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REIT Capital Structure:

The Value of Getting It Right

by Eva Steiner

EXECUTIVE SUMMARY

An analysis of the capital structure of commercial real estate investment trusts finds that the strongest REITs overall tend to employ lower leverage and longer debt maturity, maintain larger proportions of fixed-rate debt, rely less on secured debt, have a greater line of credit capacity but use it less, and hold smaller cash reserves. The REITs' strength is measured by Tobin's q, which expresses the ratio of the market value of assets relative to their book value. The study examines yearly data for the years 1993 through 2013 for 137 REITs based in the United States and the years 2001 through 2013 for 50 REITs in France, Germany, the Netherlands, and the United Kingdom. Looking specifically at hotel REITs, the study found generally similar outcomes in terms of the capital-structure characteristics associated with the strongest hotel firms, although their q ratios were lower overall. However, hotel REITs tended to have greater leverage, shorter debt maturity, and more cash on hand to market value than REITs as a whole. The financial crisis of 2007-09 highlighted the value of limited leverage, as well as fixed-rate and secured debt.

ABOUT THE AUTHOR

Eva Steiner, Ph.D., is an assistant professor of real estate at the School of Hotel Administration in the Cornell SC Johnson College of Business. Prior to joining Cornell, she was an assistant professor at the University of Cambridge, UK, where she taught undergraduate- and graduate-level real estate finance and applied econometrics. Steiner's research interests include real estate finance and economics. Her recent work is focused on real estate investment trusts (REITs) and examines their capital structure decisions and performance. Steiner's research has been published in *Real Estate Economics, Journal of Real Estate Finance and Economics,* and *Journal of Portfolio Management.* She regularly contributes to academic and industry conferences. Her work has been recognized through a number of international honors and awards, including an award from the American Real Estate and Urban Economics Association, and has attracted sponsorship from academic and industry-related sources, such as the Real Estate Research Institute. A graduate of the University of Heilbronn, Germany, she earned her MPhil and PhD degrees from the University of Cambridge, UK.

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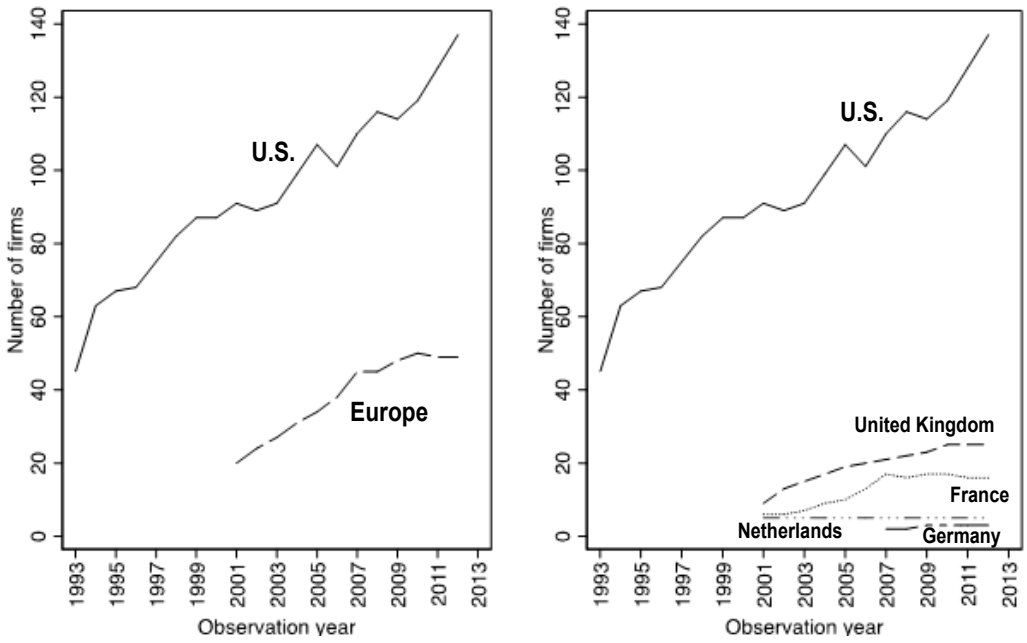
The optimal capital structure of a firm—particularly a real estate investment trust—is a complex package encompassing multiple dimensions. Inherent in this complexity is the principle that a REIT's capital structure connects directly to its performance. For this reason, I sought to identify those combinations of REIT capital-structure characteristics that are empirically related to superior firm quality.

EXHIBIT 1

Sample size and evolution



Note: The number of REITs listed on the SNL database expanded during the study period. Firms that were formed during the study period enter the sample when they first appear on SNL. Firms that were acquired or went out of business during the sample period are included for as long as they are active on SNL and dropped when they become inactive, to avoid survivorship and selection bias.

Country	Min	Max	N
France	6	17	150
Germany	2	3	16
Netherlands	5	5	60
United Kingdom	9	25	234
United States	45	137	1876

Recognizing that international disparities in legal, institutional, and tax systems may have significant implications for the empirical links between the composition of capital structure and firm value in different countries, I further sought to contrast and compare the empirical links between capital structure and firm quality for REITs in the United States and four European nations. I also analyzed the factors that support firm quality for hotel REITs, given their distinctive underlying structure.

