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Real estate investing

Guest Editor: Don T. Johnson

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Guest Editor
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GUEST EDITORIAL

Real estate investing

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Abstract

Purpose – Aims to explain the rationale for producing an issue on the topic of real estate investing and how these articles fit together.

Design/methodology/approach – Essay format.

Findings – Real estate is probably the largest category of assets for investors and the works in this issue will assist in the decision making processes of real estate investors.

Research limitations/implications – Each of these papers covers only a limited topic and more research in the area is needed.

Practical implications – These papers could change how asset allocation studies are conducted; allow investors to make superior returns around the turn of the month on real estate investment trusts (REITs); alter the capital structure of REITs; seek out real estate mutual funds with higher management fees (because they were associated with higher returns); invest directly in real estate properties.

Originality/value – All five of these papers either examine areas that have not been reviewed by researchers previously, or find results that may result in different investment decisions.

Keywords Real estate, Assets management, Investments

Paper type Viewpoint

This issue of *Managerial Finance* is dedicated to the study of real estate investments. Real estate accounts for approximately two-thirds of the national wealth of the United States and over 25 per cent of the gross domestic product. Experts attribute about 25 per cent of the worth of publicly traded corporations to their investments in real estate. Recent studies by the Census Bureau and other organizations have identified real estate as the largest holding for a large percentage of households in the United States. Clearly, issues surrounding real estate investing are of considerable interest to many parties including individual investors, institutional investors and even corporations who own real estate as part of their operations. I believe that these and other parties will find the articles in this issue to be notably useful in their real estate decision making.

In the first article in this issue, Waggle and Moon (2006) examine how using various return intervals affect optimal portfolio allocation decisions where the portfolio may contain real estate investment trusts (REITs). Much asset allocation research has been published but different studies often arbitrarily select different return intervals. Waggle and Moon (2006) show, at least with regards to REITs, that changing the return period from an annual interval to semiannual, quarterly or monthly can dramatically change the optimal portfolio allocation recommendations in substantial part due to systematically understated annual volatility. By challenging the haphazard selection of return intervals, the Waggle and Moon (2006) work may change how asset allocation decisions are made in the future.

The second paper by Compton *et al.* (2006), examines both equity and mortgage REIT returns around the turn of the month (TOM). We employ a battery of both parametric and nonparametric statistical tests that address the concerns of distributional violations raised in previous studies. The results reveal dramatic and significant positive returns on REIT stocks around the TOM. The results may indicate

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an opportunity for investors to help bring efficiency to the market by making and taking profits in REIT stocks around the TOM.

Casey *et al*. (2006) scrutinize the capital structure of REITs in the third paper of this issue. Using REITs as a proxy for nontax-driven capital structure decisions (since they avoid corporate taxation by paying out most of their earnings), they find evidence that REITs' capital structures are influenced by various market factors such as price-to-book ratios, institutional ownership and price-to-cash flow ratios. Further, they find that different types of REITs utilize different capital structures. Managers and investors may be able to use the information in this article to optimize REIT values.

The fourth paper by Philpot and Peterson (2006) examines how the characteristics of the managers of real estate mutual funds are associated with the funds' performances, risk levels and management fees. Contrary to much research using non-real estate mutual funds, Philpot and Peterson (2006) find that real estate funds with higher management fees produce higher fund returns. They also find that team-managed funds have lower returns and that there is little evidence of returns being positively related to a manager's experience or certification. The Philpot and Peterson (2006) results differ in several ways from those most commonly found by researchers studying the broad mutual fund industry and thus researchers and investors in the specialized real estate mutual funds may find their work to be quite informative and useful.

Finally, Nelson (2006) explores the topic of direct real estate investing which, despite the popularity and high profile of indirect investing vehicles such as REITs, is still the most common avenue for individuals and institutions to add real estate exposure to their portfolios. Nelson (2006) discusses the comparative advantages and problems of direct real estate investing *vis-à-vis* indirect investing. He then takes us through an actual investment case involving a mixed use building in the upper Midwestern United States.

