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The Effect of Interest-Rate Movements on Real Estate Investment Trusts

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Abstract. **The rising interest-rate environment in early 1994 in the United States raised questions by investors as to how REITs will react to interest-rate movements. This study analyzes the movement of REIT price changes during past interest-rate cycles. The results indicate that REIT price movements have a low correlation with changes in interest rates and a lower correlation with interest rates than with movements in the stock market as a whole. The findings lead to a call for research into other areas in order to ascertain the determinants of REIT price movement.**

Introduction

The strong relative performance of REITs in the first quarter of 1994 came as a surprise to many yield-oriented investors who had assumed that REIT prices would move in lockstep with bond prices as interest rates rose. Many people have also felt that REITs are similar to utility stocks due to their high dividend yields and concluded that REITs would have the same type of interest-rate sensitivity in their pricing as utility stocks. This study explores the historical relationship between interest-rate movements and REIT prices to determine what, if any, impact interest-rate movements have had on REIT prices.

Literature Review

A number of authors have analyzed the effects of different economic variables on REIT prices. Chen and Tzang looked at the sensitivity of REITs to interest rates and inflation using a regression model with Merton's intertemporal capital asset pricing model. The study used a small sample of mortgage and equity REITs with the time period 1973–1979 and 1980–1985. They found that equity REITs were not sensitive to interest rates, but only to changes in expected inflation, while mortgage REITs were sensitive to both changes in expected inflation and changes in real interest rates. Park, Mullineaux and Chew studied the inflation hedging ability of REITs and found them to be partial hedges against anticipated inflation. They also found that the dividend yield on REITs is positively related to both expected and unexpected inflation, thus the dividend yield "improves" the hedging capabilities of REIT investments. Bharati and Gupta tested the predictability of real estate REIT returns by developing an active mixed asset (stock, bond, real estate) allocation strategy and testing its performance against a passive strategy. This model used the percentage growth rate in industrial production and the current cap rate along with a number of financial market variables (such as T-bill yields

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and spreads, and S&P statistics) to predict future returns for the allocation model. They found that an active strategy (without transaction costs) outperformed a passive strategy by 250 basis points. This leads to the assumption that some capital market factors affect real estate returns. Gyourko and Keim studied REIT returns and compared them to the NCREIF appraisal-based index. This study showed the correlation between equity REITs and long bonds to be .43 and the correlation with the S&P 500 to be .65 in the time period 1978 to 1990. Their study found that REIT returns during the year were a significant predictor of year-end appraisal movements in the NCREIF index. They conclude that important information about real estate fundamentals is incorporated in equity REIT returns, especially when controlled for stock market factors. Jacob and Zisler stated that real estate returns have been positively correlated with interest rates in many instances due to the tight supply of space that allowed rents to rise, offsetting a drop in value caused by rising interest rates. They also hypothesized that during interest-rate declines there is a coincident weakening in property markets. These conflicting opinions on interest rate's impact on REIT prices calls for further study of the subject.

Data

Monthly changes in interest rates, as measured by price data from federal government three-month Treasury bills, ten-year bonds, and long-term government bonds, are compared to monthly changes in the S&P 500 Price Index, the S&P 40 Utilities Index, the NAREIT Price Index (which includes healthcare REITs), and the Wilshire Real Estate Index (which includes equity REITs and publicly traded real estate operating companies). Exhibit 1 shows the correlations between these different indices from 1972 to 1993.

This matrix shows that the NAREIT Equity Index had a low negative correlation with interest-rate movements over the time period studied. This was true for short-, medium- and long-term interest rates as the correlations were low and negative for all. Because we are comparing the changes in bond yields with the changes in prices, the negative correlation implies that equity REIT prices fall when interest rates rise. (Correlations were statistically significant with the NAREIT Index at the .01 level.) Comparison with the Wilshire Index found similar statistically significant correlations that were low and negative in the .22 to .33 range. The S&P Price Index fell in between the NAREIT and Wilshire correlations thus alluding to the idea that REITs act very similarly to the stock

Exhibit 1

	NAREIT EQ	Wilshire EQ	S&P Price	Short-Term Interest	Ten-Year Interest	Long-Term Interest
NAREIT EQ	1.000					
Wilshire EQ	.855	1.000				
S&P Price	.615	.703	1.000			
ST Interest	−.201	−.226	−.251	1.000		
Ten-Year Interest	−.267	−.337	−.283	.583	1.000	
LT Interest	−.299	−.333	−.297	.581	.975	1.000
Utilities	.446	.422	.668	−.319	−.449	−.472

market (.615 and .703 correlations respectively). We note that Utilities had a stronger negative correlation with interest-rate changes (−.319 to −.472), pointing to their bond-like qualities.