Finally, I consider the effects of the global financial crisis and the subsequent recovery, by examining how the links between the composition of capital structure and firm value vary through the real estate and capital market cycle.

In this empirical analysis, I study a sample of international, listed real estate investment firms from the U.S. and four European countries, namely, France, Germany, the Netherlands, and the United Kingdom. Due to data availability, the U.S. analysis runs from 1993 through 2013, while the European data cover 2001 through 2013. I include all firms reported on the SNL Financial database that are classified as listed equity REITs or listed property companies in the sample countries.[1] As detailed in Exhibit 1, the number of firms grew from year to year, particularly in the United States, which totaled 137 REITs in the final year of the analysis. The number of European REITs was much smaller, as Germany had three REITs in the database; France, seventeen; the Netherlands, five; and the United Kingdom, twenty-five.

[1] Acquired by McGraw Hill Financial in 2015, SNL Financial is now part of S&P Global Market Intelligence. marketintelligence.spglobal.com/

EXHIBIT 2

Financial characteristics of U.S. and European REITs

Variable	United States			Europe		
	N	Mean	SD	N	Mean	SD
q-ratio	1876	1.28***	0.27	460	0.99	0.19
Market leverage	1876	0.47	0.18	453	0.52	0.19
Debt maturity	1655	0.54	0.22	0	n/a	n/a
Fixed-rate to total debt	1808	0.77***	0.21	391	0.69	0.28
Secured debt to total debt	1806	0.63	0.35	353	0.74	0.36
Convertible debt to total debt	1806	0.02	0.08	439	0.02	0.07
Revolving credit facilities to total assets	1849	0.15**	0.11	22	0.10	0.13
Share of credit facilities drawn	1693	0.36***	0.30	15	0.10	0.20
Cash to market value	1871	0.02	0.05	453	0.04	0.06
UPREIT to total equity	1875	0.08	0.13	0	n/a	n/a
FFO payout ratio	1609	0.70	0.26	0	n/a	n/a
Market value of the firm ($m)	1876	1720**	2900	460	1460	2160
Profitability	1875	0.08***	0.05	433	0.05	0.09
Earnings volatility	1603	0.03	0.07	293	0.10	0.09

Note: U.S. REIT data are for the period 1993–2013; European REIT data are for 2001–13.

First, I employ an unconditional multivariate analysis to identify those combinations of capital structure characteristics that are associated with stronger firm quality. For the sample as a whole and U.S. firms specifically, the study finds that stronger firms tend to employ lower leverage and longer debt maturity, maintain larger proportions of fixed-rate debt, rely less on secured debt, have greater line of credit capacity but use it less, and hold smaller cash reserves. With regard to the European firms, however, the only significant result is that stronger firms have lower leverage.

Next, the analysis explores the marginal impact of individual dimensions of capital structure on firm value in the full sample, conditioned on existing firm and capital structure characteristics. These results largely support the findings that secured debt and high leverage are individually associated with lower firm quality. However, this conditional analysis reveals a positive relationship between secured debt and firm quality for U.S. REITs. This finding suggests that highly levered firms may be able to mitigate the (negative) effects of higher leverage on firm quality by pledging collateral.

Of particular interest to the hospitality industry, these data allow an analysis of the relationship between capital structure and firm quality for hotel REITs as compared to REITs as a whole. In general, hotel REITs have slightly lower q ratios than the industry as a whole. Hotel REITs also have somewhat greater leverage and cash holdings, two factors that are associated with lower q ratios. The final analysis examines changes in Tobin's q in relation to capital structures during and after the financial panic of 2007–09. Firms with relatively low leverage and solid amounts of fixed-rate and secured debt generally had the best q ratios during that period. Investors also seemed to appreciate REITs with more cash on hand, contrary to normal times.

These results have significant practical implications for managers and investors of international listed real estate firms. First, my findings assist managers in optimizing multiple dimensions of capital structure choices to improve firm value, depending on the characteristics of the firm, the institutional environment and the prevailing capital market regime. Second, the findings provide guidance for investors in international real estate firms in drawing inferences about firm quality from the composition of corporate capital structure in different countries and at different points in the cycle. Overall, these conclusions offer substantial benefits for financial decision-makers by promoting well-informed capital structure and investment choices.