Many thanks go to Dr Richard Dobbins for offering me the opportunity to assemble this issue of *Managerial Finance*. Additional thanks go to Michael Casey for acting as Special Editor on my article with William Compton and Robert Kunkel. Finally, I especially want to thank the numerous anonymous reviewers who gave of their time and effort to read and screen the submissions for this issue. They identified the best papers among the works submitted and then improved the papers in this issue by recognizing problems and suggesting ways for the authors to improve their articles.

References

Casey, M., Sumner, G. and Packer, J. (2006), "REIT capital structure: is it market imposed?", *Managerial Finance*, Vol. 32.

Compton, W., Kunkel, R. and Johnson, D. (2006), "The turn-of-the-month effect in real estate investment trusts (REITs)", *Managerial Finance*, Vol. 32.

Nelson, W. (2006), "The strong building: a case study in direct investment", *Managerial Finance*, Vol. 32.

Philpot, J. and Peterson, C. (2006), "Manager characteristics and real estate mutual fund returns, risk and fees", *Managerial Finance*, Vol. 32.

Waggle, D. and Moon, G. (2006), "Mean-variance analysis with REITs in mixed asset portfolios: the return interval and the time period used for the estimation of inputs", *Managerial Finance*, Vol. 32.

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Mean-variance analysis with REITs in mixed asset portfolios

The return interval and the time period used for the estimation of inputs

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Abstract

Purpose – Aims to test to determine whether the selection of the historical return time interval (monthly, quarterly, semiannual, or annual) used for calculating real estate investment trust (REIT) returns has a significant effect on optimal portfolio allocations.

Design/methodology/approach – Using a mean-variance utility function, optimal allocations to portfolios of stocks, bonds, bills, and REITs across different levels of assumed investor risk aversion are calculated. The average historical returns, standard deviations, and correlations (assuming different time intervals) of the various asset classes are used as mean-variance inputs. Results are also compared using more recent data, since 1988, with, data from the full REIT history, which goes back to 1972.

Findings – Using the more recent REIT datarather than the full dataset results in optimal allocations to REITs that are considerably higher. Likewise, using monthly and quarterly returns tends to understate the variability of REITs and leads to higher portfolio allocations.

Research limitations/implications – The results of this study are based on the limited historical return data that are currently available for REITs. The results of future time periods may not prove to be consistent with the findings.

Practical implications – Numerous research papers arbitrarily decide to employ monthly or quarterly returns in their analyses to increase the number of REIT observations they have available. These shorter interval returns are generally annualized. This paper addresses the consequences of those decisions.

Originality/value – It has been shown that the decision to use return estimation intervals shorter than a year does have dramatic consequences on the results obtained and, therefore, must be carefully considered and justified.

Keywords Assets management, Real estate, Returns

Paper type Research paper

Introduction

Estimates of the means and standard deviations of security returns and the correlations of those return series are essential to many portfolio decisions. Investors typically use historical calculations of this return series data as proxies for expected values. In widely used mean-variance analysis, historical return series data is employed to determine optimal portfolio allocations to various assets or asset classes. With mean-variance analysis investors can determine portfolio weights that maximize returns for given risk levels or that minimize risk for given return levels.

Despite the widespread use of historical data related to asset returns, there are no hard and fast rules as to exactly how these historical figures should be determined. Many researchers will base calculations on annual return series, but others may arbitrarily use monthly or quarterly data in order to gain more observation points.

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Some researchers use the entire historical return series available, while others may argue that one particular time period is more applicable than another.

