



Introducing “Focused Firms”: Implications from REIT Prime Operating Revenue

Zifeng Feng¹ · Peng Liu²

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Abstract

We examine the relationship between a firm’s main business focus and its risk and performance, using the unique settings of U.S. equity real estate investment trusts (REITs). In this paper, a REIT’s prime operating revenue ratio (POR) is measured as the ratio of rental revenue to total revenue. The empirical results show that REITs that earn more revenue from their prime business—property rentals—are less apt to take on risk but also achieve higher operational performance in the cross-section and over the medium term. The magnitudes of these results in a market crisis period are even stronger than in normal times. We also find evidence that REITs with higher POR are associated with less information asymmetry, higher operational efficiency, and higher market value. We also use three alternative REIT business focus measures based on their assets, expenses, and income. The results are qualitatively and quantitatively similar. To investigate why some REITs focus to a greater extent on non-prime businesses, the paper provides evidence that REIT executives receive, on average, higher pay when their firms engage more extensively in other businesses, and larger REITs are more likely to explore non-rental-revenue businesses. Lastly, we use the coronavirus pandemic as a quasi-experimental setting and provide evidence that REITs that have earned higher POR in recent years generally achieve better operational performance and reduce risk during the first three quarters of 2020. In sum, the results suggest that a REIT’s focus on its prime business generally leads to greater profitability and lower risk.

Keywords Prime operating revenue · Business focus · Performance · Risk · REIT

✉ Zifeng Feng
zfeng@utep.edu

Peng Liu
peng.liu@cornell.edu

¹ The University of Texas at El Paso, 500 W. University Ave, El Paso, TX 79968, USA

² Cornell University, 448 Statler Hall, Ithaca, NY 14853, USA

Introduction

Firm diversification has been widely researched both theoretically and empirically in the fields of corporate finance, industrial organization, and strategic management for more than 40 years. Theoretical arguments suggest that diversification has both value-enhancing and value-reducing effects. In a literature survey article, Montgomery (1994) summarizes the theoretical foundations of firm diversification into three major categories: the market-power view, the resource-view, and the agency view. Previous studies regarding firm diversification generally measure focus by analyzing diversification across SIC-defined lines of business. Our paper, in contrast, examines diversification within a single SIC-defined industry – real estate investment trusts (REITs). While there exists some heterogeneity in terms of firm diversification affecting performance across firms, the simplicity of the REIT industry and the availability of detailed financial accounts allow us to provide a clear picture of how business focus affects firm performance.

The U.S. Securities and Exchange Commission (SEC) defines a REIT as “a company that owns and typically operates income-producing real estate or related assets.”¹ The National Association of Real Estate Investment Trusts (NAREIT) defines a REIT as “a company that owns, operates or finances income-producing real estate. REITs provide all investors the chance to own valuable real estate, present the opportunity to access dividend-based income and total returns, and help communities grow, thrive, and revitalize.”² Within the REIT literature, previous research on corporate focus and performance almost always measure firm diversification using property type and/or geography. Our paper contributes to the empirical literature by introducing a novel measure of prime operating revenue ratios. There is no doubt that a REIT’s main business model involves property rentals. A REIT’s risk and performance should reflect the degree to which it concentrates on its property rental business.

To maintain REIT status, a REIT must earn at least 75 percent of its gross income from real estate-related sources. The 75% real estate test leaves room for REITs to invest in non-real estate businesses. A REIT’s total revenue generally consists of rental revenue, operating real estate revenue, and other income. News from NAREIT suggests that total development activity in the REIT industry reached \$40.8 billion in the third quarter of 2016, which was a return to its peak of 2007, prior to the Great Recession.³ Many REITs have operated in-house development teams since 2005, while some large REITs have also been active real estate developers in recent years. According to Cashman et al. (2018), more than 60% of REITs have operated active property-development pipelines in 850 firm-year observations running from 1993 through 2010. Geltner et al. (2019) further confirm that over 70% of REITs engaged

¹ See Investment Products for “Real Estate Investment Trusts (REITs)” according to *the SEC*.

² See *NAREIT*, “What’s a REIT (Real Estate Investment Trust)?”.

³ See *NAREIT*, “What’s the Outlook for New Construction? A Peek at REIT Development Pipelines in Q4,” October 25, 2018.

in some real estate development activities in their 1998–2018 sample period, with the aggregate development value reaching \$30 billion in recent years.

Another example of a non-prime REIT business is asset management. W. P. Carey, one of the largest net lease REITs, reports that they “earn asset management revenue from property management, leasing, and advisory services performed,”⁴ which is about \$39 million in 2019, and their “total revenues increased in 2019 as compared to 2018, due to increases within our Real Estate segment, partially offset by decreases within our Investment Management segment.”⁵ In addition, other non-prime business income for REITs includes, among other sources, interest income, financial-leasing income, partnership income, nonrecurring revenue, equipment-leasing revenue, development revenue, direct hotel operating revenue, food and beverage revenue, charges for customer services, and rent attributed to personal properties.

While REITs have grown in recent decades,⁶ they have also exhibited a higher level of vertical integration. There is evidence showing that REITs have been deeply involved in the non-property-rental real estate business in recent decades (See Fig. 1). They might view non-rental business as an opportunity to improve performance and firm value or as a way to diversify their income sources. The REIT research literature shows that exposure to non-prime businesses may have some implications for risk and operational performance in REITs. The risk may be higher for firms whose revenues are highly concentrated (e.g. Chacon, 2021; Zhang & Hansz, 2019), but REITs can reduce risk when they focus on their core business, which reduces information asymmetry, improves operational efficiency, and enables them to make better use of their property-rental-specific human capital (Feng et al., 2019). REIT managers normally expect to achieve stronger performance when they invest in non-prime business projects. For instance, according to Conor Flynn, the CEO of Kimco Realty Corp, Kimco has “spent significant time and effort to develop a very robust future redevelopment pipeline that is focused on unlocking the embedded value of our existing real estate.”⁷ The primary business objective for W. P. Carey “is to increase long-term stockholder value through accretive acquisitions and proactive asset management of our real estate portfolio, enabling us to grow our dividend.” Moreover, the firm adds, “important aspects of asset management include entering into new or modified transactions to meet the evolving needs of current tenants, re-leasing properties, credit and real estate risk analysis, building expansions and redevelopments, sustainability and efficiency analysis and retrofits, and strategic dispositions.”⁸ The key question here for academics, investors, managers, and regulators is: are such non-prime businesses actually paying off?

⁴ See page 78 in the 2019 Annual Report of W. P. Carey Inc.

⁵ See page 29 in the 2019 Annual Report of W. P. Carey Inc.

⁶ The equity market capitalization outstanding for the U.S. REIT industry grew from \$26 billion to \$980 billion 1993 and 2017. See <https://www.reit.com/data-research/reit-market-data/us-reit-industry-equity-market-cap>.

⁷ See *NAREIT*, “Development Pipeline Outlook.” October 25, 2018.

⁸ See pages 4 and 5 in the 2019 Annual Report of W. P. Carey Inc.

There is a lack of studies addressing the effects of the main business focus in REITs as well as in non-REITs. Few studies dive deep into the REIT business model to investigate the implication of REITs' main business/revenue focus.⁹ Specifically, more research is needed to understand (1) the appropriate classification and measurement of a REIT's focus on its main business (i.e. property rentals) and (2) the risk and performance implications associated with these relationships. In this paper, we introduce a measure of a REIT's main business focus, the prime operating revenue (POR) ratio, and illustrate the impact of the measure on REIT risk and performance.

This question is particularly important as REITs increasingly engage in activities that do not generate rental income.¹⁰ Given the rapid growth in REITs' non-property-rental business activity in recent decades and the lack of relevant studies, analyzing the effects of a REIT's main business focus will shed light on several empirical questions. In this paper, we analyze and determine the magnitudes of the effects of a REIT's main business focus on risk and performance, information asymmetry, and operational efficiency. We also consider whether there is a principal-agent issue. We then investigate whether these effects might be stronger during the recent global financial crisis.

To address all these questions empirically, we begin by constructing a measure of main business focus. A REIT's POR is measured as the proportion of revenue it earns from rental properties. When a REIT's POR ratio is high, it obtains a greater portion of its sales from its core business—property rentals (i.e. lease income). More specifically, we define two variations of the general REIT POR ratio as follows: a) the ratio of rental revenue to total revenue (*POR1*) and b) the ratio of rental revenue less expense reimbursements to total revenue (*POR2*). For robustness, we also use prime asset ratio (land & buildings / total assets), prime expense ratio (rental operating expense / total expense), and prime income ratio (rental NOI / NOI), as alternative REIT business focus measures.

Using a sample of U.S. equity REITs for the period running from 1995 through 2018 and the abovementioned REIT POR ratios, we derive two main results. First, we explore the relationship between POR and risk. A REIT's risk is measured as its annualized standard deviation of daily stock returns, which is an equity-market-based firm-level risk measure, and the three-year rolling standard deviation of funds from operations scaled by total assets (FFO/TA), which is an accounting-based firm-level risk measure. The results show that REITs with higher POR are associated, on average, with lower stock return volatility and a lower standard deviation of FFO/TA. These results imply that REITs earning a greater portion of their revenues from property rentals reduce their risk. This finding is in line with what we see reported in the early REIT literature, which shows that REITs are not exposed to the risk associated with real estate development and trading activities and hence face lower risk than real estate-related stocks (Ooi et al., 2006) and that property companies with development projects are associated with higher systematic risk (Brounen & Eichholtz, 2004).