EXHIBIT 3

Financial characteristics of European REITs

Variable	Germany			France			United Kingdom			Netherlands		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
q-ratio	16	0.92	0.12	150	1.06	0.23	234	0.95	0.16	60	0.98	0.10
Market leverage	10	0.57	0.13	150	0.56	0.19	233	0.50	0.20	60	0.48	0.09
Fixed-rate to total debt	16	0.38	0.35	108	0.67	0.33	219	0.74	0.24	48	0.63	0.22
Secured debt to total debt	16	1.00	0.00	75	0.63	0.40	224	0.81	0.32	38	0.46	0.38
Convertible debt to total debt	16	0.00	0.00	136	0.03	0.07	227	0.01	0.04	60	0.04	0.12
Revolving credit facilities to total assets	0	n/a	n/a	1	0.07	n/a	10	0.16	0.16	11	0.05	0.08
Share of credit facilities drawn	1	n/a	n/a	0	n/a	n/a	9	0.11	0.22	6	0.10	0.18
Cash to market value	16	0.07	0.04	150	0.03	0.03	227	0.05	0.08	60	0.02	0.02
Market value of the firm ($m)	16	286	248	150	2230	2900	234	1070	1700	60	1330	978
Profitability	16	0.03	0.03	136	0.06	0.05	225	0.04	0.11	56	0.06	0.05
Earnings volatility	7	0.03	0.02	91	0.06	0.05	155	0.14	0.10	40	0.06	0.03

Note: European REIT data are for 2001–13.

Data and Method

The study included all firms reported on the SNL Financial database that are classified as equity REITs in France, Germany, the Netherlands, the U.K., and the U.S. All firm-level data are obtained from SNL. The sample period for U.S. REITs begins in 1993, because this is the inception of the modern REIT era marked by the introduction of the UPREIT legislation.[2] European coverage on SNL begins in 2001. The initial sample contains a total of 2,336 firm-year observations. I measure firm value using Tobin's q ratio, which is the ratio of the market value of assets relative to their book value.[3] I relate Tobin's q to a broad range of capital structure characteristics. In this regression analysis, I also add a set of control values based on relevant firm characteristics.

Descriptive Statistics

As shown in the tables in Exhibits 2 and 3, the q ratio for U.S. firms is on average higher than those in Europe (mean of 1.28 versus 0.99) but also more volatile (standard deviation of 0.27 versus 0.19). U.S. firms are significantly larger than European firms by market value ($1.72 billion versus $1.46 billion) and more profitable (EBITDA to total assets ratio of 0.08 versus 0.05). Although U.S. and European REITs have similar firm and capital structure characteristics on a number of dimensions, U.S. REITs use

[2] Umbrella partnership REITs (UPREITS) were developed in the U.S. in response to the real estate crash of the early 1990s, when real estate owners needed a non-taxable way to infuse cash into their portfolios. Rather than the traditional method of transferring real estate into a REIT (generally a taxable event), UPREIT participants contributed property to the partnership in exchange for limited-partnership units (not typically taxable). Europe has no corresponding structure.

[3] Tobin, J. (1969): "A General Equilibrium Approach to Monetary Theory," *Journal of Money, Credit and Banking*, 1(1), 15–29.

EXHIBIT 4

Selected cross-correlations for main capital structure characteristics, full sample

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	q-ratio	1.0000										
(2)	Market leverage	-0.4535*	1.0000									
(3)	Debt maturity	0.1032*	0.0597	1.0000								
(4)	Fixed-rate debt	0.1613*	0.0449	0.4709*	1.0000							
(5)	Secured debt	-0.2094*	0.3204*	-0.0269	0.0111	1.0000						
(6)	Convertible debt	0.0158	-0.0380	0.0140	0.0194	-0.2468*	1.0000					
(7)	Credit facilities	0.0921*	-0.1356*	-0.2247*	-0.2795*	-0.1908*	0.0073	1.0000				
(8)	Facilities drawn	-0.1574*	0.2499*	-0.2982*	-0.3860*	-0.0214	0.0074	0.2377*	1.0000			
(9)	Cash	-0.1476*	-0.1122*	-0.0002	0.0180	0.1935*	-0.0098	-0.1904*	-0.2589*	1.0000		
(10)	UPREIT equity	0.0448	0.2938*	-0.0338	0.0508	0.2414*	-0.1131*	-0.1174*	0.1422*	-0.0728*	1.0000	
(11)	Payout ratio	0.0364	-0.0875*	0.0606	0.0183	-0.1287*	0.0692*	0.0909*	0.0600	-0.1276*	-0.0719*	1.0000

Note: * $p < .01$. The table presents the pairwise Pearson correlation coefficients for the capital structure and firm characteristics of the equity REITs in the sample over the period 1993–2013 (for U.S.) and 2001–2013 (for Europe) combined. *Source*: SNL Financial.

significantly more fixed-rate debt (0.77 versus 0.69). That comparison does not take into account European firms' possible use of swap contracts to fix interest rates. U.S. REITs have significantly higher line of credit capacity (0. 15, measured relative to total assets) and a higher share of credit facilities drawn (0.36) than European firms (0.10 for both).

Comparing the REITs in Europe, I found little cross-country variation in q ratios, leverage, convertible debt, cash holdings, or profitability. I did, however, find significant differences in the share of fixed-rate debt, with Germany low, at 0.38, and the U.K. high, at 0.74. The share of secured debt also has a substantial range, with the Netherlands at 0.46 and Germany at 1.0. Revolving credit facilities are rare in Europe (I observed just 22), and line-of-credit capacity varies significantly across countries from a minimum of 0.05 of assets (Netherlands) to a maximum of 0.16 (U.K.). The use of these credit facilities appears to be more homogeneous, with an average of approximately 0.10 in both the Netherlands and the U.K. France is home to the largest European firms (mean market value of $2.23 billion), while the smallest firms are in Germany ($0.29 billion). Earnings volatility varies between a minimum of 0.03 in Germany and a maximum of 0.14 in the U.K.