The primary focus of our paper pertains to portfolio choices relating to equity real estate investment trusts (EREITs) in mixed-asset portfolios. Using mean-variance analysis with stocks, bonds, cash, and EREITs, we test to see if using return data (means, standard deviations, and correlation coefficients) calculated from different return intervals (monthly, quarterly, semiannul, and annual) affects optimal portfolio allocations. If, for instance, using monthly or quarterly vs annual returns (over the same historical time period) to calculate mean-variance inputs has no impact on optimal portfolio allocations, then researchers should feel comfortable using the shorter return intervals with the resulting additional observations. If, on the other hand, using shorter return intervals has a significant impact on the portfolio allocations, researchers should provide support for their return interval choice. This is, particularly, applicable if the return interval used for estimation purposes differs from the estimated holding period. The available historical return data for real estate investment trusts (REITs) is very limited compared to that of stocks, bonds, and cash, but many argue that the more recent observations are more relevant due to the evolution of REITs over time. For our analysis, we also examine the impact on mean-variance efficient portfolios if return series data is derived from the full history of EREITs as compared to the more recent time period.

The rest of the paper continues as follows: The next section provides some background on REITs and examines their place in the portfolio, as well as the impacts of the time interval on correlations, standard deviations and betas. After that we discuss our data and the basic statistics we calculated. Included in this section are the annual and annualized mean and standard deviation calculations, as well as correlation matrices calculated using different return intervals. In our methodology section, we explain the mean-variance utility function that we employ. Our results and analysis are followed by our conclusions.

Literature review

REITs

REITs are corporations with a special tax classification that allows them to avoid paying taxes on their earnings as long as certain criteria are met. REITs must invest in either direct ownership of real estate or in financing of real estate by holding mortgages. These corporations must also distribute at least 90 per cent of their earnings to their shareholders each year as dividends. Shareholders then pay their taxes at their individual income tax rates. The vast majority of REITs are EREITs which own and operate income producing real estate. Mortgage REITs either lend money directly to real estate owners or purchase mortgages or mortgage-backed bonds. Hybrid REITs are involved in a combination of real estate ownership and financing. The National Association of Real Estate Investment Trusts (NAREIT) provides more information on REITs at www.nareit.com.

REITs are also called real estate stocks and were created to give small investors the opportunity to invest in large commercial properties. Corgel *et al.* (1995) suggest that real estate literature supports the notion that REITs incorporate some of the characteristics of both real estate and stock. Liang (1998) shows that REITs historically behaved similarly to a portfolio of 40 per cent small capitalization stocks and 60 per cent bonds, but that REITs became more unique over the last five years of his study period. Peterson and Hsieh (1997) find that EREIT returns were related to risk premiums on common stocks. Ziering *et al.* (1999) noted a downward trend in the correlation between stocks and REITs, which they expected to continue. Seiler *et al.* (1999) go as far as to suggest that private real estate and EREITs behave differently and should be treated as entirely separate asset classes. Seiler *et al.* (2001) further show that EREITs are not suitable for rebalancing or diversifying private real estate portfolios. Clayton and MacKinnon (2001), on the other hand, found that in the 1990s REIT returns were closely linked to the real estate asset class suggesting that they may be an acceptable substitute for real estate in the portfolio. One of the major differences between REIT returns and those of private real estate is that while the returns of REITs are based on market prices, return series for private real estate are generally based on appraisals. Gyourko and Keim (1993) suggested that the market-based returns of REITs actually capture information about changes in real estate values ahead of the returns derived from appraisals.

Real estate and REITs in the portfolio

Real estate has a definite role in the portfolios of institutions and individuals. There are many works such as Fogler (1984), Firstinberg *et al.* (1988), Ennis and Burik (1991), and Kallberg *et al.* (1996) which suggest optimal allocations to real estate of approximately 10 to 20 per cent of the overall investment portfolio. On the opposite end of the spectrum, Webb *et al.* (1988) argue that two-thirds of investment wealth should be allocated to real estate with the remainder going to financial assets such as stocks and bonds. Giliberto (1992) employs mean-variance analysis to show that if gross real estate returns ranged from 10 to 12 per cent, then portfolio allocations to real estate of 5-15 per cent could be justified. Bajtelsmit and Worzala (1995) examine 159 pension funds and find actual allocations to real estate that ranged from 0 to 17 per cent with an average allocation of only 4.4 per cent. Ziering and McIntosh (1997) and Hudson-Wilson (2001) both show that public real estate (REITs) and private real estate provide significant diversification benefits in mixed asset portfolios. Waggle and Johnson (2003) consider a single family home to be a key real estate component of an individual investor's portfolio and examine the affects on allocations to the traditional portfolio. Goodman (2003) and Waggle and Johnson (2004) demonstrate that REITs provide diversification benefits to individual investors when the family home is considered as an asset.

