^a (-3.00)	-0.012 ^a (-3.76)	-0.011 ^a (-3.73)
GA	0.102 (0.33)	0.392 (1.29)	0.130 (0.43)	0.087 ^c (1.88)	0.126 ^a (2.78)	0.102 ^b (2.23)	0.072 ^c (1.69)	0.093 ^b (2.26)	0.084 ^b (2.00)
NOI	0.114 (0.54)	-0.459 ^a (-3.79)		0.062 ^c (1.94)	-0.016 (-0.86)		0.050 ^c (1.70)	0.010 (0.59)	
FFO	-0.972 ^a (-3.24)		-0.837 ^a (-5.06)	-0.131 ^a (-2.92)		-0.058 ^b (-2.33)	-0.068 ^c (-1.65)		-0.010 (-0.42)
Adjusted R- Square	0.153	0.097	0.157	0.222	0.181	0.207	0.176	0.167	0.166
F-Statistic	6.357 ^a	4.997 ^a	7.914 ^a	9.438 ^a	9.191	10.651 ^a	7.339 ^a	8.395 ^a	8.344 ^a
Panel B: July 2019 – June 2022									
Constant	0.660 (1.29)	0.678 (1.32)	0.438 (0.85)	1.021 ^a (5.67)	1.031 ^a (5.64)	0.899 ^a (4.75)	0.878 ^a (6.78)	0.885 ^a (6.73)	0.822 ^a (6.28)
L	0.820 ^a (3.62)	0.782 ^a (3.47)	0.885 ^a (3.83)	0.417 ^a (5.24)	0.395 ^a (4.93)	0.452 ^a (5.36)	0.263 ^a (4.59)	0.247 ^a (4.29)	0.279 ^a (4.79)
S	0.017 (0.57)	0.017 (0.58)	0.016 (0.51)	-0.046 ^a (-4.38)	-0.046 ^a (-4.31)	-0.046 ^a (-4.18)	-0.045 ^a (-5.94)	-0.044 ^a (-5.84)	-0.045 ^a (-5.84)
GA	-0.677 (-1.47)	-0.686 (-1.49)	-0.644 (-1.36)	-0.184 (-1.14)	-0.189 (-1.15)	-0.165 (-0.96)	-0.046 (-0.40)	-0.050 (-0.42)	-0.038 (-0.32)
NOI	-0.371 ^a (-2.69)	-0.403 ^a (-2.95)		-0.204 ^a (-4.20)	-0.222 ^a (-4.58)		-0.093 ^a (-2.66)	-0.106 ^a (-3.03)	
FFO	-0.039 (-1.37)		-0.052 ^c (-1.81)	-0.022 ^b (-2.19)		-0.029 ^a (-2.77)	-0.016 ^b (-2.18)		-0.019 ^a (-2.61)
Adjusted R- Square	0.204	0.191	0.156	0.410	0.366	0.385	0.386	0.367	0.355
F-Statistic	6.134 ^a	7.151 ^a	5.575 ^a	16.700 ^a	19.072 ^a	14.4691 ^a	16.712 ^a	19.107 ^a	18.210 ^a

L stands for Leverage defined as Total Liability/Total Assets, S is the natural log of total assets or size of the company, GA is the general and administrative expenses defined as General and Administrative Expenses/Revenue, NOI is the net operating Income/Revenue, FFO is the funds from operations/revenue and D1 is a dummy variable which is 1 when externally managed and 0 otherwise. ‘t’ values are in parentheses.

Table 4 Impact of Financial Variables on Risk – Internally Managed Vs. Externally Managed RIETS