⁹ See NAREIT, "How do REITs Work?" September 21, 2017.

¹⁰ See *Seeking Alpha*, "REITs: This Time Is Different." March 12, 2020.

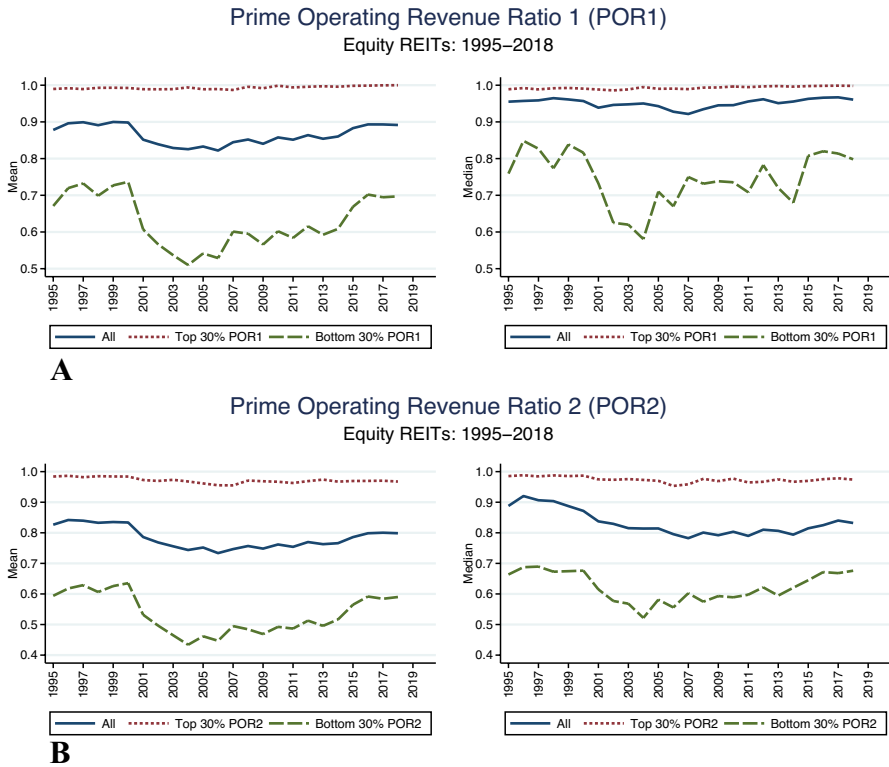


Fig. 1 Prime operating revenue ratios. This figure illustrates the means and medians of POR ratios (*POR1* and *POR2*) in REITs for the full sample, the top 30 percentiles, and the bottom 30 percentiles from 1995 through 2018. All variables are defined in the Appendix Table 13

Second, we regress REIT performance on previous-year POR ratios and a set of control variables in a property-type and year fixed-effects model. Given a negative relationship between POR and firm risk, core business concentration may also result in poor operational performance. REIT performance is measured by FFO/TA and FFO scaled by total equity (FFO/TE). Surprisingly, REIT performance is found to be positively correlated with previous-year firm-specific POR ratios. The results indicate that POR is a significant contributing component of REIT performance. These results also imply that, when a REIT devotes more of its time and resources to peripheral businesses (i.e. those that generate non-rental revenue), the REIT is likely to underperform in the following year. Capital-intensive businesses, such as REITs, find it difficult to achieve higher relative levels of returns on assets or returns on equity. Our results further highlight the importance of a REIT’s focus on its core property-rental business for performance. Moreover, the results also show that high-rental-revenue REITs are generally higher-valued than low-rental-revenue REITs. The ratios of a REIT’s share price to its net asset value (NAV) per share and its market-to-book ratio are generally higher if it earns higher rental revenues, implying

that REIT managers could maximize shareholder wealth by focusing more sharply on their property rental business.

Third, some REIT managers may invest in business activity that generates non-rental revenue in anticipation of higher total gains in coming years. To examine the medium-run effects of a REIT's POR, we regress REIT risk and performance measures on long lags of REIT POR ratios. The results indicate that the positive correlation between POR and performance holds for up to four-year lags, while the negative correlation between POR and risk holds for up to five-year lags. These results indicate that pursuing non-prime business activities is unlikely to improve REIT performance or reduce risk in the near term.

Fourth, the paper also contributes to the literature that compares the effects of the recent market crisis (the Great Recession) with what happens in normal times. During the global crisis (i.e. 2007–2009), REITs' cash flows and their investors' perceptions of real estate risks were heavily affected by the unexpected economy-wide shock. This paper examines the effects of REIT rental revenue focus under contrasting overall market conditions. The results show that high POR is a significant facilitator of REIT performance and an obstructor of REIT risk when the general economy or real estate market is declining (in a recession).

Fifth, the paper's findings suggest that rental income regulatory constraints imposed on REITs did not limit their performance.¹¹ REITs that earn rental income over and above what is required to meet regulatory requirements face lower risk and achieve stronger performance. The results of this study provide clear policy implications suggesting that REITs benefit when the share of their revenues that comes from the property rental business is restricted.

To examine the channel that drives the correlation between POR on the one hand and risk and performance on the other, we first examine the relationship between POR and information asymmetry in REITs. Two measures of information asymmetry, the bid-ask spread and analyst forecast dispersion, are employed as separate proxies to evaluate information asymmetry in REITs. The bid-ask spread affects a REIT's stock liquidity and the availability of information to investors (e.g. Marcato & Ward, 2007; Wei et al., 1995). Following recent studies in the relevant literature (Devos et al., 2019), we employ the bid-ask spread as our first information asymmetry measure. Following the accounting and finance literature (e.g. Diether et al., 2002), we adopt analyst forecast dispersion as the second measure of information asymmetry. The two information asymmetry measures are negatively and significantly associated with lagged REIT POR ratios. These results provide further evidence that REITs' peripheral business activities increase information failure in communications between REIT managers and stakeholders.

Next, we examine the relationship between REIT POR and operational efficiency. The operating efficiency ratio is defined in general terms as total expenses minus real estate depreciation and amortization scaled by total revenue (Beracha et al.,

¹¹ The measure of Prime Operating Revenue (POR) in our paper is different from a REIT's qualified income. The POR measures the percentage of contribution to a firm's total revenue from its largest source – rents from real property. A firm can still earn a REIT status while its POR is below 75%.

2019a, 2019b). Operating efficiency ratios are able to capture how easily REITs can generate cash flows. The results show that REITs with higher POR are generally associated with higher operational efficiency (lower operating efficiency ratios). We conjecture that, on average, REITs that concentrate on their core rental business tend to employ a workforce with relevant knowledge and experience in property rentals, which leads to greater operational efficiency and thus better performance, as rental-specific knowledge and experience are difficult to transfer to other non-rental aspects of the real estate business.

The article proceeds as follows. In the next section, we describe our data sources and variable construction. The section that follows presents the regression models, followed by the main results pertaining to the relationship between risk, performance, and POR in REITs, along with some additional analysis. We conclude in the final section.

Data and Descriptive Statistics

To examine the implications of REITs' main business focus, we analyze a sample of U.S. publicly listed equity REITs recorded in the S&P Global Market Intelligence database (formerly SNL Financial). First, we collect REITs' firm-level financial data and related information at an annual frequency from 1995 through 2018.¹² Specifically, we obtain annual total assets, total debt, total equity, real estate value, rental revenue,¹³ total revenue, expense reimbursements, real estate depreciation and amortization, share price, common shares outstanding, FFO, real estate investment growth, initial public offering (IPO) year, REIT-status establishment year, land, buildings and improvements, real estate property type, and mergers and acquisitions (M&A) activities. Second, we collect property-level data regarding a REIT's Metropolitan Statistical Area (MSA), real estate property types, and the net book value of each property the REIT holds each year in the sample period.¹⁴ We also collect daily stock return data from the Center for Research in Security Prices (CRSP), analyst forecasts for REITs' FFO from the I/B/E/S database, and executive compensation data from S&P's ExecuComp database.

In this paper, we assess whether a REIT focuses more of its time and resources on its main business—property rentals—by reference to the fraction of revenue that comes from rentals. More specifically, as mentioned above, we define two variations of the general REIT POR ratio as a) the ratio of rental revenue to total revenue

¹² The sample period starts in 1995 because the property-level data that are used to calculate the main variable of interest, property holding period, as well as the variables for geographic diversification and property type diversification, are available in the S&P Global Market Intelligence database only since 1995. For robustness, we also extend the sample period to 1993 as well as 1989 and re-run the analysis. The results are quantitatively and qualitatively similar to what we find for our main sample period.

¹³ Rental revenue includes base rents, percentage rents, expense reimbursement, and other rental revenue.

¹⁴ The net book value of property is commonly used to calculate the geographic diversification of REITs, as in Hartzell et al. (2014), Ling et al. (2020a), and Wang and Zhou (2020).

(*POR1*) and b) the ratio of rental revenue less expense reimbursements to total revenue (*POR2*), where expense reimbursements are replaced by zero if relevant data are missing. Hence, a higher POR ratio suggests that a REIT earns a higher proportion of its income from its property-rental business. For robustness, we also use the ratio of the sum of the book value of land and the book value of buildings and improvements to the book value of assets (prime asset ratio), the ratio of total rental operating expenses to total expenses (prime expense ratio), and the ratio of rental net operating income (NOI) to total NOI (prime income ratio) as alternative REIT business focus measures.

