

Performance Evaluation of Finite-Life Real Estate Investment Trusts

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Abstract. This study analyzes the investment performance of real estate investment trusts, comparing the finite-life trusts (FREIT) with traditional REITs and stock returns. The results indicate that the FREITs performed more poorly than the REITs, with both the FREITs and REITs underperforming the market index over the period studied. It was also found that while portfolio risk diversification benefits may exist for the REITs and FREITs, it is not clear that the reduced risk is warranted by the large reduction in returns. Finally, this research shows that little total or unanticipated inflation hedging capability exists for the REITs or FREITs over the period studied, although anticipated inflation hedging capabilities were found.

Introduction

Investment in real estate, and specifically real estate investment trusts (REITs), has received wide attention in recent academic research. Several studies [7, 22, 23] have compared the performance of REITs to stocks and bonds, while other studies [1, 9, 15, 19] have examined commingled real estate funds (CREFs) or real estate limited partnerships (RELPs) in terms of their inflation hedging ability and diversification benefits. REIT returns have been examined quite extensively, including being analyzed within the framework of market equilibrium models [4, 14, 24]. But very little attention has been given to the performance of finite-life real estate investment trusts (FREITs) in the research literature.

The REIT industry has been growing and providing strong returns to investors since a near disastrous period in the mid-1970s. Industry sources report that total REIT assets were over \$17.5 billion as of January 1987, with \$5.2 billion added since 1984 [16]. The increase in REIT market activities has prompted renewed research interest both in terms of performance of REIT stocks and portfolio considerations.

The traditional REIT has tended to sell at a discount from its underlying asset value, supposedly due to the uncertainty surrounding the liquidation and realization of value being so far in the future. With the market discounting the liquidation value heavily, the result is that REITs trade very similar to common stocks, with dividend payments constituting a

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larger portion of the current market value of the REIT stock. FREIT stocks, while a subset of the REIT industry, are considered quite different in nature given their finite maturity.

The first FREIT was offered in 1975, with only seven FREITs offered prior to 1983. Since 1983, 38 FREITs have been placed in the market, where FREITs now account for 28% of the total 138 tax-qualified REITs [17]. Since FREITs have a finite maturity, their value should reflect the liquidation component as well as the dividends, although the liquidation portion would be the lesser of the two in the early years. But as the FREIT approaches its liquidation, assuming appreciation of the underlying real estate held or invested in by the trust, the price of the stock should rise to reflect the value of the real estate. Further, while FREITs have definite deadlines for liquidation, the trustees often have the option of liquidating sooner if market conditions warrant it. This should provide a positive impact on the price of the stock since presumably the trustees could lock into a satisfactory yield prior to liquidation in a favorable market. As a result of these factors, FREITs should be considered less risky to investors, and should provide significant portfolio diversification effects.

This paper analyzes the investment performance of FREITs relative to REITs, while also examining the ability of diversification for both classes of trust. The REITs and FREITs will initially be categorized by type, being an Equity, Mortgage or Hybrid trust, with their individual performances analyzed within the framework of risk and return. Following a review of current literature, the data source, models and empirical results will be presented. The paper will conclude with a summary of the implications of the research.

Current Literature Revisited

In reviewing previous literature, it is helpful to look at representative studies that examine the return or diversification benefits of REITs relative to other types of investments. It is also of interest to review studies that illustrate the application of the CAPM, or other types of investment performance measures, to an analysis of REITs or other real estate returns.

There have been a number of studies reported concerning the investment performance of real estate other than REITs. Brueggeman, et al. [1] analyzed two CREFs relative to investment performance, inflation hedging attributes and diversification benefits. They concluded that real estate generally outperformed stocks and bonds, offered very good portfolio diversification potential by reducing risk and increasing return, and provided a good hedge against inflation. Miles and McCue [14] analyzed the market returns for a large CREF and the empirical evaluation of the benefits of diversification among the commercial real estate opportunity set. The findings were similar to other studies that show a high correlation of commercial real estate returns with measures of inflation and anticipated inflation, although not with unanticipated inflation. They also found that over the period studied, commercial real estate offered higher risk-adjusted returns than stocks and bonds. One of the earliest papers analyzing REIT returns was by Smith and Shulman [24], where they applied the framework of the capital asset pricing model (CAPM) to REIT returns from 1963 to 1974. They found that REITs, although their return performance was very similar to that of the closed-end mutual funds, provided a significant diversification benefit when combined with other common stocks. A REIT study by Miles and McCue [14] used a sample of equity REIT portfolios to investigate various real estate return performances. Return estimates from 1972-1978 were reported by property type, size and location. The REIT portfolios were also com-