I find a number of significant and numerically high correlations between firm quality (q ratio) and capital structure characteristics (as shown in Exhibit 4). There are inverse correlations between the q ratio and leverage, the share of secured debt, the share of credit facilities drawn, and cash holdings. Conversely, I find positive correlations between the q ratio and debt maturity, fixed-rate debt, and revolving credit facility capacity.

Empirical method. To identify the capital structure characteristics that strong firms have in common, I first employed an unconditional multivariate analysis to identify those combinations of capital structure characteristics that are associated with a high value of Tobin's q. For this purpose, I sorted all firm-year observations into quintiles ranked by Tobin's q (quintile 1 contains the firms with the lowest q ratio). I then tabulated the corresponding mean capital structure characteristics in each quintile to test the hypothesis that these means differ significantly across the top and bottom quintiles.

The next step was to isolate the marginal impact of changes in individual capital structure characteristics on firm quality, holding other factors equal. To do so, I ran an ordinary least squares regression analysis for each firm in each year, estimating the q ratio as a function of the firm's capital structure characteristics and the set of relevant firm characteristic control variables in that year. I estimate the following regression model:

$$Q_{it} = \alpha + \beta_1 MLev_{it} + \beta_2 Fix_{it} + \beta_3 Sec_{it} + \beta_4 Con_{it} + \beta_5 Cash_{it} + \beta_6 Size_{it} + \beta_7 Prof_{it} + \beta_8 Vol_{it} + u_{it}$$

Results

Capital structure characteristics that strong firms have in common. The strongest and most robust result is a negative relationship between Tobin's q and leverage

EXHIBIT 5

Capital structure characteristics by quintile

	Quintile	q-ratio	Market leverage	Debt maturity	Fixed-rate debt	Secured debt	Convertible debt	Revolving credit facilities	Share of facilities drawn	Cash to market value	UPREIT to total equity	FFO payout ratio
All REITs	1	0.867	0.585	0.468	0.685	0.726	0.026	0.131	0.498	0.037	0.023	0.648
	2	1.055	0.544	0.526	0.760	0.750	0.020	0.132	0.389	0.035	0.084	0.674
	3	1.189	0.490	0.533	0.778	0.662	0.017	0.146	0.340	0.020	0.087	0.713
	4	1.340	0.421	0.555	0.770	0.591	0.028	0.153	0.341	0.017	0.075	0.743
	5	1.643	0.351	0.562	0.805	0.526	0.023	0.155	0.308	0.018	0.053	0.696
	Difference	0.776***	-0.234***	0.093***	0.120***	-0.200***	-0.002	0.0239*	-0.190***	-0.019***	0.030***	0.045**
	t-stat	(92.07)	(-20.53)	(4.62)	(7.63)	(-8.25)	(-0.41)	(2.50)	(-6.94)	(-5.79)	(5.16)	(1.99)
United States	1	0.934	0.589	0.468	0.711	0.723	0.021	0.132	0.468	0.039	0.023	0.648
	2	1.128	0.532	0.526	0.788	0.713	0.018	0.137	0.355	0.022	0.084	0.674
	3	1.245	0.468	0.533	0.777	0.616	0.027	0.154	0.351	0.018	0.087	0.713
	4	1.389	0.404	0.555	0.785	0.570	0.025	0.152	0.326	0.016	0.075	0.743
	5	1.682	0.345	0.562	0.811	0.531	0.023	0.155	0.306	0.018	0.053	0.696
	Difference	0.749***	-0.244***	0.093***	0.010***	-0.192***	0.001	0.0232**	-0.162***	-0.021***	0.030***	0.045**
	t-stat	(79.36)	(-18.80)	(4.62)	(6.11)	(-7.48)	(0.25)	(2.73)	(-6.74)	(-4.62)	(5.16)	(1.99)
Europe	1	0.776	0.605	n/a	0.649	0.695	0.024	n/a	n/a	0.035	0.000	n/a
	2	0.896	0.555	n/a	0.720	0.770	0.028	0.055	0.000	0.035	0.000	n/a
	3	0.962	0.554	n/a	0.713	0.809	0.027	0.049	0.000	0.034	0.000	n/a
	4	1.044	0.490	n/a	0.726	0.818	0.014	0.111	0.155	0.048	0.000	n/a
	5	1.263	0.402	n/a	0.657	0.592	0.020	0.178	0.211	0.029	0.000	n/a
	Difference	0.487***	-0.204***	n/a	0.008	-0.103	-0.004	n/a	n/a	-0.006	n/a	n/a
	t-stat	(23.92)	(-6.99)	n/a	(0.17)	(-1.50)	(-0.39)	n/a	n/a	(-0.85)	n/a	n/a

