REIT and REOC Systematic Risk Sensitivity

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Abstract Real Estate Investment Trusts (REITs) and Real Estate Operating Companies (REOCs) seem to have different systematic risk levels even though both invest almost exclusively in real estate-related assets. The findings indicate that business risk is negatively related to systematic risk, as measured by beta, for REITs, while betas are positively related to agency costs for REOCs. The two groups' betas also show differing sensitivity to real estate property type and regional location. REITs' systematic risk is also sensitive to financial leverage and financing form.

Introduction

The most universally accepted investment advice is: diversify. Further advice holds that a diversified investment portfolio should include real estate. Real Estate Investment Trusts (REITs) are a proven way to obtain such diversification for the average investor. Chandrashekaran (1999) shows REITs decrease a portfolio's return variance and De Wit (1997) touts the unique diversification benefits of real estate in the United States. The numerical growth of an alternative real estate investment vehicle, Real Estate Operating Companies (REOCs), raises the issue of whether REOCs may provide a superior diversification alternative to REITs. Given that both forms exist to invest in real estate, any reason for investor preference should lie in regulated differences. While many would identify taxes as the most important difference, the ability to pursue growth with internally generated funds is arguably of greater importance.

Looking at the two firm types more closely, there would seem to be little reason for a preference based on business risk. Investors might prefer REOCs based on their greater investment in hotel/motel assets, but if REOCs and REITs are compared with similar investments, the two form's systematic risk from underlying business risk should also be similar. In that case, tax treatment and permissible activities are two likely determinants of the preferable structure as Damodaron, John and Liu (1997) hold. However, REOCs' ability to use internally generated cash flows seems to be a more important factor as it allows REOCs greater growth probability. In fact, Chan, Erickson and Wang (2003) state that the REIT form is a disadvantage for any firm wanting to adopt a high-growth strategy.

The basic requirements to be a REIT as set forth by the IRS are: (1) they must distribute 90% of income as dividends;[1] (2) ownership must include 100 shareholders or more (with a prohibition against five or fewer shareholders owning 50% or more of the shares); (3) at least 75% of assets must be real estate oriented, cash and/or government securities; (4) 75% or more of income must come from rent, mortgages and gains from selling property (although the property should not be owned principally for re-sale); and (5) they must hire independent real estate professionals to execute certain management activities.

However, one fact about REITs is often misunderstood. It is true that, if a REIT follows all requirements, the income used to pay dividends to its shareholders will be exempt from corporate income taxes. Thus, its shareholders can avoid double taxation on their earnings. However, it is not true that the REIT itself is exempt from taxes. Any income not distributed as dividends by the REIT is subject to corporate income taxes. Of course, the taxable amount should be relatively small: 10% of income at most and, given the fact that many REITs have enough depreciation to allow distributions of 100% or more of net earnings, effectively none.

The REOC format grew very slowly, but has become more viable in recent times.[2] In the past, the tax advantages of the REIT outweighed any disadvantages. However, the limitation on permissible activities seems to have driven recent changes in the industry. Part of the reason seems to be associated with the passage of the REIT Simplification Act of 1997 and the REIT Modernization Act of 1999. Between them, the two acts increased the permissible activities of REITs by allowing Taxable REIT Subsidiaries (TRS). However, the second act prohibits a TRS from operating or managing hotels or health care facilities. Thus, a REIT is limited where a REOC is not, thus, the likely reason why so many hotel/motel investment firms have the REOC form.

In general, REOCs face fewer restrictions than REITs. REOCs do not have to pay any specific level of income as dividends (and most pay none), there is no minimum restriction on the number of owners nor limits on ownership concentration, the company can invest in any assets of its choosing, income may be derived from any investment combination and specific tasks are not required to be conducted by outside management. These factors lead to three potentially important differences between REOCs and REITs. First, REOC shareholders' dividends face double taxation as REOCs' taxation is the same as a standard corporation's. Second, REOCs have greater investment opportunity sets, which they can fund with internally generated funds without penalty (*i.e.*, forfeiting tax advantages). Third, REOCs do not need to hire outside management.

However, we do not believe the difference in taxes is truly material to the individual investor. First, the REITs investigated in this study paid over $2 million per year in taxes on average. This means that almost all of these REITs will be paying taxes at the highest marginal rates of 34%–39%—just like REOCs. Second, while REIT shareholders can avoid double taxation, REOC investors can

do the same if REOCs retain earnings; an idea in keeping with Miller and Scholes (1978) who hold that investors should equate the after-tax returns from the disparate dividend policies.[3]

The other two potential factors, growth and outside management are important. REOCs' ability to retain earnings allows greater growth opportunities without added external funding. Since growth is generally positively related to shareholder returns, investors should prefer REOCs based on this factor.