pared with a CREF portfolio in terms of diversification effects. The conclusion was that benefits from diversification by property type appear to exist.

Davidson and Palmer [4] also used the CAPM to examine the performance of equity REITs, common stock, and stocks of homebuilding firms from 1972-1977. While they came to no overall conclusions concerning the performance of REITs, they did find that equity REITs had greater total risk than common stocks, and local market conditions may be more important than overall market conditions in determining the returns of income property. A study by Burns and Epley [2] examined REITs relative to their ability to enhance portfolio returns and diversification. Using an efficient frontier approach, they combined REITs with a diversified common stock portfolio to find that a mixed portfolio was superior to one consisting of either single asset only. Burns and Epley concluded that REITs offered portfolio diversification benefits in comparison to common stock portfolios, due primarily to the low correlation of returns between REITs and common stocks.

In a study assessing historical risks and returns of REITs and real estate assets, Zerbst and Cambon [26] reported that real estate assets showed returns similar to assets such as stocks and bonds since 1950. Further, they noted that real estate assets outperformed the other assets during periods of inflation, with risk levels of REITs similar to that of common stocks. A study by Kuhle, Walther and Wurtzebach [12] updated the performance evaluation of previous REIT studies by analyzing a sample of publicly traded REITs over the period January 1973 to December 1985. They found that the performance of the REIT stocks either significantly under or overperformed the Standard and Poors 500 index (S&P 500) during the period studied. They further concluded that the REIT market is somewhat efficient.

A study by Kuhle [11] examined the effects of diversification in the reduction of total portfolio risk in REITs, as well as comparing the overall performance between stock and REIT portfolios. The results indicated that REITs did not provide as great a reduction in risk as common stocks did, which is contrary to many of the other studies reported above. However, the study did find that REIT portfolios are more efficient in a Markowitz sense, which the authors interpreted as indicating market inefficiencies in REIT pricing over the time period studied. Finally, the study indicated that the overall performance of mixed portfolios of common stock and REITs was not significantly different from that of portfolios of only common stock, again in contrast to the results of previous studies.

Although there have been no studies reported on FREITs, these vehicles are often compared in concept to the RELPs. Three recent studies, by Kapplin and Schwartz [9, 10] and Rogers and Owers [19], have reported the returns earned by RELPs over the past decade. These studies basically indicate that RELP returns have not exceeded returns of common stocks or other real estate investments, although there is some evidence that income properties can provide a favorable portfolio diversification effect. FREITs have an advantage over the RELPs given their marketability, as well as not having onerous net worth requirements for investors, limited liability given the corporate ownership format, and the necessity by law of the FREIT passing through any cash flow. However, RELPs could pass through tax shelter benefits prior to 1987, which REITs and FREITs could not do.

The results of most studies reported concerning the return performance of REITs is that they often provide risk-adjusted returns greater or equal to other types of investments, while also providing diversification benefits and inflation hedging capabilities. This study not only provides additional evidence for REITs, but also provides an analysis and comparison of FREIT returns and diversification benefits using methods of analysis similar to previous research.

Data and Methodology

The data used in this study was obtained from the CompuServe Information Service, Columbus, Ohio, and consists of thirty-two public REITs and FREITs that were traded on the New York Stock Exchange, the American Stock Exchange, or through the National Association of Securities Dealers Automated Quotation System (NASDAQ). These securities were selected based on several screens, basically being whether each randomly selected security traded during every month of the study period. Annualized monthly returns are calculated by measuring the change in prices between months, adjusting for stock splits and dividends. Portfolios are assembled for the various types of REITs and FREITs where the portfolio returns are then used in the subsequent analysis. Since a limited number of FREITs were traded prior to 1983, the study extends from December 1983 through December 1987.