Note: U.S. data for 1993–2013; European data for 2001–13. Fifth quintile represents strongest firms. Difference is between the mean variable values across for the fifth and first Tobin's q quintile, alongside the corresponding t-statistic from a two-group mean-comparison test Significance indicated as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *Source*: SNL Financial.

across all firms (presented in the top panel of Exhibit 5). The strongest firms on average have a leverage ratio of 0.35, whereas the weakest firms on average have a significantly higher leverage ratio of 0.59. Further, stronger firms on average have higher proportions of fixed-rate debt than weak firms (0.80 versus 0.69) and lower shares of secured debt (0.53 versus 0.73). These findings suggest that reliance on variable rate debt is a sign of weakness, and further that weaker firms are required to pledge collateral when borrowing capital.[4] I also find that stronger firms hold less cash (0.02 versus 0.04).

The analysis of the U.S. REITs (middle panel of Exhibit 5) reveals that stronger firms have longer debt maturity (0.56 versus 0.47), consistent with the notion that debt maturity should match the maturity of the assets being financed.[5] Further, stronger U.S. firms have higher line of credit capacity than weak firms (0.15 to 0.13 relative to total assets) but rely less heavily on drawing on these facilities (0.31 to 0.47 of capacity drawn). Stronger firms also have more UPREIT equity (0.05 versus 0.02), and a higher FFO payout ratio (0.70 versus 0.65).

The analysis of the European firms (bottom panel of Exhibit 5) confirms the inverse relationship between firm

[4] E. Giambona, A.S. Mello, and T.J. Riddiough (2012): "Collateral and the Limits of Debt Capacity: Theory and Evidence" (working paper).

[5] SNL data are insufficient in these areas to provide a similar analysis of European REITs.

EXHIBIT 6

Regression results for Tobin's q and capital structure characteristics

Variables	(1) All	(2) US	(3) Europe	(4) Non-crisis	(5) Crisis
Market leverage	-0.766***	-0.778***	-0.281**	-0.757***	-0.790***
	(0.10)	(0.11)	(0.11)	(0.13)	(0.11)
Fixed-rate to total debt	0.126**	0.079	0.016	0.106*	0.183**
	(0.05)	(0.06)	(0.07)	(0.06)	(0.08)
Secured debt to total debt	0.049	0.087*	0.006	0.062	0.031
	(0.04)	(0.04)	(0.06)	(0.04)	(0.05)
Convertible debt	<-0.01*	<-0.01**	<0.001	<0.001	<0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Cash to market value	-0.191	-0.669*	0.448	-0.538	0.675*
	(0.32)	(0.36)	(0.31)	(0.36)	(0.40)
Log of firm size	0.025**	0.041***	0.015	0.027**	0.019
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profitability	0.734***	0.820***	0.320***	0.866***	0.515***
	(0.17)	(0.31)	(0.09)	(0.27)	(0.19)
Earnings volatility	-0.637***	-0.156	-0.493***	-0.610***	-0.901***
	(0.17)	(0.18)	(0.17)	(0.20)	(0.30)
Constant	1.096***	0.956***	0.932***	1.081***	1.108***
	(0.20)	(0.21)	(0.17)	(0.21)	(0.26)
Observations	1,759	1,538	221	1,368	391
R-squared	0.462	0.467	0.403	0.431	0.558
Sector dummies	Yes	Yes	Yes	Yes	Yes

Note: U.S. data are for 1993–2013; European data for 2001–13. Crisis period is 2007–09. Robust standard errors are shown in parentheses. Significance is indicated as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *Source*: SNL Financial.

value and leverage found in U.S. firms, but this is the only significant finding for the European REITs. This may be because there are relatively fewer European observations, but it is worth noting that the differences between the top and bottom quintiles across the firm characteristics in the European REITs generally carry the same signs as those of U.S. REITs.

The characteristic quintiles of the European firms appear to be more homogeneous on average than the quintiles of the U.S. firms. It is also possible that investors in European firms may be less sensitive to variation in capital structure characteristics or that they penalize firms with sub-optimal capital structure characteristics less heavily. If that interpretation is correct, one could further argue that optimal capital structure is less directly related to firm value in Europe than in the U.S. It may be that other factors, such as the relative cost of different types of capital, may have a stronger impact on firm value in Europe than they do for the U.S. REITs.

The relationship between Tobin's q and variation in individual capital structure characteristics. Controlling for relevant firm characteristics, one again sees an inverse relationship between leverage and firm quality. As shown in Exhibit 6, a one-standard-deviation increase in leverage results in a 14-basis-point drop in Tobin's q across all firms. However, the marginal effect of leverage on firm quality varies across geography and time. Leverage is penalized more heavily in the U.S. (also a 14-point drop) than in Europe (a drop of 5 points). Similarly, higher leverage was penalized slightly more heavily during the crisis (15-point drop) than outside of the crisis period (14-point drop).