The impact of outside management requirements is not as clear. REITs and, at times, REOCs hire outside management. If outside management serves as a monitor of inside management, the monitoring could decrease principal–agent problems. However, it seems just as likely that the existence of outside management adds multiple layers of potential principal–agent problems as shareholders would have to worry about aligning internal and external management's interests with the shareholders'. As such, self-managed firms should have a lower agency cost potential. The latter position has support from studies (*e.g.*, Cannon and Vogt, 1995) that find self-managed REITs' performance superior. The two views together lead to no clear-cut advantage for investors in regards to the REOC or REIT form based on REOC's ability to forego outside management.

The two factors, retaining earnings for growth and outside management, also overlap. REITs, with their required dividend payouts, would seem to have little need to hire outside management for monitoring purposes. That expectation seems correct given that 66% of the REITs in the final sample choose self-management.[4]

The implications from the dividend and outside management issues also lead to differing conclusions concerning the use of leverage. REITs retain few earnings, leading to the likely need for external financing to fund growth. While new debt should be less expensive than new equity, Ghosh, Nag and Sirmans (1997) report REITs raised roughly twice as much in equity than debt over 1991–1996. Perhaps REITs need to raise added equity to replace the funds paid out as dividends, but they can not take full advantage of the tax shield for interest expense.

The same situation viewed differently means REOCs' lower dividend payout leads to the need for greater monitoring. One possible way REOCs could align management's interests with shareholders' is the use of leverage (Ross, 1977).[5] If true, REOCs should have greater leverage than REITs. Furthermore, the equation developed in Hamada (1969) leads to the expectation that firms with greater leverage will have more systematic risk.[6] Thus, the leverage argument leads to the expectation that REOCs will have greater systematic risk than REITs, all else equal.[7]

In summary, the superior form, REIT or REOC, would be the one that provides the best combination of growth opportunities and management interest alignment with shareholders, with the minimum risk. REOCs seem to provide better growth opportunities, but REITs would seem to have less principal/agent conflict

potential. The next section examines the literature related to these issues. The sections that follow cover the data, methodology, results and conclusion.

Literature Review

The REIT-related literature is extensive. Gyourko and Sinai (1999) provide a good introduction to REITs with their thorough discussion of REITs' tax structure along with the retained earnings implications. The authors find that the REIT structure is valuable, but estimate only 2%–5% of REITs' market capitalization comes from their organizational structure.

Damodaron, John and Liu (1997) also consider the implications of organizational form for real estate investment in regards to changes from REITs, limited partnerships, trusts and corporations into another's form. They report that troubled firms always move to more flexible organizational forms and show some performance improvements. Changing from REIT to REOC form would be such a move. Healthy firms generally move to more restrictive organizational forms and exhibit greater profitability and dividend payouts, with lower free cash flows.

While numerous studies consider the explanation of REIT returns (*e.g.*, Chan, Hendershott and Sanders, 1990; Allen, Madura and Springer, 2000; and Conover, Friday and Howton, 2000), the importance of REIT systematic risk is open to question. Some studies, for example Chen, Hsieh, Vines and Chiou (1998), do not find systematic risk to be a significant variable in explaining REIT returns when including firm size and market-to-book ratio. Others (*e.g.*, Redman and Manakyan, 1995; and Mooradian and Yang, 2001) show the need to control any investigation using systematic risk for geographic location and property types.

However, several studies (Patel and Olsen, 1984; Khoo, Hartzell and Hoesli, 1993; and Ambrose and Linneman, 2000) do specifically investigate the components of REITs' systematic risk. Patel and Olsen examine REIT systematic risk during 1976–1978 as a function of financial leverage, business risk, advisor fee variability, property owned as a percentage of total assets and marketability of REIT shares. They find financial leverage, business risk and advisor fee variability to be positively related to systematic risk. Khoo, Hartzell and Hoesli study the decrease in REIT systematic risk between 1970 and 1989. They report the lower risk over time to be related to increased information availability (proxied by the number of analysts tracking the REITs). They conclude that REIT systematic risk varies over time. Similarly, Ambrose and Linneman find REIT systematic risk greater in 1995–1996 as compared to 1990–1994. Furthermore, their results show REIT systematic risk to be positively related to dividend payout, asset growth, debt structure and office building concentration.

Building on these works, a model is developed to examine the determinants of REIT and REOC systematic risk. One basic question is whether the risk levels will be significantly different for the two groups. Another question is whether the components of each group's systematic risk are different.