Correlations, returns, and standard deviations

The returns, standard deviations, and correlation coefficients of asset classes all change over time. Ziering and McIntosh (1997) observe that the relationships between the S&P 500, long-term government bonds, REITs, and real estate changed dramatically over their 1972-1995 study period. Dopfel (2003) likewise saw considerable changes between the correlations of stocks and bonds from 1929 through June 2003. While the typical stock-bond correlation coefficient is assumed to be about +0.4, Dopfel notes many three-year periods where the correlation was actually negative. Waggle and Moon (2005) prove the importance of the stock-bond correlation on asset allocation decisions. Wainscott (1990) derives stock-bond correlation coefficients using rolling one, three, five, and ten-year periods. Not surprisingly, the swings in the one-year correlations are much larger, but there were still periods where even the ten-year correlations are negative.

We found very few works examining the use of different return intervals in calculating correlation coefficients. Levy *et al.* (2001) note that with serial correlation, the time interval selected for calculating correlation coefficients may affect the results. Levy *et al.* also show that when one variable is multiplicative and the other is additive the choice of return interval used can impact the correlation coefficient calculations even if all random variables are independent over time. When both variables are multiplicative as in our study, Levy and Schwartz (1997) suggest that the correlation coefficient decreases as the time interval increases. For example, the correlation coefficient for a pair of independent assets decreases if quarterly returns are used instead of monthly returns in the calculation or if annual returns are used instead of quarterly returns.

Giliberto (2003) used the National Council of Real Estate Investment Fiduciaries (NCREIF) property index to show that when there is significant, positive autocorrelation in the return series, using monthly or quarterly returns to estimate annual variability would lead to understatement of the volatility of the asset class. NCREIF's quarterly returns had a very high 0.68 serial correlation, based on one-month lagged returns. Annualizing the quarterly standard deviation of the NCREIF property index suggests an annual standard deviation of 3.4 per cent. Giliberto's simulation work shows that the actual annual volatility is more likely to be in the 7 per cent to 8 per cent range. In this case annualized quarterly figures understate volatility by more then 50 per cent. Giliberto suggests that this should not be an issue with stocks since they have low serial correlation of 0.03.

The calculation of a security's beta includes the correlation of the security with the market portfolio, so some of the literature on beta applies to our analysis. In the case of beta, as with correlation coefficients, there seem to be arbitrary decisions regarding the return interval and the estimation time period to be used. Lamb and Northington (2001) surveyed various data sources to determine their methods for calculating security betas. Value Line and Standard and Poor's use a five-year calculation window, while Bloomberg uses only a two-year estimation period. While the use of monthly returns in calculating beta is the norm, Value Line and Bloomberg both use weekly returns, while Bridge and Argus use daily returns.

Levhari and Levy (1977) provide a theoretical examination of betas assuming different return intervals in their calculations. They find that for betas less than one, longer interval betas are higher than shorter interval betas (for example, monthly vs daily betas). For betas greater than one, they believe the opposite to be true. Their conclusions are supported by the empirical work of Levy (1984), but challenged by empirical works by Hawawini and Vora (1981) and Saniga *et al.* (1981). Hawawini and Vora (1982) calculated betas with several different methodologies and using daily, weekly, biweekly, and monthly returns and compared their calculated prior period betas to daily betas calculated from the subsequent 600 days. Prior period betas calculated based on daily returns were found to have the highest correlation with the subsequent betas. Reilly and Wright (1988) compared Value Line's weekly betas to Merrill Lynch's monthly betas and concluded that there were differences between the two related to the return interval used and security size factors. Chang and Weiss (1991) found differences between quarterly and semi-annual betas. Groenewold and Fraser (2000) compared a two-year beta estimation period to the standard five-year estimation period and concluded that the latter provided more useful estimates.