EXHIBIT 7

Mean and standard deviation of capital structure characteristics for U.S. hotel REITs

Variable	N	Mean	SD
Market-to-book ratio	291	1.13	0.19
Market leverage	291	0.51	0.20
Debt maturity	259	0.50	0.28
Fixed-rate debt to total debt	284	0.69	0.27
Secured debt to total debt	286	0.78	0.32
Convertible debt to total debt	286	0.02	0.06
Revolving credit facilities to total assets	290	0.17	0.16
Share of credit facilities drawn	270	0.35	0.33
Cash to market value	291	0.03	0.05
UPREIT to total equity	290	0.10	0.16
FFO payout ratio	219	0.55	0.32

Note: Data are for 1993–2013. *Source*: SNL Financial

With regard to the positive relationship between fixed-rate debt and firm quality, my calculation shows a 3-point increase in the q ratio for a one-standard-deviation increase in the share of fixed-rate debt. I further find that higher shares of fixed-rate debt in the capital structure had a stronger impact on firm quality during the crisis (4-point increase) than outside the crisis (increase of 2 points). The nature of the financial crisis highlighted the benefits of fixed-rate debt, as the supply of debt capital diminished, thus increasing firms' refinancing risk.

Although the effect is small in economic terms, I also find that firm quality is inversely related to the share of convertible debt, consistent with the notion that the issuance of convertible securities is a sign of weakness, with firms trading off a lower current rate for future convertibility. These firms—primarily found in the U.S.—are also likely to be financially constrained, restricting their ability to exploit investment opportunities and thus grow the value of the firm. The data indicate that European REITs are unlikely to use convertible debt.

The regression results for the U.S. firms suggest that, all else being equal, an increase in secured debt is related to an increase in Tobin's q. However, there is a 32-percent correlation between leverage and the share of secured debt, and a strong and consistent negative relationship between leverage and firm quality. On an unconditional basis, both secured debt and leverage are separately related to lower firm quality. The conditional analysis reveals that highly levered, poorer quality firms whose capital structure exposes them to increased bankruptcy risk may be able to mitigate the effects of leverage on measures of firm quality and continue to gain access to debt markets by pledging collateral for debt capital.

One other factor associated with a lower q ratio is higher cash holdings, at least for U.S. REITs. This finding echoes earlier work showing that bank lines are a substitute for cash in REITs, and that stronger firms have less need to hold cash because they have greater untapped capacity for long-term debt and lines of credit.[6] Given that a major reason for investing in a REIT is its cash payout, these stronger firms comply with investor preferences by reducing excess cash holdings, knowing they are secure in tapping capital and liquidity going forward. This interpretation is further consistent with recent studies on liquidity and capital structure, highlighting a crucial distinction between firms being cash constrained and financially constrained.[7] Yet, strong firms held extra cash during the financial crisis. Thus, the findings suggest that investors take a positive view of firms being able to rely on cash reserves when external sources of funds dry up because of capital market turmoil.

Focus on the U.S. Hotel REIT Sector

An analysis of the characteristics of U.S. hotel REITs found that the relationship of their financial structure to the q ratio is similar to those of the sample as a whole (see Exhibit 7). However, hotel REITs are generally not in the top tier in terms of their financial characteristics.

The sample of hotel REITs achieved an average q ratio of 1.13 overall, as compared to the strongest REITs, which scored 1.68. Hotel REIT market leverage was on average higher than the mean value associated with the REITs that achieved the highest q ratios (0.51 versus 0.35). Along similar lines, the share of secured debt for hotel REITs was 0.78 versus 0.53 for top firms, the share of credit facilities drawn was 0.35 for hotels versus 0.30 for the full sample, and UPREIT equity for hotel REITs was 0.10 versus 0.05. Hotel REIT debt maturity was shorter than that of the strongest REITs (0.50 versus 0.56), and the share of fixed-rate debt was 0.69 for hotels versus 0.80 for other REITs. Hotel REITs' share of convertible debt (0.02), cash

[6] T.J. Riddiough and Z. Wu (2009): "Financial Constraints, Liquidity Management, and Investment," *Real Estate Economics*, 37(3), 447–481.

[7] Damodaran, A. *Corporate Finance: Theory and Practice* (New York: John Wiley and Sons, 2001); M. Campello, J.R. Graham, and C.R. Harvey (2010): "The Real Effects of Financial Constraints: Evidence from a Financial Crisis," *Journal of Financial Economics*, 97(3), 470–487; and M. Campello, E. Giambona, J.R. Graham, and C.R. Harvey (2011): "Liquidity Management and Corporate Investment during a Financial Crisis," *Review of Financial Studies*, 24(6), 1944–1979.