Both REITs and FREITs specialize in the type of investments they make as well as the types of properties in which they invest. A trust that holds at least 75% of its invested assets in the ownership of property or other equity interest is called an Equity (EQ) trust; those that hold at least 75% of its invested assets in mortgages including participating mortgages and interests in mortgage pools are called Mortgage (MO) trusts; while those combining ownership and lending so that it is neither an equity nor mortgage trust are called Hybrid (HY) trusts. Exhibit 1 includes a summary of the average annualized weighted portfolio return calculations for the different types of trusts within each class over the period studied. Data existed for all types of trusts over the study period except the Hybrid FREITs, which only had data for twenty-seven periods.

Exhibit 1
Annualized Monthly Returns in Percent
January 1, 1984-December 31, 1987

	Study Period (Months)	Mean	Std. Deviation
REIT			
Equity	48	1.064	43.53
Mortgage	48	-5.622	49.24
Hybrid	48	-2.070	40.95
Combined	48	-3.233	36.77
FREIT			
Equity	48	-11.724	41.44
Mortgage	48	-9.553	43.90
Hybrid	27	-34.810	91.63
Combined	48	-11.896	36.84
Combined Pool			
Equity	48	-5.329	37.01
Mortgage	48	-10.825	51.87
Hybrid	48	-7.588	36.45
Combined	48	-5.861	34.87
Other Data			
S&P 500 Index	48	10.632	49.64
CPI Change	48	3.262	2.66
T-Bill	48	6.626	1.70

Source: Derived by the authors

Also included in Exhibit 1 are the return calculations for the S&P 500 index, which will be the market return measure used in this study, the change in the CPI index over the study period, and the average one-month Treasury bill (T-bill) returns. As Exhibit 1 indicates, the returns for the FREITs are much lower than the REIT returns, and display greater variability. An initial comparison of both the REIT and FREIT trusts and the combined sample with the S&P 500 index shows that the market index substantially outperformed the trusts over the period studied.¹

As can be seen from Exhibit 1, there appears to be a significant difference between the returns in each of the types of trusts. But given the magnitude of the variation of returns, this may not necessarily be the case. To test whether a statistically significant difference between means exists, a general procedure to make all possible comparisons among the different population means is applied. The procedure used is one proposed by Duncan [18] to detect significant differences among pairs of population means. It is a very powerful test that utilizes a comparisonwise error rate. The results of the Duncan multiple range test are provided in Exhibit 2. As these results indicate, there is a significant difference only between the Hybrid FREIT mean compared with the S&P 500 return, and all three REIT trusts. This test can also be interpreted to show that there is not a significant difference between any of the REIT means among themselves, as well as no statistically significant difference between the Equity and Mortgage FREITs among themselves or between any of the REITs. Also of particular interest is that there is a significant difference in the S&P500 return only with the Hybrid FREIT, and not with any of the other trusts.

There are several interesting relationships suggested in the correlation matrix presented in Exhibit 3. There is not a statistically significant relationship between all of the REITs and FREITs. The strongest significant relationships exist with the Equity and Mortgage REITs and FREITs, and the Hybrid REIT. The Hybrid FREIT is not significantly correlated with any of the other trusts. All of the trusts are significantly, positively correlated to the market index over the period studied except the Hybrid and the Mortgage FREITs. The only trusts significantly correlated to the change in CPI are the Hybrid FREIT, with a positive correlation, and the Mortgage REIT, with a negative correlation. Although there is a negative correlation between the rate of inflation and the common stock index, the correlation is not statistically significant. This does not coincide with other studies [7, 10] which find a negative correlation

Exhibit 2 Duncan's Multiple Range Test for Mean Differences

Type of Return	N	Mean	Grouping*
S&P 500	48	.00884	A
Equity REIT	48	.00089	A
Hybrid REIT	48	-.00173	A
Mortgage REIT	48	-.00468	A
Mortgage FREIT	48	-.00796	A B
Equity FREIT	48	-.00977	A B
Hybrid FREIT	27	-.02901	B

Alpha = .05

DF = 308

MSE = .002124

*Means with the same letter are not significantly different from each other within that grouping.