If we assume that real estate is viewed as a long-term investment asset, it would be logical to conclude that it should have a higher correlation with longer term investment indicators such as long-term bonds or ten-year Treasuries. This hypothesis appears to be true although the difference between the short-term versus medium- and long-term correlations is very small. The analysis of overall historical data shows changes in interest rates have only a minor impact on REIT prices. This leads to the question of whether REIT prices are affected differently during increasing interest-rate periods or decreasing interest-rate periods. To analyze this we divided the overall 1972–93 time period into rising rate and fall rate periods. We use the ten-year Treasury rate for determining rising and falling periods with the restriction that rate direction must last for at least twelve periods (one year) and have a magnitude in change of at least 100 basis points. Exhibit 2 shows the historical interest rates over this period broken into rising rate and falling interest-rate periods. The correlations for each time period are developed by taking actual price changes from month to month and correlating these with the interest-rate changes for each month. In Exhibit 3, the data is segregated into rising and falling interest-rate time periods for NAREIT Equity, Wilshire REI and the S&P 500.

Rate periods, NAREIT and Wilshire REI prices were negatively correlated to interest rates in the range of −.018 to −.67. In general, as interest rates rose REIT prices declined slightly. Combining all the rising time periods together, the correlations were low and negative – .153 average for NAREIT and −.34 for Wilshire REI. This would lead to the conclusion that rising interest rates have a minor negative effect on REIT prices. The difference in correlations between NAREIT and Wilshire is somewhat puzzling as both include equity REITs and have a high correlation of (.855) in their overall price movements. One possible explanation is that NAREIT includes healthcare REITs (an industry that is not as sensitive to interest-rate movements), while Wilshire includes publicly traded real