EXHIBIT 8

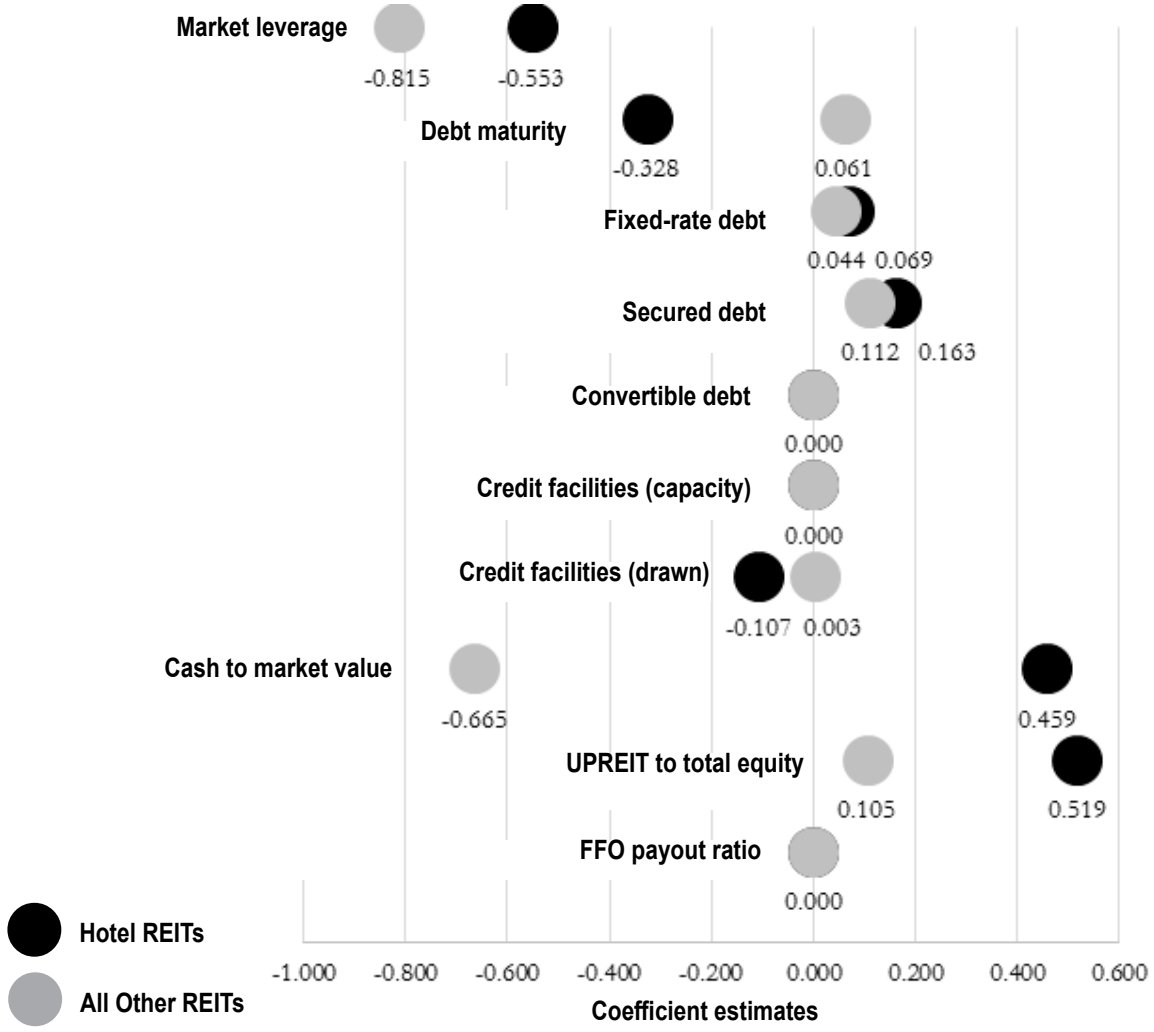
Regression results with interaction terms for US Hotel REITs

Variables	Full period	Non-crisis	Crisis
Market leverage	-0.815***	-0.839***	-0.661***
	(0.09)	(0.09)	(0.13)
Hotel*Market leverage	0.262*	0.315*	-0.201
	(0.15)	(0.17)	(0.27)
Debt maturity	0.061	0.052	0.123
	(0.04)	(0.04)	(0.09)
Hotel*Debt maturity	-0.389***	-0.402***	-0.537***
	(0.10)	(0.12)	(0.16)
Fixed-rate debt to total debt	0.044	0.057	-0.077
	(0.05)	(0.05)	(0.16)
Hotel*Fixed-rate debt to total debt	0.025	0.048	0.312
	(0.09)	(0.11)	(0.26)
Secured debt to total debt	0.112***	0.112***	0.149**
	(0.03)	(0.03)	(0.06)
Hotel*Secured debt to total debt	0.051	0.062	-0.001
	(0.07)	(0.09)	(0.15)
Convertible debt	-0.000*	-0.000**	0.000
	(0.00)	(0.00)	(0.00)
Hotel*Convertible debt	0.000**	0.000***	0.000
	(0.00)	(0.00)	(0.00)
Revolving credit facilities (capacity)	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)
Hotel*Revolving credit facilities (capacity)	0.000	0.000	-0.000**
	(0.00)	(0.00)	(0.00)
Share of credit facilities drawn	0.003	-0.005	0.042
	(0.03)	(0.03)	(0.06)
Hotel*Share of credit facilities drawn	-0.110	-0.134*	0.389*
	(0.07)	(0.08)	(0.20)
Cash to market value	-0.665**	-0.676**	-0.953
	(0.30)	(0.30)	(0.68)
Hotel*Cash to market value	1.124	1.459**	1.413
	(0.79)	(0.72)	(1.24)
UPREIT to total equity	0.105	0.154*	-0.189
	(0.10)	(0.09)	(0.14)
Hotel*UPREIT to total equity	0.414**	0.325	0.397
	(0.20)	(0.20)	(0.37)
FFO payout ratio	0.001**	0.001**	0.000
	(0.00)	(0.00)	(0.00)
Hotel*FFO payout ratio	-0.001	-0.001	-0.001
	(0.00)	(0.00)	(0.00)
Observations	1,766	1,507	259
R-squared	0.525	0.502	0.710
Sector effects, control variables, constant	Yes	Yes	Yes