Data and Model Specification

From the SNL Database (see Reeder, 2001), we identify all 168 (145 REITs, 23 REOCs) equity real estate firms trading on the New York or American Stock Exchanges or in the NASDAQ system from January, 1997 through October, 2002. The study begins with 1997 as seven of the twenty-three REOCs have their IPOs after that date. One implication being that stock valuations were nearing their peak. The next step is to create a more comparable sample considering the fact that the investments of these REOCs are predominantly hotel/motel related. The sample contains all fourteen publicly traded hotel/motel REITs. Fearing low degrees-of-freedom problems, a random number generator was used to select REITs randomly until the subsample contained REITs with 46% of their funds invested in hotel/motel assets so as to match the REOC sample's hotel/motel property concentration. This REIT subsample contains thirty-two firms. Therefore, the sample has thirty-two REITs and twenty-three REOCs, but with approximately the same hotel/motel investment exposure.

Annual data was collected for total assets (TA), debt variables [long-term (LTD), short-term (STD), variable rate (VRD) and convertible (CD)], average gross properties (AGP), funds from operations (FFO), general and administrative expenses (GA), net operating income (NOI) and the number of common shares outstanding (CSO) from the SNL Database. Annual average trading volume and systematic risk information was extracted from the Commodity Systems Inc. (CSI) and Compustat databases.

The ''beta'' measurement from Compustat is used as the systematic risk measurement. Compustat calculates betas over a five-year period using month-end closing prices for the company's stock and Standard & Poor's 500 Index Price for the market portfolio proxy. If price information is missing, Compustat will furnish a beta using as few as twenty-four months' data.

The investigation of the determinants of real estate investment companies' systematic risk sensitivity begins with definitions of the following variables suggested by the literature:

1. *Financing*. Various ratios are used to examine the impact of debt financing on REIT and REOC systematic risk. In general, greater debt usage should be positively related to systematic risk in keeping with Hamada (1969). Either the ratio of long-term debt to total assets or short-term debt to assets given the wide array of financing packages used by these real estate firms is employed.

2. *Variable Rate Financing*. The ratio of variable rate debt to total debt. This ratio is used as a proxy for the firm's sensitivity to changes in borrowing cost.

3. *Business Risk*. The ratio of funds from operations to total assets (FFO/ TA) is used as the measure of business risk. FFO is before interest and

taxes so that the implications of financial leverage and taxes can be separated. Funds from operations are scaled by total assets to account for differences in company sizes. It is expected that a lower ratio (reflecting more uncertainty as to cash flows) will lead to a larger beta.

4. *Marketability*. The natural logarithm of the ratio of average trading volume to common shares outstanding. It is expected that higher marketability is related to lower systematic risk.

5. *Agency*. The ratio of ''general and administrative expenses'' to net income. The greater the ratio, the more likely that agency cost is a problem and the higher the beta for the firm. REITs, with their higher dividend payouts and lower growth expectations should have lower agency problems than REOCs. Agency costs should be positively related to systematic risk.

Exhibit 1 presents descriptive statistics for the variables separated by REOCs and REITs. No means are significantly different between the two groups, but simply observation reveals a few interesting things. First, the average beta for REITs (0.313) compared to REOCs (0.492) shows why REITs have been touted as a good diversification tool. Second, the samples are ''matched'' to the same level of hotel/motel investment, REITs no longer seem to have the higher risk and, in fact, have the lower average beta; although there is no statistical difference. Also, both REOCs and REITs rely on long-term debt (68.49% for REITs vs. 46.37% for REOCs) with REITs using variable rate financing at a higher rate than REOCs (21.23% vs. 11.43%).

Exhibit 1 | Descriptive Statistics

	REIT		REOC	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
Short-term Financing, %	4.976	30.390	10.044	49.446
Long-term Financing, %	68.492	51.166	46.369	77.987
Variable Financing, %	21.231	36.319	11.431	74.960
Marketability	9.734	1.679	10.414	2.780
Agency Cost	0.158	2.358	2.845	22.669
Business Risk	0.109	0.199	0.074	0.072
Beta	0.313	0.249	0.492	0.595

Note: Short-term financing is the ratio of short-term debt to total assets, long-term financing is the ratio of long-term debt to total assets, variable-rate financing is the ratio of variable rate debt to total debt, marketability is the natural log of the ratio of average trading volume to common shares outstanding, agency cost is the ratio of general and administrative expenses to net operating income, business risk is the ratio of funds from operations to total assets and beta is a measure of market risk.