We adopt two common measurements of REIT performance: FFO/TA and FFO/TE, which are defined as funds from operations divided by total assets and total equity, respectively. We measure REIT risk using daily stock return data and a firm-level performance measure. The first risk measure adopted is the return volatility of a REIT's stock,¹⁵ which is the annualized standard deviation of daily stock returns. Following the literature, we exclude firms with less than 60 days of returns from the return-volatility calculation. The second risk measure is the three-year rolling standard deviation of FFO/TA.¹⁶ The standard deviation of FFO/TA is an accounting-based firm-level risk measure.

We also include two information-asymmetry proxies in the analysis. The first is the daily bid-ask spread of a REIT's stock, following Silber (2005) and Devos et al. (2019). The second is analyst forecast dispersion of a REIT's FFO, as the dispersion of an analyst's earnings forecast could be a proxy for differences of opinion that result from asymmetric information (Diether et al., 2002; Nagel, 2005; Thomas, 2002).

We also employ REIT operational efficiency measures in this paper. Specifically, we measure a REIT's operating efficiency ratio as the ratio of total expenses minus real estate depreciation and amortization to total revenue (*OER1*) and alternatively as the ratio of non-real-estate-depreciation-and-amortization expenses adjusted for rental operating expenses to total revenue less expense reimbursements (*OER2*). Real estate depreciation and amortization, rental operating expenses, and expense reimbursement are replaced by zero if relevant data are missing from the abovementioned ratios. According to Beracha et al. (2019a, 2019b), a higher (lower) operating efficiency ratio is associated with a less (more) efficient REIT.

We also use the ratio of a REIT's stock price per share to its NAV and its market-to-book ratio to measure its market value. Following Ooi et al. (2019), we define the price-to-NAV ratio as the share price as of the fiscal year-end divided by NAV per share at the same time. REITs' NAV per share is calculated as total assets minus total debt scaled by common shares outstanding. The market-to-book ratio is defined as the market value of a REIT divided by its total assets. Market value is measured as total market-value capitalization less the book value of all non-operational

¹⁵ This measure is generally referred as a listed firm's total risk.

¹⁶ For robustness, we also define firm risk as the four- or five-year rolling standard deviation of FFO/TA and rerun the analysis. The results are quantitatively and qualitatively similar.

real estate assets. This item is reported as real estate value by S&P Global Market Intelligence.¹⁷

We then follow Cheng et al. (2015) and define executive compensation in each firm as the average total compensation paid to a firm's top five executives. The corporate finance and real estate literature shows that firm size is one of the most important determinants of executive compensation (e.g. Gabaix & Landier, 2008; Hardin, 1998; Pennathur & Shelor, 2002), and we therefore calculate the residual executive compensation in REITs while controlling for the total value of their assets by regressing the natural logarithm of executive compensation on the natural logarithm of total assets in the cross-section (i.e. $\text{Log Execu Comp}_{i,t} = \beta_0 + \beta_1 \text{Log Total Assets}_{i,t} + \varepsilon_t$), as in Cheng et al. (2015).

Other control variables we use in the regression analysis include the natural logarithm of total assets (*Log Total Asset*), the natural logarithm of one plus a firm's years in operation since its IPO (*Firm Age*),¹⁸ the ratio of total debt to total equity (*Leverage*), real estate investment growth, the negative of the Herfindahl Index of a REIT calculated based on the firm's assets invested in different MSAs (*Geographic Diversification*) and based on the firm's assets invested in various real estate property types (*Property Type Diversification*), the ratio of the firm's assets invested in the six gateway MSAs to its total assets (*Gateway MSA Concentration*),¹⁹ and a dummy variable that equals one if a REIT is involved in M&A activity in year t and 0 otherwise (*M&A Dummy*). The definitions of the variables mentioned above are also listed in the Appendix Table 13.

Firm-year observations that lack data indicating total assets, total revenue, or rental revenue are excluded. Because we use lagged variables in the regression, firms with less than two years of *PORI* information are also excluded. Numeric variables are winsorized at the 1% and 99% tails of the distributions to avoid the influence of extreme observations. Summary statistics for REIT *POR* ratios, risk, and operational performance measures as well as firm characteristics used in the empirical analysis over the sample period running from 1995 through 2018 are reported in Table 1.

Regarding performance, a typical REIT has an average (median) *FFO/TA* and *FFO/TE* of 4.9% (5.2%) and 13.3% (12.1%), respectively. For firm risk measures, the mean and median of stock return volatility are 0.279 and 0.218, respectively, while the mean and median of the standard deviation of *FFO/TA* are 0.013 and 0.008, respectively. Concerning information asymmetry measures, the mean (median) bid-ask spread is 2.38 (1.94) while the mean (median) analyst forecast dispersion is 0.024 (0.011). In terms of operational efficiency, the mean and median of *OERI* (*OER2*) are 0.65 (0.43) and 0.62 (0.36), respectively. The price-to-NAV ratio has a mean and median of 1.48 and 1.25 while the market-to-book ratio has a mean and median of 1.23 and 1.07. The average total compensation of the top five executives

¹⁷ Negative price-to-NAV and market-to-book ratios are replaced with missing values.

¹⁸ Where IPO date are not available, we calculate firm age based on the year in which a REIT's status as such is established.

¹⁹ The six gateway MSAs are Boston, Chicago, Los Angeles, New York, San Francisco, and Washington, D.C. (see Ling et al., 2020a).

in a REIT has a mean and median of \$2.2 million and \$1.7 million. Regarding POR ratios, the variables of interest, the *POR1* of a typical REIT has an average of 86.7% and a median of 95.4%, while its *POR2* has an average of 78.7% and a median of 83.3%.

Figure 1 illustrates the mean of a REIT's revenues from its main business—property rentals—in our sample for the period running from 1995 through 2018. The figure plots the means and medians of the POR ratios (*POR1* and *POR2*) of REITs in the full sample (the solid line), the top 30 percentiles (the short dashed line), and the bottom 30 percentiles (the long dashed line) for each year. It can be seen on the left side of Panel A that the mean *POR1* of a typical REIT ranged roughly between 82 and 90% while the mean of the top 30 percentiles were all above 97% and the mean of the bottom 30 percentiles ranged roughly between 61 and 79%. These lines indicate that there are wide variations in rental income intensity across REITs each year, even given the existence of a rule that 75% of income has to come from rentals to maintain REIT status.²⁰ The right side of Panel A regarding the median of *POR1* and Panel 2 regarding the median of *POR2* depict a similar pattern.

Research Methodology

A REIT's focus on its main business—property rentals—may be positively linked to its risk when its income sources are highly concentrated. A high level of revenue concentration is a key driver of the cross-sectional variation in risk. One might also argue, however, that a high level of POR can reduce a firm's risk because maintaining a focus on its main business is likely to reduce information asymmetry and improve the firm's operational efficiency. The property-rental-specific human capital in a REIT may be better utilized when it focuses more sharply on its main business. To investigate the relationship between REIT POR and firm risk empirically, we run the following model with heteroscedasticity-robust standard errors that are clustered at the firm-level:

$$Risk_{i,t} = \beta_0 + \beta_1 POR_{i,t-1} + \gamma Controls_{i,t-1} + \alpha_t + \eta_i + \epsilon_{i,t} \quad (1)$$

where the dependent variable is the risk measure (stock return volatility and the standard deviation of FFO/TA) for REIT *i* in year *t*. The key independent variable is the REIT POR ratio (*POR1* and *POR2*). The coefficient of interest, β_1 , measures the cross-sectional relationship between a REIT's risk and its prime operating revenue at the firm level. The control variables (*Controls*) adopted in the regression include the previous-year natural log of total assets, firm age, leverage ratio, real estate investment growth, geographical and property-type diversification, gateway MSA concentration, and an M&A dummy variable. η_i represents real estate property-type

²⁰ See NAREIT, "How to Form a REIT (Real Estate Investment Trust)," and U.S. SEC Investor Bulletin, "Real Estate Investment Trusts (REITs)." Both state that a REIT must derive "at least 75 percent of its gross income from real estate related sources, including rents from real property and interest on mortgages financing real property," to maintain its REIT status.

Table 1 Summary statistics

	Mean	Median	Std. Dev	Min	Max	Obs
Total Assets (\$B)	3.071	1.436	4.502	0.013	25.241	3,876
Leverage	0.497	0.498	0.183	0.000	1.036	3,876
Year Listed	13.441	9.000	12.676	0.000	54.000	3,695
Real Estate Investment Growth	0.217	0.071	0.462	-0.383	2.747	3,682
Geographic Diversification	-0.219	-0.113	0.255	-1.000	-0.014	3,196
Property Type Diversification	-0.792	-0.912	0.237	-1.000	-0.246	3,196
Gateway MSA Concentration	0.234	0.127	0.274	0.000	1.000	3,189
M&A Dummy	0.018	0.000	0.133	0.000	1.000	3,876
Return Volatility	0.279	0.218	0.182	0.118	1.101	3,150
Std. Dev. of FFO/TA	0.013	0.008	0.017	0.001	0.111	3,426
FFO/TA	0.049	0.052	0.035	-0.088	0.146	3,799
FFO/TE	0.133	0.121	0.177	-0.698	1.034	3,799
Bid-Ask Spread	2.381	1.943	1.349	0.940	8.302	3,101
Analysts' Forecast Dispersion	0.024	0.011	0.045	0.000	0.319	2,244
<i>OER1</i>	0.655	0.615	0.270	0.187	2.101	3,813
<i>OER2</i>	0.426	0.359	0.274	0.046	1.866	3,813
Price-to-NAV	1.482	1.249	0.989	0.201	6.465	3,535
Market-to-book	1.125	1.070	0.400	0.163	2.555	3,529
Executive Compensation (\$M)	2.219	1.742	1.772	0.067	8.246	1,327
<i>POR1</i>	0.867	0.954	0.217	0.009	1.027	3,876
<i>POR2</i>	0.787	0.833	0.215	0.009	1.000	3,876
Prime Asset Ratio	0.938	0.966	0.213	0.129	1.388	3,702
Prime Expense Ratio	0.327	0.349	0.139	0.010	0.617	3,511
Prime Income Ratio	0.973	1.000	0.113	0.250	1.015	3,803

In this table we report summary statistics for the main variables used in the empirical analysis. The sample period runs from 1995 through 2018. All variables are defined in the Appendix Table 13. Numerical variables are winsorized at the 1% and 99% levels to avoid the influence of extreme observations

fixed effects and α_t represents year fixed effects. $\epsilon_{i,t}$ is an error term. The variables included in Eq. (1) are defined as they are earlier in "Data and Descriptive Statistics" section and the Appendix Table 13.