Variables	Market Risk (Beta)			Total Risk (Sigma)			Idiosyncratic Risk (Epsilon)		
Panel A: July 2013 – June 2016									
	Model1	Model2	Model3	Model1	Model2	Model3	Model1	Model2	Model3
Constant	1.087 ^a (2.78)	1.296 ^a (3.25)	1.147 ^a (3.10)	0.327 ^a (5.64)	0.354 ^a (6.04)	0.367 ^a (6.59)	0.280 ^a (5.25)	0.293 ^a (5.55)	0.313 ^a (6.13)
L	-0.183 (-0.88)	0.089 (0.45)	-0.156 (-0.78)	0.024 (0.77)	0.058 ^b (2.00)	0.042 (1.39)	0.043 (1.51)	0.060 ^b (2.29)	0.058 ^b (2.11)
S	0.001 (0.06)	-0.023 (-0.98)	-0.002 (-0.11)	-0.008 ^a (-2.14)	-0.011 ^a (-3.10)	-0.010 ^a (-3.00)	-0.008 ^a (-2.55)	0.010 ^a (-3.16)	-0.010 ^a (-3.37)
GA	0.053 (0.16)	0.372 (1.16)	0.073 (0.23)	0.111 ^a (2.31)	0.152 ^a (3.23)	0.125 ^b (2.57)	0.099 ^a (2.24)	0.119 ^a (2.81)	0.110 ^b (2.48)
NOI	0.103 (0.48)	-0.467 ^a (-3.65)		0.067 ^a (2.12)	-0.005 (-0.25)		0.056 ^a (1.92)	0.021 (1.22)	
FFO	-0.984 ^b (-3.26)		-0.866 ^a (-4.97)	-0.125 ^a (-2.78)		-0.047 ^c (-1.80)	-0.061 (-1.49)		0.003 (0.14)
D1	0.033 (0.49)	0.014 (0.20)	0.036 (0.54)	-0.016 ^c (-1.65)	-0.019 ^c (-1.85)	-0.014 (-1.41)	-0.018 ^b (-1.98)	-0.019 ^b (-2.11)	-0.016 ^c (-1.76)
Adjusted R- Square	0.149	0.091	0.153	0.231	0.195	0.212	0.193	0.186	0.178
F-Statistic	5.309 ^a	3.979 ^a	6.359 ^a	8.414 ^a	8.163 ^a	8.976 ^a	6.893 ^a	7.763 ^a	7.395 ^a
Panel B: July 2019 – June 2022									
	Model1	Model2	Model3	Model1	Model2	Model3	Model1	Model2	Model3
Constant	0.746 (1.45)	0.769 (1.49)	0.467 (0.89)	1.040 ^a (5.72)	1.054 ^a (5.71)	0.895 ^a (4.68)	0.892 ^a (6.81)	0.901 ^a (6.78)	0.824 ^a (6.24)
L	0.815 ^a (3.61)	0.778 ^a (3.46)	0.886 ^a (3.82)	0.415 ^a (5.22)	0.394 ^a (4.91)	0.452 ^a (5.34)	0.262 ^a (4.57)	0.247 ^a (4.28)	0.279 ^a (4.77)
S	0.008 (0.25)	0.008 (0.03)	0.011 (0.36)	-0.048 ^a (-4.43)	-0.048 ^a (-4.40)	-0.046 ^a (-3.99)	-0.046 ^a (-5.94)	-0.046 ^a (-5.88)	-0.045 ^a (-5.67)
GA	-0.645 (-1.40)	-0.651 (-1.41)	-0.628 (-1.32)	-0.176 (-1.09)	-0.180 (-1.09)	-0.167 (-0.97)	-0.041 (-0.35)	-0.044 (-0.37)	-0.037 (-0.31)
NOI	-0.410 ^a (-2.90)	-0.443 ^a (-3.17)		-0.213 ^a (-4.27)	0.232 ^a (-4.66)		-0.099 ^a (-2.76)	-0.113 ^a (-3.15)	
FFO	-0.037 (-1.29)		-0.052 ^c (-1.79)	-0.021 ^b (-2.14)		-0.029 ^a (-2.76)	-0.015 ^b (-2.13)		-0.019 ^a (-2.60)
D1	0.098 (1.21)	0.105 (1.28)	0.045 (0.55)	0.022 (0.78)	0.026 (0.90)	-0.005 (-0.18)	0.022 (0.78)	0.019 (0.90)	0.003 (0.16)
Adjusted R- Square	0.173	0.169	0.123	0.384	0.365	0.384	0.384	0.366	0.350
F-Statistic	5.374 ^a	6.081 ^a	4.495 ^a	13.972 ^a	15.394 ^a	13.970 ^a	13.986 ^a	15.426 ^a	14.456 ^a

L stands for Leverage defined as Total Liability/Total Assets, S is the natural log of total assets or size of the company, GA is the general and administrative expenses defined as General and Administrative Expenses/Revenue, NOI is the net operating Income/Revenue, FFO is the funds from operations/revenue and D1 is a dummy variable which is 1 when externally managed and 0 otherwise. ‘t’ values are in parentheses.

Table 5: Impact of Financial Variables on Risk – Internally Advised Vs. Externally Advised RIETS for