The REIT and REOC differences indicate that a two-factor model examining returns sensitivity to the market index and interest rates may provide added insight. This possibility is investigated using the following model:

$$(R - R_f) = (R_{SP500} - R_f) + (R_{T\text{-}bonds} - R_f), \tag{1}$$

where R is REOCs' returns (REITs' returns), R_f is the realized yield on thirty-day U.S. Treasury Bills, $R_{T\text{-}bonds}$ is the realized yield on ten-year U.S. Treasury Bonds and R_{SP500} is the rate of return on the S&P 500 Index.

The comparison in Exhibit 2 confirms that REOCs and REITs have relatively low sensitivity to stock market movements, but also shows a need to consider the spread of the term structure of interest rates. The negative coefficient on the term premium means that REOC and REIT returns increase when the term premium spread decreases. This result implies REIT and REOC values increase as the relative yield on long-term bonds decreases, which would be consistent with the firms' being able to take advantage of refinancing at lower rates during the test period.

The means tests also show that REOCs have higher risk relative to the stock market index and REITs show greater absolute risk to changing term structure situations. Based on this evidence, if comparing like-property investments for REITs and REOCs, the REITs seem to be the better portfolio diversification tool.

The second step in the analysis is to investigate the systematic risk of REOCs and REITs by estimating the following model:

Exhibit 2 | REOC and REIT Comparison

	REOC	REIT
Intercept	−0.034**	−0.035
	(0.079)	(0.988)
$R_{SP500}-R_f$	0.385*	0.228*
	(0.000)	(0.000)
$R_{T\text{-}bonds}-R_f$	−0.152*	−0.008*
	(0.007)	(0.006)
Adj. R^2	2.9%	2.3%

Note: Mean tests on market premium and term premium coefficients are significant. Coefficients are in parentheses.
* Significant at the 1% level.
** Significant at the 10% level.

$$Beta_t = \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing$$
$$+ \delta_t * Marketability + \phi_t * AgencyCost$$
$$+ \varphi_t * BusinessRisk + \varepsilon_t, \tag{2}$$

where $Beta_t$ is the systematic risk in period t, *FinancingTerm* is the ratio of short-term (long-term) debt to total debt in period t, *VRfinancing* is the ratio of variable debt to total debt in period t, *Marketability* is the natural log of the ratio of trading volume to the number of common shares outstanding in period t, *Agency Cost* is the ratio of General and Administrative Expenses to Net Operating Income in period t, *Business Risk* is the ratio of Funds From Operations to Total Assets in period t and ε_t is the error term. Exhibit 3 reports the correlation matrix for the variables and does not raise undue multicollinearity concerns.

Redman and Manakyan (1995) find real estate assets invested in health care property provide higher risk-adjusted performance, so the following variable is added to Equation (2):

6. *Property Types*. The ratio of investment in a specific property type to total assets.

Variables for are also added for commercial, industrial, residential and undeveloped properties based on descriptors set by the National Council of Real Estate Investment Fiduciaries (NCREIF).

$$Beta_t = \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing$$
$$+ \delta_t * Marketability + \phi_t * AgencyCost$$
$$+ \varphi_t * BusinessRisk + \gamma_t * CP + \tau_t * Ind$$
$$+ \kappa_t * Resid + \lambda_t * Land + \varepsilon_t, \tag{3}$$

where *CP* is the percentage of assets invested in commercial property (defined as shopping centers, office buildings and hotels/motels), *Ind* is the percentage of assets invested in industrial properties (defined as factories, warehouses and industrial parks), *Resid* is the percentage of assets invested in residential properties (defined as single- and multi-family housing as well as manufactured houses), *Land* is the percentage of assets invested in undeveloped land.

Redman and Manakyan (1995) also find investment in Western U.S. properties impact REIT risk-adjusted returns. To recognize the possible influence of regional location on risk, the following variable is added to Equation (4):

Exhibit 3 | Correlation Matrix

	Short-term Financing	Long-term Financing	Variable Financing	Marketability	Agency Cost	Business Risk	Beta
Panels A: REITs							
Short-term Financing	1						
Long-term Financing	0.202	1					
Variable Financing	0.111	0.343	1				
Marketability	0.268	−0.095	−0.052	1			
Agency Cost	0.040	0.095	0.078	0.073	1		
Business Risk	−0.078	−0.135	−0.054	0.690	0.009	1	
Beta	−0.189	0.142	−0.150	−0.233	−0.055	−0.312	1
Panel B: REOCs							
Short-term Financing	1						
Long-term Financing	0.849	1					
Variable Financing	0.390	0.342	1				
Marketability	0.166	0.204	0.100	1			
Agency Cost	−0.064	−0.118	−0.024	−0.211	1		
Business Risk	−0.042	−0.016	0.099	0.288	−0.417	1	
Beta	0.012	0.038	−0.068	−0.159	0.330	−0.234	1

Note: Short-term financing is the ratio of short-term debt to total assets, long-term financing is the ratio of long-term debt to total assets, variable-rate financing is the ratio of variable rate debt to total debt, marketability is the natural log of the ratio of average trading volume to common shares outstanding, agency cost is the ratio of general and administrative expenses to net operating income, business risk is the ratio of funds from operations to total assets, and beta is a measure of market risk.