Source: Derived by the authors

Exhibit 3
Pearson Correlation Coefficients
Prob > |R| Under Ho: Rho = 0

	EQ-FR	EQ-RE	HY-FR	HY-RE	MO-FR	MO-RE	S&P 500	CPI	T-BILL
EQ-FR	1.00000 .0000								
EQ-RE	.51763 .0002	1.0000 .0000							
HY-FR	.21259 .2871	.05172 .7978	1.00000 .0000						
HY-RE	.51655 .0002	.70317 .0001	.11441 .5699	1.00000 .0000					
MO-FR	.37435 .0088	.52449 .0001	-.00118 .9954	.53016 .0001	1.00000 .0000				
MO-RE	.21107 .1499	.49025 .0004	-.22625 .2565	.56666 .0001	.22254 .1284	1.00000 .0000			
S&P 500	.36527 .0107	.49969 .0003	.12789 .5250	.43553 .0020	.21068 .1506	.44622 .0015	1.00000 .0000		
CPI	-.05208 .7252	.03109 .8338	.46858 .0137	-.20583 .1605	-.17764 .2271	-.38377 .0071	-.01082 .9418	1.00000 .0000	
T-BILL	.25110 .0852	.16831 .2528	-.01926 .9240	.24173 .0979	.12071 .4138	.25383 .0817	-.02228 .8805	.09906 .5030	1.00000 .0000

Source: Derived by the authors

between the rate of inflation and common stock prices and a positive correlation between the rate of inflation and real estate returns.

While a number of studies that have examined returns on real estate have used an internal rate of return (IRR) methodology [9, 19, 23], this is not appropriate for analyzing REIT returns given the data problems of not being able to accurately assess cash flows and reversion values of the underlying properties in the trusts. Thus the CAPM has been adapted in several studies that have analyzed the performance of REITs [1, 4, 12, 24]. An extension of the CAPM was advanced by Jensen [8] that allows the evaluation of investment performance, and has been used in other studies analyzing real estate returns (see [1] for example). The Jensen performance index model is also applied in this study given its ability to evaluate the risk-adjusted performance of investments relative to a market measure.

Using the Jensen model allows us to assess the systematic risk associated with the individual securities or portfolios. In this research, Jensen's *alpha* (α)-measures are calculated to see if the REIT and FREIT portfolios provide excess returns above the equilibrium rates allowed in the market. This α -measure is designed to evaluate investment performance of securities (or portfolios) within the two-parameter equilibrium model by evaluating ex-post risk premiums of individual investment vehicles:

$$R'_{jt} = \alpha_j + \beta_j R'_{mt} + \epsilon_{jt} \quad (1)$$

where

- R'_{jt} = excess rate of return ($R_{jt} - R_{ft}$) on portfolio j in period t ;
- R'_{mt} = excess rate of return ($R_{mt} - R_{ft}$) on the market portfolio in period t ;
- α_j, β_j = intercept and slope terms, respectively, of the least squares regression line;
- ϵ_{jt} = random error term with $E(\epsilon_{jt}) = 0$

and

$$R_{jt} = \text{rate of return on portfolio } j \text{ in period } t;$$

$$R_{mt} = \text{rate of return on the market portfolio in period } t;$$

$$R_{ft} = \text{risk-free rate of return in period } t.$$

The rate of return on the market portfolio is represented here by the S&P 500 index. Given the limited number of EQ, MO and HY types in each class of REIT and FREIT, the total sample of the REIT, FREIT and combined trusts are used as the portfolios in the subsequent analysis. As mentioned, the risk-free rate of return is measured by the one-month T-bill rate. The *alpha* (α) in equation (1) is the Jensen performance index and the *beta* (β) indicates the systematic risk of the portfolio. A negative alpha would indicate an inferior performance of the portfolio relative to an unmanaged portfolio of similar market risk, where a positive alpha would indicate a superior performance of a trust portfolio given the portfolio's systematic risk.