Variables	Market Risk (Beta)			Total Risk (Sigma)			Idiosyncratic Risk (Epsilon)		
Panel A: July 2013 – June 2016									
	Model1	Model2	Model3	Model1	Model2	Model3	Model1	Model2	Model3
Constant	1.059 ^a (2.74)	1.282 ^a (3.27)	1.119 ^a (3.05)	0.349 ^a (6.32)	0.373 ^a (6.76)	0.374 ^a (7.09)	0.303 ^a (6.02)	0.312 ^a (6.30)	0.321 ^a (6.70)
L	-0.18 (-0.86)	0.072 (0.36)	-0.151 (-0.75)	0.018 (0.59)	0.045 (1.59)	0.030 (1.03)	0.037 (1.35)	0.047 ^b (1.87)	0.045 ^c (1.73)
S	0.005 (0.20)	-0.017 (-0.74)	0.001 (0.06)	-0.007 ^a (-1.93)	-0.009 ^a (-2.71)	-0.008 ^b (-2.44)	-0.007 ^a (-2.37)	-0.008 ^a (-2.79)	-0.008 ^a (-2.82)
GA	0.122 (0.38)	0.448 (1.43)	0.155 (0.49)	0.134 ^a (2.91)	0.168 ^a (3.81)	0.147 ^a (3.26)	0.120 ^a (2.85)	0.133 ^a (3.35)	0.130 ^a (3.15)
NOI	0.107 (0.50)	-0.459 ^a (-3.78)		0.045 (1.45)	-0.016 (-0.91)		0.033 (1.16)	0.009 (0.62)	
FFO	-0.959 ^a (-3.14)		-0.832 ^a (-4.99)	-0.102 ^a (-2.34)		-0.049 ^b (-2.05)	-0.039 (-0.98)		0.000 (-0.02)
D2	-0.021 (-0.23)	-0.072 (-0.77)	-0.028 (-0.31)	-0.049 ^a (-3.73)	-0.054 ^a (-4.14)	-0.051 ^a (-3.97)	-0.049 ^a (-4.15)	-0.052 ^a (-4.40)	-0.052 ^a (-4.37)
Adjusted R- Square	0.148	0.095	0.152	0.286	0.264	0.281	0.260	0.261	0.259
F-Statistic	5.272 ^a	4.107 ^a	6.310 ^a	10.892 ^a	11.612 ^a	12.551 ^a	9.689 ^a	11.438 ^a	11.331 ^a
Panel B: July 2019 – June 2022									
	Model1	Model2	Model3	Model1	Model2	Model3	Model1	Model2	Model3
Constant	0.767 (1.49)	0.793 (1.54)	0.519 (0.99)	0.993 ^a (5.46)	1.011 ^a (5.47)	0.866 ^a (4.54)	0.847 ^a (6.52)	0.861 ^a (6.50)	0.791 ^a (6.04)
L	0.853 ^a (3.76)	0.823 ^a (3.65)	0.915 ^a (3.94)	0.408 ^a (5.11)	0.388 ^a (4.80)-	0.440 ^a (5.20)	0.254 ^a (4.44)	0.239 ^a (4.12)	0.268 ^a (4.60)
S	0.001 (0.04)	0.000 (0.00)	0.003 (0.08)	-0.042 ^a (-3.75)	0.043 ^a (-3.78)	-0.041 ^a (-3.47)	-0.040 ^a (-5.04)	-0.041 ^a (-5.04)	-0.040 ^a (-4.90)
GA	-0.838 ^c (-1.78)	-0.862 ^c (-1.82)	-0.777 (-1.60)	-0.142 (-0.85)	-0.158 (-0.94)	-0.111 (-0.63)	-0.001 (-0.01)	-0.013 (-0.10)	0.013 (0.11)
NOI	-0.388 ^a (-2.81)	-0.417 ^a (-3.07)		-0.200 ^a (-4.10)	-0.220 ^a (-4.51)		-0.088 ^b (-2.53)	-0.103 ^a (-2.95)	
FFO	-0.034 (-1.19)		-0.048 ^c (-1.67)	-0.023 ^b (-2.30)		-0.031 ^a (-2.90)	-0.017 ^b (-2.37)		-0.020 ^a (-2.81)
D2	0.157 (1.43)	0.173 (1.58)	0.131 (1.16)	-0.041 (-1.04)	-0.030 (-0.76)	-0.054 (-1.31)	-0.045 (-1.61)	-0.037 (-1.31)	-0.051 ^c (-1.79)
Adjusted R- Square	0.177	0.175	0.130	0.386	0.364	0.305	0.394	0.371	0.367
F-Statistic	5.495 ^a	6.289 ^a	4.742 ^a	14.108 ^a	15.319 ^a	11.981 ^a	14.543 ^a	15.718 ^a	15.474 ^a

Sigma represents total risk, L stands for Leverage defined as Total Liability/Total Assets, S is the natural log of total assets or size of the company, GA is the general and administrative expenses defined as General and Administrative Expenses/Revenue, NOI is the net operating Income/Revenue, FFO is the funds from operations/revenue and D2 is a dummy variable which is 1 when externally advised REIT and 0 otherwise. 't' values are in parentheses.