7. *Geographic Area.* Variable to account for regional variations in economic growth in the U.S. The NCREIF regional definitions are used.

$$
\begin{aligned}
Beta_t = {} & \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing \\
& + \delta_t * Marketability + \phi_t * AgencyCost \\
& + \varphi_t * BusinessRisk + \gamma_t * NE \\
& + \tau_t * ME + \kappa_t * WN + \lambda_t * EN + \mu_t * SE \\
& + \nu_t * SW + o_t * P + \pi_t * F + \overline{\omega}_t * MO + \varepsilon_t, \qquad (4)
\end{aligned}
$$

where NE, ME, WN, EN, SE, SW, P and MO are the percentage of property invested in the northeast, mideast, west north central, east north central, southeast, southwest, pacific and mountain regions of the U.S., F is the percentage of property invested in foreign locations.

Equations (2), (3) and (4) are estimated separately for the REIT and REOC subsamples.

Results

Exhibit 4 presents the results from estimating Equation (2) with the *Financing* variable short-term debt to total assets in Panel A and long-term debt to total assets in Panel B.[8] Empirical results show that REITs' business risk is negatively related to beta and significant at the 1% level. Thus, a lower ratio (reflecting more uncertainty as to cash flows) leads to a larger beta. Agency Cost is found to be positively related to REOCs' beta (Panel B). Thus, REOCs, which have neither the outside management nor the dividend payout requirements of REITs, exhibit a greater relationship between agency costs and systematic risk.

The findings from Exhibit 4 reveal that the debt financing variables have no impact on REOC betas. Based on the discussion that most REITs retain no earnings and that the findings indicate a higher percentage of debt for REITs, the REITs' market performance should be more sensitive to their financing choice than REOCs. Exhibit 4 shows REITs' reliance on short-term financing decreases their systematic risk (Model 1, Panel A's short-term financing coefficient is −0.149 and significant at the 10% level), where REITs' choice to finance operations through long-term debt increases their market risk (Model 2, Panel A's long-term financing coefficient is 0.118 and significant at the 5% level).

In Exhibit 4, Model 2, Panel A also shows REITs' variable-rate financing ratio is negatively related to systematic risk (variable-rate financing coefficient is −0.205 and significant at the 1% level). Overall, the *Financing* coefficient supports the

Exhibit 4 | Determinants of Systematic Risk in Real Estate Companies

	Intercept	Financing	VR Financing	Marketability	Agency Cost	Business Risk	Adj. R² (%)	CNᵃ	A.I.C.ᵇ	B.I.C.ᶜ
Panel A: Model 2										
REITs	−10.240	−0.149***	−0.081	−0.942	−0.526	−77.755*	11.64	3.065	9.735	7.002
	(0.624)	(0.100)	(0.286)	(0.621)	(0.591)	(0.004)				
REOCs	−18.330	0.046	−0.036	−0.587	0.470*	−51.233	8.7	2.760	10.090	7.390
	(0.239)	(0.545)	(0.470)	(0.661)	(0.007)	(0.341)				
Panel B: Model 2A										
REITs	−13.442	0.118**	−0.205*	−0.622	−0.707	−76.611*	13.28	4.256	9.716	6.983
	(0.518)	(0.014)	(0.002)	(0.741)	(0.468)	(0.004)				
REOCs	−23.102	0.054	−0.043	−0.730	0.484*	−47.468	9.46	2.862	10.081	7.385
	(0.156)	(0.260)	(0.377)	(0.586)	(0.005)	(0.375)				

Note:

Model 2: $Beta_t = \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing + \delta_t * Marketability + \phi_t * AgencyCost + \varphi_t * BusinessRisk + \varepsilon_t$, where $Beta_t$ is the systematic risk of real estate companies in period t, *Financing* is the ratio of short-term debt to total debt in period t, *VRfinancing* is the ratio of variable debt to total debt in period t, *Marketability* is the natural log of (trading volume / number of common shares outstanding) in period t, *Agency Cost* is the ratio of General and Administrative Expenses to Net Operating Income in period t, *Business Risk* is the ratio of Funds from Operations to Total Assets in period t and ε_t is an error term.