Data and basic statistics

We employ monthly, quarterly, semiannual, and annual historical return data for EREITs, large-company stocks, long-term government bonds, and treasury bills for the 1972-2002 period. Rather than mixing mortgage and equity REITs in our analysis, we chose to focus exclusively on the more common EREITs. The 1972 start date is constrained by the availability of EREIT returns. We obtained total returns (capital gains and dividends) of large company stocks, long-term government bonds, and US treasury bills from Ibbotson Associate's *SBBI 2003 Yearbook*. Hereafter, we will refer to them simply as stocks, bonds, and cash, respectively. We use the total return data for EREITs obtained from the NAREIT.

After calculating means and standard deviations based on monthly, quarterly, and semiannual returns, we annualized all of the estimates. The annualized return r_A is calculated as follows:

$$r_A = (1 + r_n)^n - 1 \tag{1}$$

where r_n is mean return for the return interval and n is the number of periods there are per year. The commonly used annualized standard deviation σ_A calculated is as follows:

$$\sigma_A = \sqrt{n}\sigma_n \tag{2}$$

where σ_n is the standard deviation of the return interval. The multi-period standard deviation calculation assumes that each period's returns are independent and identically distributed.

Table I, panel A shows the means and standard deviations of the returns of stocks, bonds, cash, and EREITs for the full 1972-2002 period. The first set of figures shows the calculations based on annual returns and then there are annualized calculations based on semiannual, quarterly, and monthly returns as described above. Based on annual returns, stocks have a mean return of 12.4 per cent and a standard deviation of 18.0 per cent. The mean and standard deviation of bonds are 9.8 and 12.2 per cent, respectively. The mean return for cash is 6.5 per cent with a standard deviation of 2.8 per cent. For the full period EREITs are the dominant asset with a higher return than stocks and a lower standard deviation. EREITs had a mean return of 13.5 per cent and a standard deviation of 16.7 per cent.

The annualized mean returns differ only trivially from the annual means, but this is not the case for the annualized standard deviations. The annualized standard deviation calculations all understate their annual counterparts. The standard deviation calculations for EREITs and cash both increase steadily as the return interval increases. This could be explained by a lack of independence of the various return series as noted by Giliberto (2003). Lagged monthly stock returns are, however, virtually uncorrelated with a serial correlation figure of −0.014. The serial correlation figures for bonds, cash, and EREITs are all positive with values of 0.081, 0.941, and 0.109, respectively. Some of the differences between the annualized and annual calculations are consistent with the Levhari and Levy (1977) observations on beta. The high serial correlation of cash explains the striking differences between the annualized standard deviations and the standard deviation of the annual returns. The monthly annualized standard deviation for cash is 0.008 compared to the standard deviation of annual returns of 0.028.

Observations for the second half of our study period 1988 through 2002 are comparable to the full sample. It is notable that EREITs no longer dominate stocks in this sample period. EREITs have less risk than stocks, but they also have a lower return. The mean return of EREITs was 11.5 per cent compared to 13.0 per cent for stocks. The standard deviations of stocks and EREITs were 18.6 and 15.8 per cent, respectively. In all

	Stocks	Bonds	Cash	EREITs
A. 1972-2002				
Annual returns				
Mean	0.124	0.098	0.065	0.135
Standard deviation	0.180	0.122	0.028	0.167
Annualized semiannual returns				
Mean	0.123	0.098	0.065	0.134
Standard deviation	0.169	0.111	0.019	0.155
Annualized quarterly returns				
Mean	0.125	0.099	0.065	0.133
Standard deviation	0.170	0.118	0.013	0.146
Annualized monthly returns				
Mean	0.123	0.098	0.065	0.132
Standard deviation	0.158	0.104	0.008	0.136
B. 1988-2002				
Annual returns				
Mean	0.130	0.110	0.050	0.115
Standard deviation	0.186	0.112	0.018	0.158
Annualized semiannual returns				
Mean	0.124	0.109	0.050	0.113
Standard deviation	0.133	0.095	0.012	0.137
Annualized quarterly returns				
Mean	0.128	0.109	0.050	0.114
Standard deviation	0.155	0.091	0.009	0.136
Annualized monthly returns				
Mean	0.127	0.109	0.050	0.112
Standard deviation	0.148	0.084	0.005	0.119