Note: data are for 1993–2013. Robust standard errors are shown in parentheses. Significance is indicated as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: SNL Financial.

EXHIBIT 9

Comparison of coefficient estimates between US hotel and other commercial REITs



Note: The graph presents the comparison between coefficient estimates on different capital structure characteristics across hotel REITs and all other REITs. Coefficient estimates represent the marginal effect of variation in a given capital structure characteristic on the firm's q ratio. Estimates are from the regression results for the full study period in Column (1) of Exhibit 7. Estimates for Hotel REITs are the sum of the main effect of the capital structure characteristics and the corresponding interaction with the hotel REIT indicator. Where the graph shows only one dot for a capital structure characteristic, there are no significant differences in the estimates for hotel REITs and other REITs.

holdings (0.03), and revolving credit facilities available (0.17) were on average similar to the benchmark.

To determine the effects of individual capital structure choices on the q ratio of hotel REITs relative to the overall sample of U.S. REITs, I replicate the regression analysis shown in Exhibit 6, but add an interaction term between the hotel REIT sector indicator and the capital structure variables of interest, with the results shown in Exhibit 8.

Overall, hotel REITs are not that different from other commercial REITs, but I did find some specific variations in the effects of capital structure (see Exhibit 9). For example, both types of REIT showed a negative coefficient on the market leverage variable overall, consistent with the prior results. However, I also find a significantly positive interaction term between market leverage and the hotel REIT indicator, suggesting that investors tolerate more leverage in hotel REITs than in REITs overall. Neverthe-

less, the net effect (sum of the two coefficients) remains negative. In contrast to REITs as a whole, debt maturity shows a significantly negative interaction with the hotel REIT indicator, suggesting that the flexibility to exploit favorable refinancing opportunities, which is embedded in shorter debt maturities, is associated with higher q ratios in hotel REITs. These results further suggest that investors penalized hotel REITs more than other REITs for drawing a larger share of their credit facilities outside of the crisis period. Then again, hotels were penalized less for expanding the use of credit during the crisis. Further, hotel REITs holding more cash achieved higher q ratios, especially outside of the crisis period. Last, the results suggest that a larger share of UPREIT equity was associated with higher q ratios in hotel REITs than in the average REIT.

In sum, my comparison of hotel REITs to U.S. REITs as a whole generated the following four main practical implications.

(1) Higher leverage is associated with a lower q ratio for hotel REITs, but the reduction in the q ratio from higher leverage is less severe for hotel REITs than for other REITs;

(2) While longer debt maturities seem to be associated with higher q ratios in REITs overall, hotel REITs with shorter debt maturities have higher q ratios, suggesting that hotel REIT investors appreciate the flexibility associated with more frequent refinancing opportunities;

(3) Larger cash reserves in hotel REITs are associated with higher q ratios, in contrast to REITs overall; and

(4) A larger share of UPREIT equity is associated with higher q ratios in hotel REITs, where the effect is larger than for REITs overall.

One possibility to consider for hotel REITs would be to reduce leverage, operations and strategic considerations permitting. While my results suggest that investors penalize leverage less heavily in hotel REITs than in the average REIT, the effect on q ratios that I document here remains negative. Therefore, consistent with the overall findings for the REIT sector, reducing leverage may represent an opportunity for hotel REIT managers to achieve higher q ratios.

Conclusion

In this study, I empirically evaluate the implications of corporate capital structure for firm quality in a sample of international real estate investment trusts. Using Tobin's q as a measure of strength, the strongest firms in the full sample have the following characteristics in common: low leverage, long debt maturity, high shares of fixed-rate debt, and low shares of secured debt. Further, these strong firms seem not to have to rely on collateral to mitigate lender concerns, and they generally maintain low cash holdings. Hotel REITs in the U.S. generally have similar characteristics, although their q ratios are not quite as high as those of the strongest firms, and hotels are distinguished by comparatively shorter debt maturity and greater cash holdings. Overall, my findings suggest that firm value is supported by a defensive, prudent capital structure with low leverage, which further matches debt and asset maturity and limits interest rate risk through fixed-rate instruments. ■

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Kate Walsh, Acting Dean, School of Hotel Administration

Center for Hospitality Research
School of Hotel Administration
Cornell SC Johnson College of Business
389 Statler Hall
Ithaca, NY 14853

607-254-4504
chr.cornell.edu