Model 2a: $Beta_t = \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing + \delta_t * Marketability + \phi_t * AgencyCost + \varphi_t * BusinessRisk + \varepsilon_t$, where the variables are as described above except *Financing*, which is the ratio of long-term debt to total debt in period t.

ᵃCN is the conditional number measuring multicollinearity.

ᵇA.I.C. is the Akaike Information Criteria.

ᶜB.I.C. is the Schwartz measure of the model's goodness of fit as we add model variables.

*Significant at the 1% level.

**Significant at the 5% level.

***Significant at the 10% level.

Exhibit 5 | Property Use Impact on the Systematic Risk of Real Estate Companies

	Intercept	ST Financing	VR Financing	Marketability	Agency Cost	Business Risk	Commercial	Industrial	Residential	Land	Adj. R² (%)	CN[a]	A.I.C.[b]	B.I.C.[c]
Panel A: Model 3														
REITs	−23.928	−0.153*	−0.101	−1.373	−0.408	−70.642***	0.043	−0.128**	0.065	−0.011	14.41	24.047	9.724	7.061
	(0.318)	(0.089)	(0.188)	(0.467)	(0.681)	(0.009)	(0.845)	(0.012)	(0.512)	(0.830)				
REOCs	17.307	0.001	−0.001	1.024	0.441**	−72.750	−0.098	0.151	−0.160*	0.172**	13.46	14.097	10.068	7.466
	(0.507)	(0.989)	(0.968)	(0.568)	(0.012)	(0.186)	(0.234)	(0.342)	(0.076)	(0.014)				

	Intercept	LT Financing	VR Financing	Marketability	Agency Cost	Business Risk	Commercial	Industrial	Residential	Land	Adj. R² (%)	CN[a]	A.I.C.[b]	B.I.C.[c]
Panel B: Model 3A														
REITs	−27.163	0.119**	−0.229***	−1.002	−0.532	−70.364***	0.033	−0.123**	0.055	−0.029	15.98	25.349	9.706	7.042
	(0.254)	(0.013)	(0.001)	(0.590)	(0.590)	(0.009)	(0.877)	(0.015)	(0.578)	(0.562)				
REOCs	8.671	0.057	−0.022	0.583	0.455***	−61.966	−0.103	0.136	−0.151*	0.172**	14.65	14.052	10.054	7.452
	(0.745)	(0.225)	(0.653)	(0.745)	(0.009)	(0.256)	(0.211)	(0.386)	(0.092)	(0.012)				

Notes:

Model 3: $Beta_t = \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing + \delta_t * Marketability + \phi_t * AgencyCost + \varphi_t * BusinessRisk + \gamma_t * CP + \tau_t * Ind + \kappa_t * Resid + \lambda_t * Land + \varepsilon_t$, where $Beta_t$ is the systematic risk of real estate companies in period t, $Financing$ is the ratio of short-term debt to total debt in period t, $VRfinancing$ is the ratio of variable debt to total debt in period t, $Marketability$ is the natural log of (trading volume / number of common shares outstanding) in period t, $Agency Cost$ is the ratio of General and Administrative Expenses to Net Operating Income in period t, $Business Risk$ is the ratio of Funds From Operations to Total Assets in period t, CP is the percentage of assets invested in commercial property (shopping center, office buildings, hotels/motels), IND is the percentage of assets invested in industrial property (factories, warehouses, industrial parks), $RESID$ is the percentage of assets invested in residential real estate (single- and multi-family housing and manufactured homes), $Land$ is the percentage of assets invested in land and ε_t is an error term.

Model 3a: $Beta_t = \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing + \delta_t * Marketability + \phi_t * AgencyCost + \varphi_t * BusinessRisk + \gamma_t * CP + \tau_t * Ind + \kappa_t * Resid + \lambda_t * Land + \varepsilon_t$, where the variables are defined as above with $Financing$ is the ratio of long-term debt to total debt in period.

[a]CN is the conditional number measuring multicollinearity.

[b]A.I.C. is the Akaike Information Criteria.

[c]B.I.C. is the Schwartz measure of the model's goodness of fit as we add model variables.

*Significant at the 1% level.