Conventional wisdom in finance tells us that a firm's performance is generally positively associated with its risk. To empirically investigate the relationship between REIT POR and performance, a similar approach is adopted, as follows:

$$Perf_{i,t} = \beta_0 + \beta_1 POR_{i,t-1} + \gamma Controls_{i,t-1} + \alpha_t + \eta_i + \epsilon_{i,t} \quad (2)$$

where the dependent variable is the performance measure (i.e. FFO/TA and FFO/TE) for REIT i in year t . Other variables included in Eq. (2) are defined as they are earlier in the text and the Appendix Table 13.

To further evaluate whether REIT POR has a medium-term effect on risk and performance, we adopt a predictive regression model, in which the POR ratios

serve as predictor variables and the risk and performance measures in the medium term serve as the predicted variables, as in Eq. (3) below:

$$Perf_{i,t+h}(Risk_{i,t+h}) = \beta_0 + \beta_1 POR_{i,t} + \alpha_t + \eta_i + \varepsilon_{i,t+h} \quad (3)$$

where $h = 1, \dots, 5$. The variables included in Eq. (3) are defined as they are earlier in the text and the Appendix Table 13.

In an additional analysis, we adopt a similar model by replacing the dependent variables in Eqs. (1) and (2) with our REIT information-asymmetry measure (bid-ask spreads and analyst forecast dispersion) or operational efficiency measures (*OER1* and *OER2*) to examine whether information asymmetry or operational efficiency could be a channel through which REIT POR influences risk and performance.

Since maximizing shareholder wealth is the primary objective of a firm (i.e. value-based management theory), we examine whether the market valuations of REITs would be associated with their rental revenue focus. If POR influences risk and performance in REITs, it is very likely that POR also affects REITs' market valuation. A similar regression is employed to examine the impact of prime operating revenue on REIT market valuation, which is measured as the price-to-NAV ratio and the market-to-book ratio.

Moreover, knowing the extent to which risk and performance in REITs are associated with POR under varying market conditions is important to stakeholders and managers. Thus, we regress REIT risk and performance measures on the previous-year POR ratios, a binary variable for the global financial crisis period, and an interaction term (POR ratios * crisis dummy).

Finally, to examine whether REITs expand their efforts to pursue non-rental revenue, we adopt the following model to show the relationship between executive compensation and REIT POR in the cross-section:

$$Execu\ Comp_{i,t} = \beta_0 + \beta_1 POR_{i,t-1} + \gamma Controls_{i,t-1} + \alpha_t + \eta_i + \varepsilon_{i,t} \quad (4)$$

where the dependent variable is a REIT i 's residual executive compensation in year t , and other variables are defined as they are earlier in the text and the Appendix Table 13. The residual executive compensation measure is obtained by regressing the natural logarithm of total executive compensation on the natural logarithm of total assets for each cross-section. The regression based on Eq. (4) estimates a pooled effect across cross-sections in the panel.

Empirical Results

Main Results

As described above, we begin the analysis of the empirical links between REIT POR and risk by measuring risk using annualized stock return volatility and a three-year rolling standard deviation of FFO/TA. From a theoretical perspective, a REIT's main business focus could lead to higher risk because of the concentration

Table 2 Firm risk

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA
Log Total Assets					-0.020*** [-2.91]	-0.002** [-2.35]	-0.021*** [-2.97]	-0.002** [-2.49]
Firm Age					0.002 [0.54]	-0.001 [-1.53]	0.003 [0.80]	-0.001 [-1.35]
Leverage					0.100*** [2.88]	0.006 [1.22]	0.099*** [2.83]	0.005 [1.14]
Real Estate Investment Growth					-0.002 [-0.31]	0.001 [0.68]	-0.002 [-0.23]	0.001 [0.81]
Geographic Diversification					-0.033 [-1.38]	-0.007* [-1.78]	-0.031 [-1.30]	-0.007* [-1.70]
Property Type Diversification					-0.028 [-1.41]	-0.005* [-1.73]	-0.026 [-1.30]	-0.005 [-1.64]
Gateway MSA Concentration					-0.053*** [-2.74]	-0.004 [-1.31]	-0.057*** [-2.91]	-0.004 [-1.56]
M&A Dummy					0.003 [0.32]	0.003** [1.98]	0.003 [0.30]	0.003* [1.94]
<i>PORI</i>	-0.070** [-2.27]	-0.013*** [-4.58]			-0.056*** [-3.26]	-0.014*** [-4.62]	0.003 [0.03]	0.003* [1.94]
<i>POR2</i>			-0.062** [-2.08]	-0.013*** [-4.42]			-0.061*** [-3.09]	-0.014*** [-4.69]
Constant	0.238*** [9.85]	0.030*** [7.64]	0.230*** [10.51]	0.029*** [7.89]	0.398*** [3.52]	0.035*** [3.95]	0.408*** [3.61]	0.036*** [4.07]
Observations	2,897	3,423	2,897	3,423	2,314	2,672	2,314	2,672

Table 2 (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA
R-squared	0.612	0.073	0.611	0.075	0.722	0.125	0.723	0.126
Property Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

In this table we report the results of regressing risk (stock return volatility and the standard deviation of FFO/TA) in REITs on previous-year POR ratios (*POR1* and *POR2*). The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

of income sources, but such a focus could also reduce risk because such focusing should reduce information asymmetry and improve operational efficiency.

In Table 2 we report the results derived from Eq. (1). The univariate regression results are reported in Columns (1) to (4). When the dependent variable is stock return volatility (standard deviation of FFO/TA), the estimated coefficients of the previous-year POR ratios are -0.070 and -0.062 (-0.013 and -0.013), respectively, both of which are statistically significant at the 5% (1%) level.²¹ The economic significance of the relationship between stock return volatility (standard deviation of FFO/TA) and *POR* is 0.083 (0.167) standard deviations.²² The baseline results suggest that REITs with a higher level of business focus, on average, have lower firm risk.

The multivariate regression results are reported in Columns (5) to (8). Overall, the results provide evidence that REITs that focus sharper on their main rental business experience lower risk, controlling for firm size, firm age, financing, growth opportunity and strategy, and diversification strategies. When the dependent variable is stock return volatility, the estimated coefficients of the previous-year POR ratios are -0.056 and -0.061, both of which are statistically significant at the 1% level. The negative coefficients indicate that REITs with higher POR experience, on average, have lower stock return volatility. The results presented with the standard deviation of FFO/TA as the dependent variable are very similar to the results generated when stock return volatility is the dependent variable. The estimated coefficients of the previous-year POR ratios are both -0.014 and are statistically significant at the 1% level. In addition to the reported coefficients of interest, the results also show that larger REITs and those with higher leverage are associated with lower risk. REITs with higher gateway MSA concentration are associated with lower stock return volatility. However, most of the estimated coefficients of the previous-year geographic and property-type diversification variables are not statistically significant in the regressions. Overall, these results imply that increasing POR shields REITs against risk.

Next, we shed light on the extent to which operational performance is associated with REIT POR. The results derived from Eq. (2) are reported in Table 3. The results show, perhaps surprisingly, that REITs with higher POR enjoy better performance while experiencing less risk, as shown previously.

When the independent variable is previous-year *POR*, the estimated coefficients are positive (0.019 and 0.028 when FFO/TA is the dependent variable and 0.081 and 0.107 when FFO/TE is the dependent variable) with statistical significance at the 1% or 5% levels, as shown in the odd columns. Based on the multivariate regression results, FFO/TA (FFO/TE) increases by 0.028 (0.107) percentage points if *POR* increases by 1%. The economic significance of the relationship between stock return

²¹ That is, ceteris paribus, stock return volatility (standard deviation of FFO/TA) decreases by 0.070 (0.013) percentage points if *POR* increases by 1%.

²² The economic significance is computed by taking the estimated coefficients of *POR* and multiplying it by the unconditional standard deviation of *POR* and dividing by the unconditional standard deviation of stock return volatility (standard deviation of FFO/TA).