Results

The Jensen performance index test results are presented in Exhibit 4. The systematic risk levels of both the REIT and FREIT samples are very low, as measured by β . This is not surprising, given that the trusts are secured by the real property underlying the investments, which should give investors a relatively low perceived investment risk. With the low beta of the trusts, they should provide a vehicle to reduce the systematic risk of a portfolio, which confirms the results of previous studies [1, 2, 15, 23]. The systematic risk coefficients of both the REITs and FREITs are statistically significant at the 1% level. The basic model has reasonable explanatory power, where 11% of the FREIT return variability and 29% of the REIT return variability are explained by the relationship with the stock index. There are forty-eight observations, corresponding to the time period studied, in each of the regressions.

Jensen's α -measures are also shown in Exhibit 4. The excess return generated from the FREIT portfolio appears very low relative to the REITs. The REIT, FREIT and combined portfolios performed much worse than the index that they were measured against over the time period studied. To compare the return performance of the REIT and FREIT portfolios to

Exhibit 4
Regression Results of Single-Factor Jensen Performance Index
(Monthly Data)

Portfolio	α	β	α/β	Adj. R^2
Combined Pool	-.011167** (-3.318)	.379692** (4.422)	-.02941	.2830
FREIT	-.016299** (-3.910)	.260158** (2.555)	-.06265	.1053
REIT	-.009564** (-2.584)	.405951** (4.491)	-.02356	.2897

(t-statistics)

*significant at the .10 level of confidence

**significant at the .01 level of confidence

Source: Calculated using equation 1

each other, the Jensen α -measure must be risk adjusted [8]. This is accomplished by dividing Jensen's alpha by beta, as shown in Exhibit 4. It is thus obvious that the risk-adjusted performance of the REITs is superior to the FREITs, although all of the trust portfolios underperformed the market index over the period studied.

Perhaps a more appropriate model than the single-factor ex-post model for measuring risk-adjusted investment performance is one that incorporates inflation and hedging potential. An extension of the Jensen model, as developed in [1], that incorporates inflation is called the two-factor Jensen index, and is specified as follows:

$$R'_{jt} = \alpha'_j + \beta_{j1}R'_{mt} + \beta_{j2}\pi'_t + \epsilon_{jt} \quad (2)$$

where

- R'_{jt} = the excess rate of return ($R_{jt} - R_{ft}$) on the portfolio j in the period t ;
- R'_{mt} = the excess rate of return ($R_{mt} - R_{ft}$) on the market portfolio in the period t ;
- π'_t = the excess rate of inflation ($\pi_t - R_{ft}$) in period t ;
- α'_j = the modified Jensen index on the portfolio j ;
- β_{j1}, β_{j2} = the portfolio's response coefficients to the market and inflation factors, respectively;
- ϵ_{jt} = the random error term with $E(\epsilon_{jt}) = 0$.

The rate of inflation used here is the log of the CPI_t series divided by CPI_{t-1} . The results of this regression are presented in Exhibit 5 for the REIT, FREIT and combined samples. Since the alpha coefficients are negative and significant, this again suggests an inferior performance of the trusts relative to the market over the period studied, despite incorporating inflation in the analysis. The negative, significant response coefficient for the combined pool inflation factor would indicate that there may be hedging capabilities in the trusts. But the two-factor model does not fully answer the question of whether the trusts provide inflation hedging abilities over the period studied, especially in terms of anticipated and unanticipated inflation.

Titman and Warga [25] suggest that a single-index asset-pricing model such as CAPM may be inappropriate for assessing the risk of real estate investments. They theorize that the

Exhibit 5 Regression Results of Two-Factor Jensen Performance Index (Monthly Data)

Portfolio	α	β_1	β_2	Adj. R^2
Combined Pool	-.02021** (-4.458)	.978414** (4.724)	-.867162** (-2.804)	.9760
FREIT	-.021938** (-3.511)	.259462** (2.561)	-.200795 (-1.209)	.1141
REIT	-.019009** (-3.578)	.404784** (4.699)	-3.363493* (-2.378)	.3549

(t-statistics)
*significant at the .10 level of confidence
**significant at the .01 level of confidence