**Significant at the 5% level.

***Significant at the 10% level.

Exhibit 6 | Property Geographic Location Impact on the Determinants of Systematic Risk of Real Estate Companies

Variable	REITs				REOCs			
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Intercept	−16.7760	0.456	−18.483	0.411	−10.721	0.620	−11.253	0.605
Short-term financing	−0.195**	0.046			−0.013	0.864		
Long-term financing			0.110**	0.033			0.097	0.856
Variable rate financing	−0.108	0.199	−0.248***	0.001	0.044	0.404	0.036	0.495
Marketability	−1.454	0.463	−1.106	0.574	0.676	0.696	0.634	0.713
Agency Cost	−0.713	0.495	−0.783	0.454	0.328*	0.085	0.325*	0.087
Business Risk	−57.265**	0.040	−59.738**	0.031	−115.054*	0.056	−112.588*	0.060
NE	0.003	0.967	−0.020	0.748	0.035	0.773	0.040	0.740
ME	−0.029	0.764	−0.029	0.762	−0.252**	0.019	−0.253**	0.018
WN	−0.055	0.405	−0.055	0.407	−0.315*	0.064	−0.321**	0.060
EN	−0.136*	0.066	−0.107	0.138	−0.058	0.788	−0.062	0.775
SE	0.166**	0.022	0.139*	0.051	−0.036	0.642	−0.033	0.671
SW	0.109	0.278	0.090	0.369	0.468**	0.024	0.461**	0.026
P	−0.009	0.897	0.012	0.866	−0.155**	0.027	−0.151**	0.034
F	0.104	0.868	0.013	0.839	−0.063	0.413	−0.053	0.527
MO	−0.059	0.482	−0.086	0.293	0.087	0.469	0.094	0.444
Adjusted R^2	12.64%		13.20%		21.03%		21.03%	

Exhibit 6 | (continued)

Property Geographic Location Impact on the Determinants of Systematic Risk of Real Estate Companies

Variable	REITs				REOCs			
	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
F value	3.395	0.000	3.459	0.000	3.206	0.000	3.327	0.000
A.I.C	9.770		9.763		10.014		10.014	
B.I.C.	7.194		7.188		7.530		7.530	
CN	6.719		7.346				15.698	

Notes:

Model 4: $Beta_t = \alpha_t + \beta_t * FinancingTerm + \chi_t * VRfinancing + \delta_t * Marketability + \phi_t * AgencyCost + \varphi_t * BusinessRisk + \gamma_t * NE + \tau_t * ME + \kappa_t * WN + \lambda_t * EN + \mu_t * SE + \nu_t * SW + o_t * P + \pi_t * F + \overline{\omega}_t * MO + \varepsilon_t$, where $Beta_t$ is the systematic risk of equity REIT in period t, *Financing* is the ratio of short-term debt (long-term debt) to total debt in period t, *VRfinancing* is the ratio of variable debt to total debt in period t, *Marketability* is the a natural log of (trading volume / number of common shares outstanding) in period t, *Agency Cost* is the ratio of General and Administrative Expenses to Net Operating Income in period t, *Business Risk* is the ratio of Funds From Operations to Total Assets in period t, *NE* is the percentage of assets invested in property located in the northeast U.S., *ME* is the percentage assets invested in property located in the mideast U.S., *WN* is the percentage assets invested in property located in the west north central U.S., *EN* is the percentage assets invested in property located in the east north central U.S., *SE* is the percentage assets invested in property located in the southeast U.S., *SW* is the percentage assets invested in property located in the southwest U.S., *P* is the percentage assets invested in property located in the pacific U.S., *F* is the percentage assets invested in property located in foreign countries, *MO* is the percentage of assets invested in property location in the mountain U.S. and ϵ_t is an error term.

[a] CN is the conditional number measuring multicollinearity.

[b] A.I.C. is the Akaike Information Criteria.

[c] B.I.C. is the Schwartz measure of the model's goodness of fit as we add model variables.

*Significant at the 1% level.

**Significant at the 5% level.

***Significant at the 10% level.

expectation that higher leverage leads to greater systematic risk. At the same time, the estimated coefficient of *VRfinancing* suggests that higher variable rate debt leads to lesser systematic risk. Recall that Exhibit 1 shows 21.23% of REIT debt is variable rate.

Empirical evidence in Exhibit 5 suggests that real estate firms' market risk is sensitive to the real estate investment type. REITs' investing in industrial properties exhibit a lower level of systematic risk (estimated coefficient is −0.128 and significant at the 5% level in Model 3, Panel A and −0.123 in Model 4, Panel A). The findings imply that REOCs' investing in undeveloped land increases their systematic risk exposure (estimated coefficient is 0.172 and significant at the 5% level in both Model 3, Panel A and Model 4, Panel A), while housing investment reduces REOCs' average systematic risk (the estimated coefficient is −0.160 and significant at the 10% level in Model 3, Panel A and −0.151 in Model 4, Panel A). The improved adjusted R^2 measures and the significance of the various property variables show the usefulness of adding them to Equation (2).