Table 3 Performance

Variables	(1) FFO/TA	(2) FFO/TE	(3) FFO/TA	(4) FFO/TE	(5) FFO/TA	(6) FFO/TE	(7) FFO/TA	(8) FFO/TE
Log Total Assets					0.000 [0.25]	-0.003 [-0.57]	0.000 [0.32]	-0.003 [-0.54]
Firm Age					0.005*** [3.00]	0.009 [1.33]	0.004*** [2.84]	0.008 [1.19]
Leverage					-0.058*** [-4.79]	0.064 [0.80]	-0.057*** [-4.61]	0.068 [0.84]
Real Estate Investment Growth					-0.007*** [-3.67]	-0.017* [-1.81]	-0.007*** [-3.80]	-0.018* [-1.90]
Geographic Diversification					0.004 [0.61]	-0.053 [-1.17]	0.004 [0.56]	-0.052 [-1.14]
Property Type Diversification					0.003 [0.38]	-0.035 [-1.16]	0.002 [0.32]	-0.037 [-1.18]
Gateway MSA Concentration					0.016*** [2.69]	0.025 [0.67]	0.018*** [2.87]	0.029 [0.79]
M&A Dummy					0.004 [1.42]	-0.001 [-0.10]	0.004 [1.50]	-0.000 [-0.02]
<i>POR1</i>	0.019** [2.33]	0.081*** [3.39]			0.028*** [3.63]	0.107*** [3.93]		
<i>POR2</i>			0.018** [2.27]	0.061** [2.47]			0.024*** [3.24]	0.072** [2.49]
Constant	0.042*** [5.08]	0.034 [1.13]	0.044*** [5.84]	0.052** [1.99]	0.057** [2.55]	-0.036 [-0.37]	0.061*** [2.75]	0.001 [0.01]

Table 3 (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FFO/TA	FFO/TE	FFO/TA	FFO/TE	FFO/TA	FFO/TE	FFO/TA	FFO/TE
Observations	3,431	3,431	3,431	3,431	2,678	2,678	2,678	2,678
R-squared	0.107	0.070	0.106	0.066	0.236	0.099	0.231	0.094
Property Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

In this table we report the results of regressing operational performance (FFO/TA and FFO/TE) in REITs on previous-year POR ratios (POR1 and POR2). The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

Table 4 Predictive regression on risk and performance

Panel A. Firm Risk										
Variables	Return Volatility			Std. Dev. of FFO/TA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>POR1, t-m</i>	<i>m</i> = 1	<i>m</i> = 2	<i>m</i> = 3	<i>m</i> = 4	<i>m</i> = 5	<i>m</i> = 1	<i>m</i> = 2	<i>m</i> = 3	<i>m</i> = 4	<i>m</i> = 5
	-0.070**	-0.061**	-0.062**	-0.065**	-0.063**	-0.013***	-0.011***	-0.010***	-0.009***	-0.007***
	[-2.27]	[-2.01]	[-2.01]	[-2.32]	[-2.18]	[-4.58]	[-4.54]	[-4.38]	[-3.35]	[-2.85]
<i>POR2, t-m</i>	-0.062**	-0.054*	-0.057*	-0.061**	-0.060**	-0.013***	-0.011***	-0.010***	-0.009***	-0.008***
	[-2.08]	[-1.85]	[-1.91]	[-2.18]	[-2.10]	[-4.42]	[-4.13]	[-4.01]	[-3.17]	[-2.85]
Observations	2,897	2,635	2,375	2,131	1,910	3,423	3,068	2,743	2,450	2,184
R-squared	0.612	0.629	0.662	0.688	0.705	0.073	0.072	0.067	0.066	0.073
Property Type FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Panel B. Performance										
Variables	FFO/TA			FFO/TE						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>POR1, t-m</i>	<i>m</i> = 1	<i>m</i> = 2	<i>m</i> = 3	<i>m</i> = 4	<i>m</i> = 5	<i>m</i> = 1	<i>m</i> = 2	<i>m</i> = 3	<i>m</i> = 4	<i>m</i> = 5
	0.019**	0.020**	0.017**	0.016*	0.015*	0.081***	0.082***	0.074***	0.062***	0.082***
	[2.33]	[2.39]	[2.01]	[1.85]	[1.69]	[3.39]	[3.58]	[3.22]	[2.60]	[3.26]
<i>POR2, t-m</i>	0.018**	0.019**	0.015*	0.014*	0.013	0.061**	0.065***	0.057**	0.045*	0.068***
	[2.27]	[2.37]	[1.90]	[1.70]	[1.50]	[2.47]	[2.90]	[2.51]	[1.88]	[2.69]
Observations	3,431	3,074	2,749	2,455	2,188	3,431	3,074	2,749	2,455	2,188
R-squared	0.107	0.107	0.113	0.116	0.127	0.070	0.074	0.075	0.078	0.077
Property Type FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

In this table we report the regression results for risk (stock return volatility and the standard deviation of FFO/TA) and operational performance (FFO/TA and FFO/TE) in REITs using long lags of POR ratios (*POR1* and *POR2*). Each column represents a separate regression for the dependent variable indicated in the column header. The coefficients on constant, property-type, and year dummies are not reported. The observations and t-squared reported reflect when the dependent variable is *POR1*. t-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

volatility (standard deviation of FFO/TA) and *POR1* is 0.174 (0.010) standard deviations. Regarding *POR2*, as shown in the even columns, the estimated coefficients are 0.018 and 0.024 when FFO/TA is the dependent variable and 0.061 and 0.072 when FFO/TE is the dependent variable. Both findings are statistically significant. In terms of control variables, the results show that REIT performance is negatively correlated with lagged leverage and real estate investment growth. Overall, these results suggest that REITs that increase their POR are, on average, associated with superior performance.

For a deeper understanding of the relationship between firm-level risk, performance, and POR over the medium term, in Table 4 we report the results of the predictive regression from Eq. (3), where the predicted variables are REIT risk (stock return volatility and standard deviation of FFO/TA) and performance (FFO/TA and FFO/TE), and the predictor variables are PORs. Each cell is a separate regression for the predicted variables indicated by the panel headers and the predictor variables indicated by the row labels.

In Panel A of Table 4, which presents the results of a one- and five-year predictive regression where the predicted variables are stock return volatility and the standard deviation of FFO/TA, respectively, the estimated coefficients of the previous-year POR ratios are all negative and statistically significant. The predictive regression results indicate that REITs with POR ratios are, on average, less risky, not only in the cross-section but also over the medium term. The results reported in Panel B demonstrate that REITs that earn higher POR generally have higher FFO/TA for up to four years and higher FFO/TE for up to five years. Again, these results suggest that POR has a significant effect on a firm's operational performance in the near and medium terms.

Collectively, the results presented thus far provide evidence that REIT POR is related negatively to risk and positively to performance; this evidence is statistically and economically significant. The results are robust when we control for other factors that are related to REIT risk and performance, such as size, age, financing, investment growth, diversification, and growth strategy. The positive relationship obtains in the cross-section as well as over the medium term.

Additional Analysis

We next report the empirical links between REIT POR and our information-asymmetry measures (i.e. bid-ask spread and analyst forecast dispersion). The results obtained with bid-ask spread as the dependent variable and POR ratios as the independent variables are reported in columns (1) and (3) of Table 5. The estimated coefficients of previous-year POR ratios are -0.470 and -0.435, with statistical significance at the 1% level. Concerning analyst forecast dispersion, the estimated coefficients are also negative (-0.032 and -0.034), as can be seen in columns (2) and (4). Both coefficients are statistically significant at the 1% level. Overall, the results suggest that firms that earn a higher fraction of their revenue from their core rental business, on average, experience less information asymmetry.

Next, we examine the effects of POR on firm-level operational efficiency. The results are reported in Table 6. The negative estimated coefficients of previous-year *POR1* (-0.349 when *OERI* is the dependent variable and -0.496 when *OER2* is the dependent variable) and their statistical significance, as shown in columns (1) and (2), imply that REITs with higher POR are associated with, on average, higher operational efficiency (lower OER). In terms of *POR2*, the estimated coefficients are also significantly negative (-0.335 and -0.482), as seen in columns (3) and (4). Overall, the results presented in this table indicate that operational efficiency in REITs is positively related to their POR.

After confirming that high-rental-revenue REITs are able to (1) reduce risk exposure (i.e. stock return volatility and the standard deviation of FFO/TA), (2) generate greater cash flow with the same assets or equity (i.e. higher FFO/TA and FFO/TE), and (3) experience less information asymmetry and higher operational efficiency, we investigate whether REIT POR is related to market valuation. We expect to find a positive relationship between REIT value and POR insofar as the classic discounted cash flow tells us that the present value (i.e., market valuation) of a REIT should be high when it generates higher cash flow (i.e. more FFO) and a lower discounted rate (i.e. lower risk).

We report the regression results, which examine whether high-rental-revenue REITs generally are higher-valued than low-rental-revenue REITs, in Table 7. In columns (1) and (3) we present the results obtained when the dependent variable is the price-to-NAV ratio. The estimated coefficient of previous-year *POR1* is 0.338 and is statistically significant at the 1% level, while that of previous-year *POR2* is 0.239 and is statistically significant at the 5% level. These results suggest that a REIT's POR is positively associated with its premium-to-NAV ratio. Regarding the market-to-book ratio, the estimated coefficients of previous-year POR ratios are both positive (0.470 and 0.386) and statistically significant at the 1% level. These results suggest that a REIT's market-to-book ratio is generally higher when it earns higher rental revenue. The results also imply that maintaining a high level of business focus (i.e. on property rentals) enables REIT managers to maximize shareholder wealth.