Exhibit 2

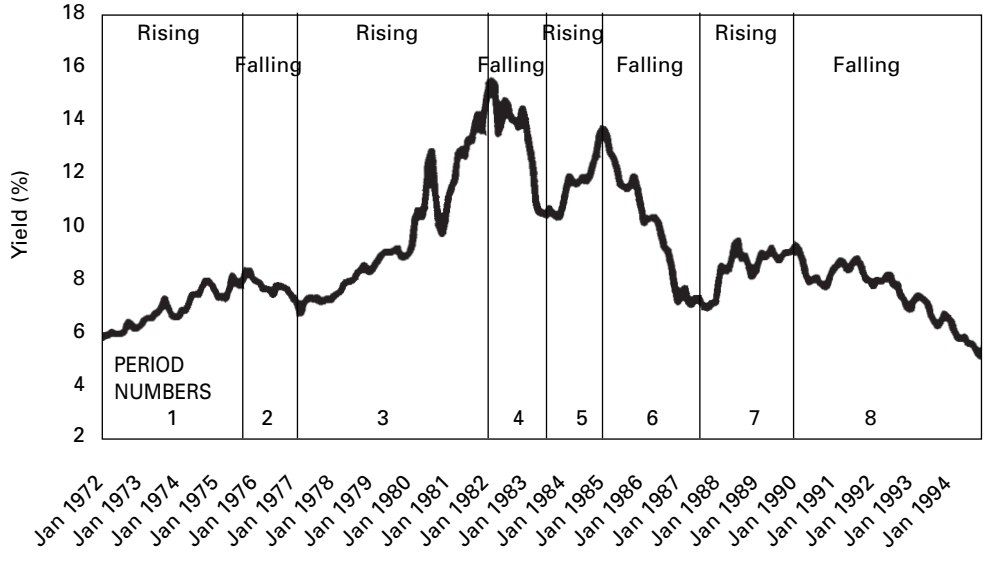

Exhibit 3
Correlations of Price Change to Interest-Rate Change

Dates	Length (Months)	NAREIT ST Interest	NAREIT Med Interest	NAREIT LT Interest	Wilshire REI ST Interest	Wilshire REI Med Interest	Wilshire REI LT Interest	S&P 500 ST Interest	S&P 500 Med Interest	S&P 500 LT Interest
Rising Period										
1 1–72 9–75	45	−.163	−.057	−.24	n/a	n/a	n/a	−.436	−.189	−.335
3 1–77 9–81	57	−.128	−.146	−.146	−.302	−.362	−.352	−.193	−.204	−.178
5 3–83 5–84	17	−.124	−.646	−.674	−.018	−.418	−.446	.081	−.357	−.415
7 2–87 3–89	26	−.182	−.305	−.281	−.082	−.307	−.287	.135	−.094	−.073
All Rising	145	−.134	−.153	−.198	−.259	−.34	−.326	−.229	−.17	−.19
Falling Period										
2 10–75 12–76	15	−.529	−.364	−.525	n/a	n/a	n/a	−.443	−.528	−.589
4 10–81 2–83	16	−.407	−.715	−.638	−.478	−.788	−.738	−.558	−.589	−.538
6 6–84 1–87	31	−.009	−.279	−.295	−.114	−.379	−.394	.195	−.184	−.235
8 4–89 9–93	55	−.224	−.387	−.419	−.163	−.324	−.345	−.152	−.35	−.352
All Falling	117	−.278	−.408	−.409	−.257	−.464	−.461	−.21	−.373	−.374
Total Periods	262	−.199	−.267	−.299	−.226	−.337	−.333	−.251	−.284	−.297

estate investment companies that typically have higher leverage than equity REITs and leveraged companies are more impacted by interest-rate increases. The correlations of the S&P 500 were almost identical to the NAREIT Index, thus REITs appear to be as good an investment vehicle during rising interest rates as the stock market in general.

During falling interest-rate periods the NAREIT and Wilshire Index had stronger negative correlations ranging from −.01 to −.79, thus NAREIT Equity and Wilshire prices always went up during falling interest-rate periods. The Wilshire Index had stronger upward movement than the NAREIT Equity Index, supporting the previous hypothesis that higher leverage of operating companies in the Wilshire Index has a greater effect on prices when interest rates move. The combined falling interest-rate periods have very similar correlations for NAREIT and Wilshire at −.25 to −.46. In comparison to the S&P 500, REITS could even be considered a better hedge against falling interest rates than the general stock market.

A test for leads and lags of the indices was also performed, leading and lagging interest-rate movements by up to six periods in each direction. The results found that movements did not increase correlations, however an interesting phenomenon did occur: when interest rates were moved forward (lead) by two periods the overall correlation turned from negative .20 to positive .20.

To further analyze this association, a regression analysis was run on the overall time period as well as each individual time period. Regressing interest-rate changes on equity REIT price changes provides an analysis of the effects interest rates may have. If a consistent relationship existed, the *betas* for each variable should be similar in each time period, especially for rising rate or falling rate periods. The data in Exhibit 4 shows that the interest-rate *betas* are inconsistent and even change from positive to negative in different time periods. Additionally *R*-squared values are low in most cases and very low for the overall time period.

Exhibit 4
Regression Results—Interest-Rate Change on REIT Price Change

	ST Interest	Med Interest	LT Interest		
	Beta	*Beta*	*Beta*	R^2	Significant
Rising					
1	−.21	1.96	−2.24	.22	.01
3	−.03	−.00008	−.135	.02	.74
5	.68	.12	−1.55	.62	.001
7	.015	1.6	1.48	.005	.39
All Rising	−.085	1.07	−1.33	.054	.015
Falling					
2	−.26	3.4	−.49	.51	.012
4	.004	−.15	1.15	.51	.008
6	−.03	.42	−.62	.09	.44
8	−.117	.119	−.72	.14	.013
All Falling	−.063	−.128	−.273	.155	0
All Periods	−.65	.403	−.725	.09	0

The correlations and regressions show that the spontaneous relationships between interest-rates changes and REIT price changes is very weak. It appears that if changes in interest rates do impact REIT prices, the relationship is very complex, and a number of other factors must affect REIT prices as well. A review of the history of the REIT industry provides some perspective on these issues. In 1973 and 1974, rising interest rates appear to have had a devastating impact on the REIT sector. At that time, the majority of REITs were highly leveraged mortgage REITs focused on making high-risk construction and permanent loans to private real estate developers. Many of these companies relied heavily on short-term variable rate debt to finance their longer term mortgage lending activity. The combination of rising interest rates, and a severe real estate recession with a high level of loan defaults, caused many of the REITs to become completely unraveled. Between 1972–1974, the NAREIT Mortgage REIT Index fell by close to 70% on a price basis, and dragged the equity REIT index down with it.