Exhibit 6 reports the results from estimating Equation (4). The findings indicate a statistically significant relation between properties' geographical location and real estate firms' systematic risk. Property ownership in the southeastern U.S. adds systematic risk for REITs while investing in the east north central region decreases REITs' risk.

Investing in the mid-east, west north central and pacific regions shows a negative relation to REOC systematic risk while investing in the southwest has a positive relation. Thus, investors should carefully examine the geographical location of REIT and REOC properties before making real estate investment choices.

The findings also indicate that relationships between business risk, agency cost and systematic risk are robust. After controlling for the property locations, agency cost is still positively related to REOC systematic risk, and business risk is negatively related to REIT market risk. However, for the first time, the uncertainty of REOCs' ability to generate cash flows from operations adds to their systematic risk exposure. Thus, greater uncertainty as to cash flows leads to higher systematic risk for REOCs as is does for REITs in keeping with expectations.

Conclusion

Based on casual observation, REITs' systematic risk appears to be consistently greater than REOCs', even though both investment company structures invest almost exclusively in real estate. However, once a sample of REITs is created with the same investment percentage in hotel/motel assets, REOCs seem to have relatively greater systematic risk. Once the sample controls for a firm's returns for a term structure, REOCs' systematic risk is significantly greater than REITs'. To examine the differences in REIT and REOC systematic risk further, systematic risk is estimated as a function of financing, marketability, agency cost, business risk, and either property function or geographic location.

In every formulation, REIT systematic risk has a negative relationship to the ratio of funds from operations to total assets. Thus, the lower the certainty of cash flows from normal operations, the greater the systematic risk. For REOCs, higher agency costs as measured by the ratio of general and administrative expenses to net operating income have a positive relationship to systematic risk in every formulation.

Evidence is also found to corroborate the findings of Redman and Manakyan (1995) as to the importance of controlling for property type and location. The findings indicate that REITs with greater industrial property holdings have lower systematic risk. In another formulation, REITs with greater investments in the southeast have greater systematic risk. For REOCs, greater residential and undeveloped land holdings show lower and higher systematic risk, respectively. Also, investing in the mid-east, west north central and pacific shows negative relationships to systematic risk while investing in the southwest shows a positive relationship.

Taken together, the results provide support for the following:

1. The potential for agency costs seems to be a greater worry for REOCs;
2. Business risk, as measured by funds from operations to total assets, is an important factor for both REITs and REOCs, but of greater significance to REITs;
3. Controlling for the property type and location is important in comparing these real estate property investment firms; and
4. The financing method utilized is of more importance for REITs than REOCs in explaining systematic risk. For REITs, greater short-term financing and variable-rate financing are both negatively related to systematic risk. These results support the idea of lesser interest rate risk leading to lower systematic risk. Also, greater long-term debt has a positive relationship to REIT systematic risk, as expected.

In summary, the findings show that REOCs have greater systematic risk than REITs after controlling for term structure considerations. REITs and REOCs also have similar, but different systematic risk traits. Taken together, REITs should afford better diversification possibilities in general, but investors should also consider geographic and/or property use specifics.

Endnotes

[1] The distribution rate changed from 95% to 90% on January 1, 2001.

[2] Hilton Hotels was the first REOC in 1947. The next still actively traded REOC did not have its IPO until 1970 and seven of the twenty-three REOCs in the sample have an IPO date from 1997 or later.

[3] If approved in its current form, the recent 2003 tax package will reduce REITs' dividend advantage further as REIT dividends would continue to be taxed at the 38.6% rate while non-REIT dividends would be taxed at the 15% rate.

[4] Of the 145 REITs initially identified, 82.8% choose self-management.

[5] Given that 87.0% of the REOCs in the sample choose self-management, outside managers do not seem to provide a monitoring role for REOCs.

[6] Note that the Hamada model builds on the Modigliani and Miller (1958, 1963) models. In addition, Ehrhardt and Daves (2002) discuss problems related to these models when considering firms with non-zero growth.

[7] A further complicating factor is interest rate risk, which should be positively related to systematic risk. However, Allen, Madura and Springer (2000) find no relation between interest rate risk and REIT stock returns.

[8] Note that the conditional number does not indicate any multicollinearity problems for any of the regressions nor do the Akaike index and the Swartz B.I.C. indicate significant problems for adjusted R^2s from adding variables to the models in Exhibits 4–6.

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