In the next step in our analysis, we examine whether differentials exist in the relationship between REIT POR on the one hand and risk and performance on the other under varying market conditions. In Table 8 we present the regression results with a binary variable for the financial crisis period and an interaction term (*POR ratios * crisis dummy*) added to Eqs. (1) and (2). Not surprising, the estimated coefficients of the financial crisis dummy are positive (negative) when the dependent variables are firm risk (performance) measures, with statistical significance at the 1% or 5% levels. The estimated coefficients of POR ratios are negative (positive) when the dependent variables are firm risk (performance) measures. More importantly, when the dependent variables are stock return volatility and standard deviation of FFO/TA, the estimated coefficients for *POR1*Crisis Dummy* (*POR2*Crisis Dummy*) are -0.213 and -0.020 (-0.227 and -0.021), respectively, with statistical significance at the 1% level. When the dependent variables are FFO/TA and FFO/TE, the estimated coefficients for the *interaction terms* are all positive (0.054, 0.136, 0.044 and 0.107), and with statistical significance. The results show that REITs with higher POR, on

Table 5 Information asymmetry

Variables	(1) Bid-Ask Spread	(2) Analysts' Forecast Dispersion	(3) Bid-Ask Spread	(4) Analysts' Forecast Dispersion
Log Total Assets	-0.173*** [-3.25]	-0.004*** [-2.60]	-0.176*** [-3.31]	-0.004*** [-2.76]
Firm Age	-0.014 [-0.41]	-0.000 [-0.24]	-0.006 [-0.17]	-0.000 [-0.00]
Leverage	0.876*** [3.05]	0.018* [1.83]	0.870*** [2.99]	0.018* [1.94]
Real Estate Investment Growth	-0.033 [-0.57]	0.003 [1.17]	-0.029 [-0.50]	0.004 [1.29]
Geographic Diversification	-0.286 [-1.29]	-0.002 [-0.38]	-0.275 [-1.22]	-0.002 [-0.34]
Property Type Diversification	-0.242 [-1.46]	0.006 [0.91]	-0.226 [-1.35]	0.008 [1.04]
Gateway MSA Concentration	-0.491*** [-3.02]	-0.008 [-1.37]	-0.514*** [-3.18]	-0.010 [-1.61]
M&A Dummy	0.037 [0.47]	0.001 [0.08]	0.035 [0.45]	0.000 [0.06]
<i>POR1</i>	-0.470*** [-3.42]	-0.032*** [-3.43]		
<i>POR2</i>			-0.435** [-2.50]	-0.034*** [-3.72]
Constant	3.203*** [3.74]	0.104*** [4.34]	3.212*** [3.77]	0.107*** [4.70]
Observations	2,308	1,818	2,308	1,818
R-squared	0.703	0.080	0.702	0.084
Property Type FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

In this table we report results of regressing the information asymmetry measures (bid-ask spreads and analyst forecast dispersion) in REITs on previous-year POR ratios (*POR1* and *POR2*). The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

average, experience less risk and superior performance at all times, with the effects in the crisis period seemingly greater.

As our business focus measure is based on revenues, this might be a potential problem as they do not necessarily measure focus, but the possible outcomes. To address this concern, we use three alternative business focus measures based on REITs' assets, expenses, and NOI. They are prime asset ratio (land & buildings / total assets), prime expense ratio (rental operating expense / total expense), and prime income ratio (rental NOI / NOI), respectively.

Table 6 Operational efficiency

Variables	(1)	(2)	(3)	(4)
	<i>OER1</i>	<i>OER2</i>	<i>OER1</i>	<i>OER2</i>
Log Total Assets	-0.019* [-1.86]	-0.014* [-1.71]	-0.021** [-2.01]	-0.017* [-1.97]
Firm Age	-0.022** [-2.11]	-0.040*** [-4.44]	-0.018* [-1.75]	-0.035*** [-3.94]
Leverage	0.525*** [9.42]	0.486*** [8.08]	0.517*** [9.12]	0.474*** [7.38]
Real Estate Investment Growth	-0.005 [-0.29]	0.000 [0.01]	-0.001 [-0.08]	0.005 [0.30]
Geographic Diversification	-0.072 [-1.36]	-0.063 [-1.50]	-0.067 [-1.23]	-0.055 [-1.26]
Property Type Diversification	-0.040 [-0.76]	-0.015 [-0.35]	-0.034 [-0.63]	-0.006 [-0.14]
Gateway MSA Concentration	-0.077* [-1.89]	-0.093*** [-2.69]	-0.094** [-2.25]	-0.117*** [-3.38]
M&A Dummy	0.008 [0.37]	-0.007 [-0.36]	0.005 [0.26]	-0.010 [-0.56]
<i>POR1</i>	-0.349*** [-7.34]	-0.496*** [-12.63]		
<i>POR2</i>			-0.335*** [-7.26]	-0.482*** [-11.49]
Constant	0.591*** [3.86]	0.630*** [4.68]	0.598*** [3.98]	0.646*** [4.85]
Observations	2,693	2,693	2,693	2,693
R-squared	0.314	0.387	0.312	0.386
Property Type FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

In this table we report the results of regressing operational efficiency (*OER1* and *OER2*) in REITs on previous-year POR ratios (*POR1* and *POR2*). The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

Table 9 reports the results on the relationship between REITs' firm risk and performance and their business focus measures based on assets, expenses, and NOI. Negative relations between firm risk and prime asset ratio, prime expense ratio, and prime income ratio are evident. When the dependent variable is stock return volatility, the coefficients (*t*-statistics) of the three business focus measures are -0.039 (-1.63), -0.053 (-1.38), and -0.060 (-2.43). When the dependent variable is the standard deviation of FFO/TA, the coefficients of the previous-year firm-specific prime asset ratio, prime expense ratio, and prime income ratio are -0.010, -0.010, and -0.011, with statistically significant at the 10% or 1% level. There are evidence

Table 7 Market valuation

Variables	(1)	(2)	(3)	(4)
	Price-to-NAV	Market-to-Book	Price-to-NAV	Market-to-Book
Log Total Assets	-0.010 [-0.68]	0.001 [0.19]	-0.010 [-0.64]	0.003 [0.42]
Firm Age	0.153*** [7.62]	0.044*** [5.19]	0.149*** [7.42]	0.038*** [4.51]
Leverage	1.926*** [10.21]	0.057 [0.89]	1.934*** [10.23]	0.068 [1.03]
Real Estate Investment Growth	-0.088** [-2.18]	-0.028* [-1.75]	-0.090** [-2.23]	-0.031* [-1.90]
Geographic Diversification	-0.149* [-1.78]	-0.051 [-1.50]	-0.149* [-1.78]	-0.056 [-1.58]
Property Type Diversification	-0.191** [-2.11]	-0.061 [-1.64]	-0.198** [-2.19]	-0.069* [-1.86]
Gateway MSA Concentration	0.775*** [11.32]	0.227*** [7.57]	0.789*** [11.50]	0.247*** [8.20]
M&A Dummy	0.036 [0.43]	-0.011 [-0.33]	0.038 [0.45]	-0.009 [-0.28]
<i>POR1</i>	0.338*** [3.02]	0.470*** [8.95]		
<i>POR2</i>			0.239** [2.18]	0.386*** [7.74]
Constant	0.373 [0.73]	0.930*** [3.67]	0.451 [0.88]	0.980*** [3.88]
Observations	2,579	2,594	2,579	2,594
R-squared	0.303	0.259	0.302	0.248
Property Type FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

In this table we report the results of regressing market-valuation measures (the price-to-NAV ratio and the market-to-book ratio) in REITs on previous-year POR ratios (*POR1* and *POR2*). The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

that operating performance are positively related to prime asset ratio, prime expense ratio, and prime income ratio. Specifically, the coefficients of the previous-year firm-specific prime asset ratio and prime expense ratio are positive and statistically highly significant, while the coefficients of the previous-year firm-specific prime income ratio are positive but insignificant. The results suggest that REIT risk and performance are closely associated with its business focus measured according to a firm's assets, expenses, and NOI. Overall, these results provide strong support on the main result that REITs with a high level of business focus, on average, are associated with lower firm risk and superior performance.

Table 8 In the global financial crisis period (2007–2009)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA	FFO/TA	FFO/TE	FFO/TA	FFO/TE
Log Total Assets	-0.021*** [-3.32]	-0.001** [-2.14]	-0.022*** [-3.43]	-0.001** [-2.44]	-0.002 [-1.62]	-0.008 [-1.49]	-0.002 [-1.44]	-0.008 [-1.43]
Firm Age	0.002 [0.53]	-0.001 [-0.92]	0.003 [0.72]	-0.001 [-0.82]	0.003* [1.72]	0.005 [0.62]	0.002 [1.63]	0.004 [0.54]
Leverage	0.118*** [3.46]	0.006 [1.25]	0.118*** [3.48]	0.006 [1.17]	-0.061*** [-4.97]	0.065 [0.83]	-0.060*** [-4.79]	0.067 [0.86]
Real Estate Investment Growth	0.004 [0.60]	0.001 [0.73]	0.005 [0.69]	0.001 [0.84]	-0.006*** [-3.31]	-0.013 [-1.44]	-0.006*** [-3.40]	-0.014 [-1.52]
Geographic Diversification	-0.029 [-1.20]	-0.008* [-1.84]	-0.025 [-1.05]	-0.007* [-1.73]	0.005 [0.76]	-0.047 [-1.06]	0.004 [0.61]	-0.049 [-1.07]
Property Type Diversification	-0.024 [-1.23]	-0.006* [-1.76]	-0.023 [-1.14]	-0.006* [-1.68]	0.005 [0.64]	-0.034 [-1.10]	0.005 [0.59]	-0.035 [-1.11]
Gateway MSA Concentration	-0.051** [-2.52]	-0.004 [-1.44]	-0.052*** [-2.63]	-0.005 [-1.63]	0.018*** [2.92]	0.029 [0.78]	0.019*** [3.05]	0.033 [0.87]
M&A Dummy	0.012 [0.95]	0.002 [1.37]	0.012 [0.97]	0.002 [1.42]	0.009*** [3.39]	0.012 [1.12]	0.009*** [3.38]	0.013 [1.17]
Financial Crisis Dummy	0.589*** [10.64]	0.020*** [3.16]	0.579*** [12.66]	0.019*** [3.69]	-0.057*** [-3.24]	-0.158*** [-2.72]	-0.044*** [-3.21]	-0.122** [-2.27]
POR1	-0.029 [-1.60]	-0.011*** [-3.94]			0.021*** [2.88]	0.084*** [3.16]		
POR1 * Crisis Dummy	-0.213*** [-3.63]	-0.020*** [-2.89]			0.054*** [2.81]	0.136** [2.14]		
POR2			-0.030 [-1.57]	-0.012*** [-4.08]			0.021*** [2.87]	0.060** [2.12]