In the early 1980s, the REIT industry was dominated by a handful of equity REITs. These companies were characterized by relatively low levels of debt and the property-type composition of the industry was heavily tilted toward retail properties. At that time, many of the better quality equity REITs were generating double-digit dividend growth because of strong underlying property fundamentals and portfolio growth. As a result, despite record high interest rates, REIT dividend yields remained well below bond yields and the REITs generated strong overall returns throughout the period (see Exhibit 5).

In recent years, declining interest rates have positively impacted the REIT sector in several ways. REITs have benefitted, along with the broader equity market, from the flood of capital into equities that resulted from record low yields on CDs and other money market instruments that pushed prices up. Additionally, the divergence in yield expectations for the public and private markets created a unique opportunity for the REITs to buy properties with initial yields in excess of their cost of capital. This was a major source of cash flow and dividend growth for the REITs during 1993 and 1994.

Exhibit 5

Year	Yields			Equity REIT Total Returns (%)
	Three-Month T-Bills (%)	Ten-Year T-bond (%)	Equity REITs (%)	
12/77	6.1	7.7	7.6	22.4
12/78	9.1	9.0	8.0	10.3
12/79	12.1	10.4	7.7	35.8
12/80	15.7	12.8	7.7	24.4
12/81	10.9	13.7	8.6	6.0
12/82	8.0	10.6	7.8	21.6
12/83	8.9	11.8	7.2	30.6
12/84	8.2	11.5	7.1	20.9
12/77–12/84	10.0	10.9	7.7	21.2

Conclusion

The value changes and performance of real estate comes from a complex relationship between supply and demand factors that affect commercial property lease rates; this coupled with money flows in the capital markets to both debt and equity real estate affect REIT prices. Real estate exists in a private market where information is hard to find and reactions to capital market movements may lag by both short and long periods. With REIT prices and interest rates having low and negative correlations during both rising and falling interest-rate periods we must accept the hypothesis that REIT price movement cannot be adequately explained by interest-rate movements. While real estate had stronger negative correlations with interest rates in a falling environment, it had minor negative correlations during rising interest-rate periods. Possibly real estate prices behave in a bond-like fashion when interest rates go down (as the bond-like cash flow of real estate allows prices to move up). The low negative correlations during rising interest-rate time periods lends support to the premise that unleveraged real estate is not affected greatly by interest-rate movements and is thus a good diversifier in a portfolio of stocks and bonds. Rising interest rates may have little impact on real estate and may be more of a coincidence that is better explained by general economic and real estate fundamentals associated with the supply and absorption of property at the time interest rates are moving. We presume that real estate market fundamentals and other macroeconomic and capital market factors may affect real estate more strongly and call for future study in this area with such factors as GDP, employment growth and inflation.

Looking ahead, the impact of higher interest rates on the REIT sector may depend on the magnitude of the increase in rates and should vary significantly from company to company, based on portfolio composition and capital structure. In 1994, the REIT sector as a whole was conservatively leveraged. The general industry estimate of debt to total market capitalization was approximately 30% and variable rate debt accounted for about 30% of total debt. For the sector as a whole, increases in interest cost could be more than offset by increases in net operating income from existing properties. The extent to which top-line internally generated growth flows through to the bottom-line operating results will depend on capital structure. Companies that are highly leveraged with long-term fixed-rate debt will have the greatest bottom-line growth in the short term. Companies that have relied heavily on short-term variable rate debt could see declining operating

results, particularly for the companies owning office or industrial properties that are constrained by oversupply or are leased on a long-term basis at flat rates.

To the extent that higher interest rates do not cause a corresponding increase in direct property capitalization rates, rising interest rates will also impact the ability of the companies to acquire properties at a positive spread to their cost of capital. Over the past couple of years, positive spread investing has been a major source of growth for the REITs. This should be a less significant source of growth in the future, in part because of the recent increase in interest rates but also due to increased competition for the acquisition of properties and the fact that the companies are now larger and the incremental impact of additional acquisitions is diminishing. Offsetting this, however, may be improved internally generated growth from existing properties.

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