Notes: The means and standard deviations of stocks, bonds, cash, and EREITs are calculated using monthly, quarterly, semiannual, and annual returns. The monthly, quarterly, and annual mean return and standard deviation figures are annualized using equations 1 and 2, respectively

Table I.
Annualized means and standard deviations for different return intervals

cases, the annualized standard deviations were less than the standard deviations based on annual returns.

Table II shows correlation matrices for stocks, bonds, cash, and EREITs calculated for different return intervals for the full sample period 1972-2002 and the latter half 1988-2002. Levy and Schwartz (1997) suggest that there may be a pattern of decreasing correlations with longer return intervals, but this does not occur consistently in our population. The stock-EREITs correlation based on quarterly returns is 0.603 compared to 0.453 for annual returns. The quarterly and annual bonds-EREITs correlation coefficients are virtually identical at 0.265 and 0.258.

Comparisons of the 1972-2002 period and the 1988-2002 period show considerable differences. Based on annual returns, the stocks-EREITs correlation was 0.453 for the full period and only 0.165 for the latter half. The bond-EREITs correlation did not change appreciably at 0.258 for the full period and 0.281 for the second half. The decision regarding which return interval to use has a notable impact on correlations for the latter half of our study period. The stocks-EREITs correlation based on quarterly returns is 0.396 compared to the annual return correlation of just 0.165. The quarterly bonds-EREITs correlation is 0.126 compared to the annual correlation of 0.281.

	Stocks	Bonds	Cash
A. 1972-2002			
Annual returns			
Bonds	0.302		
Cash	0.092	−0.014	
EREITs	0.453	0.258	0.070
Semiannual returns			
Bonds	0.268		
Cash	0.030	−0.019	
EREITs	0.599	0.246	0.003
Quarterly returns			
Bonds	0.217		
Cash	−0.022	0.010	
EREITs	0.603	0.265	−0.039
Monthly returns			
Bonds	0.253		
Cash	−0.020	0.058	
EREITs	0.527	0.165	−0.044
B. 1988-2002			
Annual returns			
Bonds	0.215		
Cash	0.445	0.129	
EREITs	0.165	0.281	−0.064
Semiannual returns			
Bonds	0.161		
Cash	0.390	0.085	
EREITs	0.148	0.169	−0.078
Quarterly returns			
Bonds	−0.083		
Cash	0.157	0.122	
EREITs	0.396	0.126	−0.079
Monthly returns			
Bonds	0.134		
Cash	0.119	0.064	
EREITs	0.363	0.138	−0.048

Note: The correlation matrices for stocks, bonds, cash, and EREITs are calculated using monthly, quarterly, semiannual, and annual returns

Table II.
Correlation matrices for different return intervals

Methodology

Rational investors prefer higher returns and seek to avoid risk or variability of the returns. Using mean-variance analysis, investors can choose portfolio combinations that provide the maximum expected return for a given level of risk or, alternatively, the minimum level of risk for a given expected return. Risk is measured by the portfolio's variance or standard deviation. In our analysis, we employ a common mean-variance utility function that is a function of both expected portfolio return r_{p} and the variance of the portfolio return σ_{p}^2. Investors seek to maximize utility by maximizing the following function:

$$r_{\mathrm{p}} - \frac{1}{2}A\sigma^2 \qquad (3)$$

The coefficient A is a measure of the individual investor's level of relative risk aversion. Low values of A are consistent with a higher tolerance for risk, while higher values for A equate to higher degrees of risk aversion. The expected portfolio return and standard deviation are calculated as