Table 8 (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	Std. Dev. of FFO/TA	FFO/TA	FFO/TE	FFO/TA	FFO/TE
<i>POR2</i> * Crisis Dummy			-0.227*** [-4.27]	-0.021*** [-3.46]			0.044*** [2.66]	0.107* [1.66]
Constant	0.392*** [3.55]	0.029*** [3.43]	0.402*** [3.62]	0.031*** [3.59]	0.085*** [4.18]	0.052 [0.55]	0.083*** [4.14]	0.075 [0.82]
Observations	2,314	2,672	2,314	2,672	2,678	2,678	2,678	2,678
R-squared	0.536	0.115	0.537	0.119	0.210	0.080	0.204	0.076
Property Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	NO	NO	NO	NO	NO	NO	NO

In this table we report the results of regressing risk (stock return volatility and standard deviation of FFO/TA) and operational performance (FFO/TA and FFO/TE) in REITs on previous-year POR ratios (*POR1* and *POR2*), a binary variable for the global financial crisis period (2007–2009) and an interaction term for POR ratios and crisis dummy. The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

Table 9 Business focus measured based on assets, expense, and net operating income

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Return Volatility	Std. Dev. of FFO/TA	Return Volatility	FFO/TA	Return Volatility	Std. Dev. of FFO/TA	FFO/TA	FFO/TE	Return Volatility	Std. Dev. of FFO/TA	FFO/TA	FFO/TE	
Log Total Assets	-0.020*** [-2.83]	-0.002** [-2.35]	0.001 [0.61]	-0.004 [-0.67]	-0.020*** [-2.72]	-0.001** [-2.04]	0.001 [0.49]	-0.004 [-0.63]	-0.021*** [-3.00]	-0.002** [-2.38]	0.000 [0.19]	-0.004 [-0.66]	
Firm Age	0.004 [0.87]	-0.001 [-1.18]	0.004*** [2.80]	0.007 [1.05]	0.006 [1.50]	-0.001 [-0.64]	0.003* [1.93]	0.001 [0.16]	0.004 [0.95]	-0.001 [-1.22]	0.004*** [2.72]	0.008 [1.15]	
Leverage	0.099*** [2.85]	0.007 [1.40]	-0.064*** [-6.74]	0.056 [0.71]	0.085** [2.14]	0.003 [0.67]	-0.044*** [-3.60]	0.105 [1.17]	0.096*** [2.70]	0.005 [1.02]	-0.055*** [-4.37]	0.071 [0.86]	
Real Estate Investment Growth	-0.001 [-0.11]	0.000 [0.49]	-0.004** [-2.10]	-0.013 [-1.38]	-0.001 [-0.15]	0.001 [1.25]	-0.005*** [-2.63]	-0.016 [-1.51]	0.001 [0.14]	0.001 [1.36]	-0.008*** [-4.63]	-0.021** [-2.32]	
Geographic Diversifica- tion	-0.026 [-1.09]	-0.008* [-1.86]	0.002 [0.34]	-0.067 [-1.52]	-0.043* [-1.76]	-0.009* [-1.95]	0.007 [0.92]	-0.044 [-0.91]	-0.036 [-1.50]	-0.008* [-1.90]	0.006 [0.93]	-0.044 [-0.98]	
Property Type Diversifica- tion	-0.023 [-1.16]	-0.006* [-1.93]	0.004 [0.55]	-0.042 [-1.38]	-0.029 [-1.37]	-0.005 [-1.46]	0.006 [0.72]	-0.027 [-0.92]	-0.030 [-1.44]	-0.005 [-1.56]	0.003 [0.41]	-0.034 [-1.11]	
Gateway MSA Con- centration	-0.052*** [-2.63]	-0.004 [-1.48]	0.017*** [3.22]	0.021 [0.56]	-0.052*** [-2.66]	-0.003 [-1.05]	0.011* [1.68]	0.009 [0.25]	-0.054*** [-2.72]	-0.004 [-1.32]	0.018*** [2.74]	0.030 [0.80]	
M&A Dummy	0.001 [0.07]	0.003** [2.06]	0.004 [1.24]	0.002 [0.19]	0.008 [0.80]	0.003* [1.80]	0.004 [1.20]	0.001 [0.07]	0.004 [0.43]	0.003* [1.82]	0.006* [1.92]	0.005 [0.37]	
Prime Asset Ratio	-0.039* [-1.93]	-0.010*** [-2.87]	0.058*** [7.90]	0.131*** [3.36]									
Prime Expense Ratio					-0.053 [-1.38]	-0.010* [-1.76]	0.070*** [4.50]	0.249*** [3.09]					

Table 9 (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Return Volatility	Std. Dev. of FFO/TA	FFO/TA	FFO/TA	Return Volatility	Std. Dev. of FFO/TA	FFO/TA	FFO/TA	Return Volatility	Std. Dev. of FFO/TA	FFO/TA	FFO/TE
Prime Income Ratio												
Constant	0.385*** [3.43]	0.031*** [3.18]	0.012 [0.58]	-0.075 [-0.71]	0.373*** [2.98]	0.022** [2.48]	0.061*** [2.73]	0.009 [0.09]	0.421*** [3.34]	0.033*** [3.47]	0.067*** [2.23]	0.020 [0.17]
Observations	2,254	2,601	2,607	2,607	2,152	2,479	2,485	2,485	2,284	2,628	2,634	2,634
R-squared	0.724	0.119	0.320	0.117	0.725	0.110	0.244	0.112	0.715	0.106	0.225	0.091
Property Type FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

In this table we report the results of regressing risk (stock return volatility and the standard deviation of FFO/TA) and operational performance (FFO/TA and FFO/TE) in REITs on previous-year year prime asset ratio (land & buildings / total assets), prime expense ratio (rental operating expense / total expense), and prime income ratio (rental NOI / NOI), respectively. The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

Table 10 Executive compensation

Variables	(1) Residual Executive Compensation	(2) Residual Execu- tive Compensa- tion
Firm Age	0.005 [1.24]	0.005 [1.27]
Leverage	0.517* [1.81]	0.540* [1.91]
Real Estate Investment Growth	0.038 [0.27]	0.049 [0.35]
Geographic Diversification	-0.093 [-0.36]	-0.095 [-0.37]
Property Type Diversification	-0.562** [-2.49]	-0.564** [-2.48]
Gateway MSA Concentration	0.065 [0.32]	0.043 [0.20]
M&A Dummy	-0.052 [-0.39]	-0.054 [-0.41]
<i>POR1</i>	-0.671* [-1.85]	
<i>POR2</i>		-0.740* [-1.71]
Constant	0.175 [0.52]	0.191 [0.54]
Observations	1,120	1,120
R-squared	0.153	0.157
Size- <i>t</i> FE	YES	YES
Property Type FE	YES	YES
Year FE	YES	YES

In this table we report the results of regressing residual executive compensation in REITs on previous-year POR ratios (*POR1* and *POR2*). The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

Next, we check whether the principal-agent issue induces some REITs to pursue non-rental revenue by linking executive compensation to REIT POR. We first compute residual executive compensation after excluding firm size effects on compensation and then examine correlations between residual executive compensation and POR ratios using Eq. (4). The results reported in Table 10 indicate that lagged POR ratios are negatively correlated with REIT executive compensation in both columns, with statistical significance at the 10% level. These results provide evidence that REIT managers are compensated with higher pay when they pursue non-rental-revenue businesses more extensively, which is positively associated with risk and

Table 11 Determinants of prime operating revenue ratios

Variables	(1) <i>POR1</i>	(2) <i>POR2</i>
Log Total Assets	-0.009*** [-2.90]	-0.014*** [-4.44]
Firm Age	-0.002 [-0.51]	0.009* [1.92]
Leverage	0.040* [1.86]	0.024 [1.09]
Real Estate Investment Growth	0.013 [1.34]	0.021** [2.14]
Geographic Diversification	0.058*** [3.73]	0.080*** [5.26]
Property Type Diversification	-0.032** [-2.21]	-0.018 [-1.19]
Gateway MSA Concentration	0.035*** [2.80]	-0.012 [-1.00]
M&A Dummy	0.010 [0.73]	0.009 [0.61]
Constant	0.893*** [14.54]	0.933*** [15.81]
Observations	2,729	2,729
R-squared	0.340	0.345
Property Type FE	YES	YES
Year FE	YES	YES

In this table we report the results of regressing POR ratios (*POR1* and *POR2*) in REITs on previous-year firm characteristics. The coefficients on property-type and year dummies are not reported. *t*-statistics are reported in brackets. Standard errors are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, and 1 asterisk, respectively. All variables are defined in the Appendix Table 13

negatively associated with operational performance, as indicated in the conspicuous results reported in Tables 3 and 4.