Source: Calculated using equation 2

Exhibit 6
Regression Results of Two-Factor Model with Inflation
(Monthly Data)

PARAMETER	REIT	FREIT	COMBINED
γ_0	.000336 (.057)	-.009503 (-1.402)	-.001355 (-.242)
γ_1	.410246** (4.555)	.264513* (2.559)	.384852** (4.506)
γ_2	-2.454811 (-1.466)	-1.013765 (-.527)	-2.555584 (-1.608)
Adj. R^2	.3092	.0936	.3093

(t-statistics)
 *significant at the .10 level of confidence
 **significant at the .01 level of confidence

Source: Calculated using equation 3

returns from these investments are particularly sensitive to unexpected changes in inflation and interest rates, where most stock returns are not particularly sensitive to interest-rate changes after controlling for the returns on the market portfolio. As a result they use a multiple-index model, the Arbitrage Pricing Model (APM), to assess all non-diversifiable risk factors associated with real estate investments. While their results show that the APM and CAPM can provide different estimates of the investment performance of REITs, they conclude that the REIT returns are so volatile that neither the APM or CAPM-based techniques are powerful enough to provide reliable performance evaluations.

Therefore, in this research an extension of the CAPM is used to incorporate the effect of inflation, specifically an extension of the two-factor equilibrium capital asset-pricing model under inflation (CAPMUI). The rationale of the CAPMUI is that both market risk and inflation risk should be determinants of the equilibrium rate of return on a portfolio. Several versions of the CAPMUI have been developed (Chen and Boness [3], Friend et al. [6], Long [13] and Roll [20]), which extend the CAPM to incorporate the impact of uncertain inflation on equilibrium returns.

The CAPMUI extension used in this study, as developed in [1], is a two-factor equilibrium model specified as follows:

$$R_{jt} = \gamma_0 + \gamma_1 R_{mt} + \gamma_2 \pi_t + \mu_{jt} \tag{3}$$

where

- R_{jt} = the rate of return on the portfolio j in the period t ,
- R_{mt} = the rate of return on the market portfolio in period t ,
- π_t = the inflation rate in period t ,
- $\gamma_0, \gamma_1, \gamma_2$ = regression parameters, and
- μ_{jt} = the random error in period t

The calculated coefficient γ_1 provides information on the market risk, where a low or insignificant coefficient would indicate low market risk. If an investment trust possessed low market risk, then a common stock portfolio would benefit from including such a trust and reducing systematic risk. Similarly, the calculated coefficient γ_2 provides information on the inflation hedging potential of a portfolio. If this coefficient is positive and significant, then

the investment trust portfolio would be indicated to provide a good hedge against inflation.

The results of this regression are presented in Exhibit 6 for the REIT, FREIT and combined samples. The γ_0 coefficients are not statistically different from zero. The γ_1 coefficient for all samples are low and significant, indicating possible diversification benefits between the investment trust portfolios and a stock portfolio. This confirms the results of the Jensen performance index models which find that the REIT, FREIT and combined portfolios have low betas, and should be useful in reducing the systematic risk of a portfolio. The γ_2 coefficient is negative but statistically insignificant in each portfolio, indicating little total inflation hedging capability of the trusts. The R^2 levels again indicate reasonable explanatory power.

The inflation factor can be decomposed further into anticipated and unanticipated portions in order to gain insight into the inflation hedging potential of the real estate trusts over the period studied. Following similar research using this methodology [1, 5], a T-bill rate lagged one period is used for the anticipated inflation. The realized inflation rate, as measured by the log of the CPI_t/CPI_{t-1} , minus a one-period lagged T-bill rate is used for the unanticipated inflation rate.

Exhibit 7 includes the regression results from equation (3) with the anticipated inflation measure. Again, the γ_1 market coefficients are low and significant indicating the investment trusts might provide diversification benefits. The anticipated inflation coefficients, γ_2 , indicate that all of the trust portfolios do provide a good hedge against anticipated inflation. This is opposite of the results of the regression using total inflation only.