Table 6: Risky versus Safer REITs Classified Based on High versus Low Beta for July 2019 – June 2022

Variables	Market Risk (Beta)		Total Risk (Sigma)		Idiosyncratic Risk (Epsilon)	
	Risky REITs	Safer REITs	Risky REITs	Safer REITs	Risky REITs	Safer REITs
Constant	0.676 (1.35)	0.898 ^c (1.76)	1.012 ^a (5.83)	1.103 ^a (6.20)	0.884 ^a (6.77)	0.911 ^a (6.91)
L	0.693 ^a (3.13)	0.705 ^a (3.12)	0.367 ^a (4.76)	0.370 ^a (4.70)	0.248 ^a (4.27)	0.248 ^a (4.26)
S	0.006 (0.19)	0.004 (0.14)	-0.046 ^a (-4.73)	-0.049 ^a (-4.71)	-0.046 ^a (-5.99)	-0.047 ^a (-5.99)
GA	-0.396 (-0.88) -	-0.433 (-0.94)	-0.077 (-0.49)	-0.089 (-0.56)	-0.012 (-0.11)	-0.015 (-0.13)
NOI	0.335 ^a (-2.42)	-0.358 ^a (-2.56) -	-0.183 ^a (-3.79)	-0.191 ^a (-3.91)	-0.090 ^a (-2.49)	-0.093 ^a (-2.56)
FFO	-0.025 (-0.90)	0.027 (-0.95)	-0.017 ^c (-1.73)	-0.017 ^c (-1.76)	-0.014 ^b (-1.92)	-0.014 ^b (-1.94)
D1	0.102 (1.30)	0.097 (1.22)	0.024 (0.87)	0.022 (0.79)	0.017 (0.42)	0.016 (0.78)
Drisky	0.210 ^a (3.15)		0.084 ^a (3.61)		0.025 (1.41)	
Dsafe		-0.168 ^a (-2.48)		-0.069 ^a (-2.93)		-0.021 (-1.18)
Adjusted R- Square	0.274	0.252	0.472	0.453	0.423	0.386
F-Statistic	6.368 ^a	5.682 ^a	15.052 ^a	13.959 ^a	12.370 ^a	12.228 ^a

D1 is a dummy variable which is 1 when externally managed and 0 otherwise, and Drisky REITs have average beta values greater than 1. Dsafe REITs have average beta value less than 1. The riskier REITs include Hotels, Retail and Healthcare while safer REITs are Industrial, Office, Residential, Diversified, and Specialty. ‘t’ values are in parentheses.

Table 7: Risky versus Safer REITs Classified Based on High versus Low total/Idiosyncratic Risk for July 2019 – June 2022

Variables	Market Risk (Beta)		Total Risk (Sigma)		Idiosyncratic Risk (Epsilon)	
	Risky REITs	Safer REITs	Risky REITs	Safer REITs	Risky REITs	Safer REITs
Constant	0.597 (1.16)	0.768 (1.49)	0.963 ^a (5.43)	1.053 ^a (5.91)	0.856 ^a (-6.55)	0.899 ^a (6.92)
L	0.699 ^a (3.04)	0.723 ^a (3.09)	0.356 ^a (4.48)	0.360 ^a (4.45)	0.234 ^a (4.00)	0.233 ^a (3.95)
S	0.013 (0.42)	0.01 (0.33)	-0.045 ^a (-4.33)	-0.046 ^a (-4.39)	-0.045 ^a (-5.83)	-0.045 ^a (-5.89)
GA	-0.633 (-1.39)	-0.628 (-1.37)	-0.017 (-1.09)	-0.166 (-1.05)	-0.038 (-0.33)	-0.038 (-0.31)
NOI	-0.368 ^a (-2.61)	-0.384 ^a (-2.71)	-0.191 ^a (-3.93)	-0.197 ^a (-4.02)	-0.089 ^a (-2.48)	-0.191 ^a (-2.55)
FFO	-0.031 (-1.10)	-0.032 (-1.13)	-0.019 ^b (-1.73)	-0.019 ^b (-1.90)	-0.014 ^b (-1.95)	-0.014 ^b (-1.94)
D1	0.11 (1.38)	0.105 (1.29)	0.029 (1.04)	0.026 (0.94)	0.019 (0.95)	0.018 (0.90)
Drisky	0.144 ^b (2.07)		0.075 ^a (3.12)		0.035 ^b (2.00)	
Dsafe		-0.105 (-1.46)		-0.063 ^a (-2.52)		-0.033 ^c (-1.81)
Adjusted R-Square	0.241	0.227	0.458	0.443	0.433	0.429
F-Statistic	5.345 ^a	4.957 ^a	14.255 ^a	13.420 ^a	12.864 ^a	12.687 ^a

D1 is a dummy variable which is 1 when externally managed and 0 otherwise, and Drisky REITs have average sigma values greater than 0.35 and Dsafe REITs have average sigma values less than 0.35. The riskier REITs include Hotels, Retail, Healthcare, diversified and Specialty while safer REITs are Industrial, Office, and Residential. 't' values are in parentheses.