We next identify which types of REITs earn higher POR by running a regression where the dependent variables are *POR1* and *POR2*. The independent variables are the same REIT characteristics as those used in the previous analysis. In Table 11, we present the results. The estimated coefficients of previous-year total assets are both negative (-0.009 and -0.014), with *t*-statistics of -2.90 and -4.44. This result indicates that, as a REIT grows, it is more likely to pursue non-rental-revenue business. This result is in line with our expectation that larger firms prefer stronger vertical integration of their businesses. Moreover, the estimated coefficients of previous-year geographic diversification are 0.058 and 0.080 and are statistically significant at the 1% level.

Lastly, the COVID-19 pandemic is wreaking havoc on our health and economic activities. Because real estate is a cornerstone of social and economic activities, the REIT market environment has changed substantially during the coronavirus pandemic (Ling et al. 2020b). The performance and risk associated with real estate assets during the first three quarters of 2020 have changed dramatically. Thus, we examine whether there exist differentials in REIT performance and risk that exhibit varying levels of business focus. Specifically, we regress REIT operational performance (FFO/TA) and risk (standard deviation of FFO/TA) during the first three quarters of 2020 on average POR ratios and firm characteristics since 2010. Table 12 presents the results.

Overall, the results show that REITs earning higher POR in recent years generally achieve superior operational performance while reducing risk. More specifically, the estimated coefficients of average *POR1* and *POR2* in recent years are both 0.010 when the dependent variable is FFO/TA in 2020 Q1, Q2, and Q3, with statistical significance at the 5% level. Meanwhile, the estimated coefficients of average *POR1* and *POR2* in recent years are -0.009 and -0.010, respectively, when the dependent variable is the standard deviation of FFO/TA during the first three quarters of 2020, with statistical significance at the 1% level. The results using the coronavirus pandemic as a quasi-experiment also provide some evidence pertaining to the effects of business focus on real estate performance and risk.

Conclusions

This paper examines whether and to what extent a firm's main business focus is related to risk and performance, using U.S.-listed equity REITs' unique setting. One of the requirements for maintaining REIT status is earning at least 75 percent of gross income from real estate-related sources. REITs have, however, remained deeply involved in non-property-rental real estate businesses in recent decades. There is a lack of studies addressing the effects of main business focus on REITs as well as non-REITs. We measure a REIT's main business focus by reference to its POR ratio, which is defined as the ratio of its rental revenue to its total revenue, and investigate the relationship between REIT POR on the one hand and risk and performance on the other, the differentials in these effects between the recent financial crisis and normal market times, and their correlations with information asymmetry, operational efficiency, and executive compensation.

Using a sample of REITs for the 1995–2018 period, we show that REITs with strong main business focus reduce risk, measured by stock return volatility and the standard deviation of FFO/TA, and achieve superior operational performance, measured by FFO/TA and FFO/TE, than REITs that diffuse their focus into non-prime businesses. The negative (positive) relationship between POR and risk (performance) exists in the cross-section as well as over the medium term. The above relationships exist even after controlling for geographic diversification and property type diversification. These effects are especially important when the economy is in recession and the real estate market declines. Moreover, high-POR REITs are also associated with reduced information asymmetry,

Table 12 The effect of business focus on performance and firm risk in the pandemic

Variables	(1) FFO/TA	(2) FFO/TA	(3) Std. Dev. of FFO/TA	(4) Std. Dev. of FFO/TA
Log Total Assets	0.000 [0.50]	0.000 [0.43]	0.001 [1.64]	0.001 [1.61]
Firm Age	0.000 [1.16]	0.000 [1.26]	-0.000 [-0.01]	-0.000 [-0.18]
Leverage	-0.005 [-0.90]	-0.005 [-0.86]	0.004* [1.95]	0.004* [1.87]
Real Estate Investment Growth	0.001 [0.27]	0.000 [0.11]	0.000 [0.16]	0.001 [0.39]
Geographic Diversification	0.002 [0.81]	0.002 [0.76]	-0.001 [-0.30]	-0.001 [-0.25]
Property Type Diversification	-0.006* [-1.85]	-0.005 [-1.65]	0.002 [0.97]	0.002 [0.71]
Gateway MSA Concentration	0.002 [0.51]	0.002 [0.59]	-0.002 [-0.77]	-0.002 [-0.85]
M&A Dummy	-0.003 [-0.42]	-0.004 [-0.68]	-0.002 [-0.52]	-0.001 [-0.14]
<i>POR1</i>	0.010** [2.26]		-0.009*** [-2.85]	
<i>POR2</i>		0.010** [2.39]		-0.010*** [-3.15]
Constant	-0.006 [-0.53]	-0.004 [-0.39]	-0.000 [-0.03]	-0.001 [-0.27]
Observations	323	323	323	323
R-squared	0.125	0.123	0.263	0.265

In this table we report the results of regressing operational performance (FFO/TA) and risk (standard deviation of FFO/TA) in REITs during the first three quarters of 2020 on average POR ratios (*POR1* and *POR2*) and firm characteristics since 2010. *t*-statistics are reported in brackets. Standard errors are clustered at the firm level and are heteroscedasticity-robust. Significance at the 1%, 5%, and 10% levels is shown with 3, 2, or 1 asterisk, respectively. All variables are defined in the Appendix 13

higher operational efficiency, and greater firm value. Moreover, executives generally receive higher compensation for bearing extra risk in non-rental-revenue businesses, which harms performance. Larger REITs tend to pursue non-rental-revenue businesses to a greater extent.

Collectively, our findings illustrate the importance of a firm's main business focus (e.g., property rentals for REITs) and contribute to the literature on this underexplored topic. Investors need to pay closer attention to the revenue-generating mechanisms of their respective industries, a finding that equity REITs in particular should note. From the REIT perspective, managers should focus on utilizing their specific knowledge and experience in property rentals, as focusing on their prime business—property rentals—is not only highly profitable but also less risky.

Appendix

Table 13 Definitions of variables

Variable	Definition
Prime Operating Revenue Ratio 1 (<i>POR1</i>)	Rental revenue divided by total revenue
Prime Operating Revenue Ratio 2 (<i>POR2</i>)	Rental revenue less expense reimbursement divided by total revenue. Expense reimbursement is replaced with zero if relevant data are missing
Prime Asset Ratio	The ratio of the sum of the book value of land and the book value of buildings and improvements to total assets
Prime Expense Ratio	The ratio of total rental operating expenses to total expenses
Prime Income Ratio	The ratio of rental net operating income (NOI) to total NOI
Firm Age	The natural logarithm of one plus the number of years since the IPO or REIT status was established if the IPO year is missing (Year Listed)
Leverage Ratio	The ratio of the total debt to total assets
Real Estate Development Growth	The real estate development growth rate, as reported by S&P Global Market Intelligence
Geographic Diversification	The negative of the Herfindahl Index of REITs, calculated using assets invested in different MSAs, based on net book value
Property Type Diversification	The negative of the Herfindahl Index of REITs, calculated using assets invested in various real estate property types, based on net book value
Gateway MSA Concentration	The ratio of a REIT's real estate assets invested in the six gateway MSAs to its total assets, based on book value. Gateway MSAs are defined as Boston, Chicago, LA, New York, San Francisco, and Washington D.C
Mergers and Acquisitions Dummy (M&A Dummy)	A binary variable indicating whether a REIT is involved in merger and acquisition activities as a buyer or a seller in a given year
Real Estate Property Type	A REIT's real estate property type, which is determined by a tenant's uses of a property as reported by S&P Global Market Intelligence
Return Volatility	The standard deviation of daily stock returns in each firm-year
Funds from Operations on Assets (FFO/TA)	Funds from operations divided by total assets
Funds from Operations on Equity (FFO/TE)	Funds from operations divided by total equity
Std. Dev. of FFO/TA	The three-year rolling standard deviation of FFO/TA
Bid-Ask Spread	Daily bid-ask Spread (Spread) is calculated as $[(Ask - Bid)/(Ask + Bid)/2]$, spread over the calendar year
Analyst Forecast Dispersion	The ratio of the standard deviation of analyst forecasts of FFO to the median of analyst forecasts of FFO

Table 13 (continued)

Variable	Definition
Operating Efficiency Ratio 1 (<i>OER1</i>)	The ratio of total expenses minus real estate depreciation and amortization to total revenue. Real estate depreciation and amortization are replaced with zero if relevant data are missing
Operating Efficiency Ratio 2 (<i>OER2</i>)	The ratio of total expenses minus real estate depreciation and amortization minus rental operating expenses to total revenue minus expense reimbursements. Real estate depreciation and amortization, rental operating expenses, and expense reimbursement are replaced with zeros if relevant data are missing
Price-to-NAV ratio	Share price divided by net asset value per share. Net asset value per share is calculated as total assets minus total debt scaled by shares outstanding. Negative price-to-NAV is replaced with missing values
Market-to-Book ratio	The market value of REITs divided by total assets. Market value is measured as total market-value capitalization less the book value of all non-operational real estate assets. The item is reported as real estate value in S&P Global Market Intelligence. A negative market-to-book ratio is replaced with missing values
Executive Compensation	The average total compensation (<i>tdc1</i> in ExecuComp) of the top five executives in a firm

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