The results of the regression using equation (3) with unanticipated inflation are provided in Exhibit 8. Diversification benefits are again indicated, as reflected in the γ_1 coefficients. This is similar to the results from the previous regressions using total and anticipated inflation. But unlike the anticipated inflation regression, there are no inflation hedging abilities indicated against unanticipated inflation, as evidenced by the negative γ_2 coefficients. The γ_0 coefficients in Exhibits 7 and 8 are negative and significant, which is surprising. One possible explanation for this is that the REITs and FREITs are not part of the market index that they are being compared against. As such, the expected market return normally measured by γ_0 would not necessarily be achieved. All of the regressions using equation (3) provide reasonably good explanatory power, as measured by the adjusted R^2 .

Exhibit 7 Regression Results of Two-Factor Model with Anticipated Inflation (Monthly Data)

PARAMETER	REIT	FREIT	COMBINED
γ_0	-.033346* (-2.211)	-.043349* (-2.560)	-.039269** (-2.781)
γ_1	.418772** (4.708)	.273274** (2.736)	.394477** (4.736)
γ_2	4.819841* (1.848)	5.542913* (1.895)	5.526142* (2.263)
Adj. R^2	.3273	.1554	.3442
(t-statistics)			
*significant at the .10 level of confidence			
**significant at the .01 level of confidence			

Source: Calculated using equation 3

Exhibit 8
Regression Results of Two-Factor Model with Unanticipated Inflation
(Monthly Data)

PARAMETER	REIT	FREIT	COMBINED
γ_0	-.015833** (-2.912)	-.019273** (-3.047)	-.018630** (-3.665)
γ_1	.414606** (4.765)	.267268* (2.640)	.389528** (4.788)
γ_2	-3.290276* (-2.348)	-2.430047 (-1.491)	-3.57845** (-2.732)
Adj. R^2	.3553	.1310	.3735

(t-statistics)
*significant at the .10 level of confidence
**significant at the .01 level of confidence

Source: Calculated using equation 3

Conclusion

In this study the investment performance of real estate investment trusts were analyzed. Most studies of real estate returns indicate a perceived belief by investors that real estate is a relatively safe investment, offering diversification and inflation hedging abilities. This study provides only minimal support of these beliefs.

The returns of both the REITs and FREITs under-performed the market index over the period studied, although the REIT portfolio outperformed the FREIT portfolio. And while the systematic risk of both types of trusts were low, suggesting portfolio risk diversification benefits similar to other studies [2, 14, 24], it is not clear whether the reduced risk achieved is warranted given the large reduction in return. This tends to support the research of Kuhle [11] in that there may be market inefficiencies in REIT pricing as well as little indicated benefits in diversifying a portfolio with REITs.

When incorporating the effects of inflation in the analysis, the results indicated little total inflation hedging capability. When the inflation element was decomposed into anticipated and unanticipated factors, it was found that the trusts provided a good hedge against anticipated inflation only, and no hedge against unanticipated inflation.

There are several possible explanations for the performance of the investment trusts. The obvious one is the fact that the market portfolio rose dramatically during most of this time period, while the investment trusts were buffeted by declining property values as a result of overbuilt markets and changing tax laws. This latter factor would also help explain the reason for the superior performance of the REIT sample relative to FREITs. If the market indeed discounts the reversionary values for the FREITs along with the dividends, we would expect the returns to be lower for the FREITs over this time period.

Since the FREITs are a relatively new investment vehicle, additional research is needed covering a longer time period to determine if FREITs will outperform REITs in strong markets and as the liquidation period of the FREITs approaches. In addition, research comparing the FREITs to a real estate index or other more global index, as opposed to a stock market index, might provide some interesting results. Finally, it should be noted that the REIT returns reported here do not appear to be as good as those reported in other studies and industry reports. Since this study deals with a specific sample over a limited time period, it is difficult to generalize these results or make specific comparisons with other studies.

Notes

¹Since REIT stocks trade infrequently, and in relatively small amounts, the NASDAQ index may be a more appropriate measure of market return than the S&P 500 [21]. Running the same analysis on both indexes shows that the S&P 500 provided slightly better returns than the NASDAQ with lower variability, although all other empirical results were very similar. Since the studies cited analyzing real estate returns have used the S&P 500 as the market index, for consistency this is the index that is used here.

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