$$r_{\mathrm{p}} = \sum_{i=1}^{n} w_i r_i \tag{4}$$

$$\sigma_{\mathrm{p}}^2 = \sum_{i-1}^{n} \sum_{j=1}^{n} w_i w_j \rho_{ij} \sigma_i \sigma_j \tag{5}$$

where

n = the total number of assets in the portfolio,

r_i = the expected return of the asset (stocks, bonds, cash, or EREITs),

w_i = the portfolio weight of the ith asset,

w_j = the portfolio weight of the jth asset, and

ρ_{ij} = the correlation coefficient of assets i and j.

The utility function is subject to some constraints. For our purposes, the entire portfolio is comprised of stocks, bonds, cash, and EREITs; and all of these assets are included in our analysis, so the asset weights must equal 100 per cent of the portfolio or

$$\sum_{i=1}^{n} w_i = 1$$

We do not permit shorting of asset classes in our optimal portfolio solutions, so for all i, $w_i \geq 0$.

Investors choose the portfolio weights w_i that maximize the mean-variance utility function given their individual perceptions toward risk as measured by A. We examine optimal portfolio combinations for stocks, bonds, cash, and EREITs using the mean, standard deviation, and correlation matrix data based on annual returns and annualized monthly, quarterly, and semiannual returns. We also examine mean-variance output based on unadjusted monthly, quarterly, and semiannual data, but it did not vary appreciably from the annualized data and is not reported. We look at the full sample period from 1972 to 2002 and the second half of the period from 1988 to 2002. We want to determine if there are any differences in calculated optimal portfolio allocations, and EREITs in particular, related to the estimation period and/or the return interval used.

Results and analysis

Our results show that optimal allocations to a mixed-asset portfolio of stocks, bonds, cash, and EREITs are impacted dramatically by both the estimation period and the return interval used. Table III shows optimal portfolio weights for our four asset classes with different mean-variance input calculations for different assumed levels of risk aversion with A set at levels of 1, 2, 3, 5, 8, and 10. For the full sample period of 1972-2002 shown in panel A, EREITs play a dominant role in the portfolio due to their high return and low risk relative to stocks. While EREITs still have significant portfolio weights using the data from just the more recent 1988-2002 period, panel B shows that in this case the optimal allocations to EREITs dropped by 50 per cent or

	1	2	3	5	8	10
A. 1972-2002						
Annual data						
Stocks	0.117	0.271	0.224	0.158	0.097	0.076
Bonds	0.000	0.006	0.217	0.261	0.182	0.156
Cash	0.000	0.000	0.000	0.201	0.480	0.574
EREITs	0.883	0.723	0.559	0.381	0.241	0.194
Semiannual data						
Stocks	0.000	0.128	0.119	0.099	0.061	0.049
Bonds	0.000	0.015	0.234	0.334	0.220	0.181
Cash	0.000	0.000	0.000	0.113	0.432	0.538
EREITs	1.000	0.857	0.647	0.453	0.287	0.232
Quarterly data						
Stocks	0.000	0.106	0.123	0.113	0.071	0.057
Bonds	0.000	0.000	0.172	0.287	0.182	0.148
Cash	0.000	0.000	0.000	0.099	0.430	0.540
EREITs	1.000	0.894	0.705	0.501	0.317	0.255
Monthly data						
Stocks	0.000	0.121	0.138	0.112	0.077	0.062
Bonds	0.000	0.000	0.134	0.332	0.267	0.213
Cash	0.000	0.000	0.000	0.000	0.278	0.421
EREITs	1.000	0.879	0.729	0.557	0.378	0.303
B. 1988-2002						
Annual data						
Stocks	0.671	0.418	0.333	0.266	0.204	0.155
Bonds	0.069	0.339	0.429	0.501	0.471	0.378
Cash	0.000	0.000	0.000	0.000	0.117	0.295
EREITs	0.259	0.243	0.238	0.234	0.208	0.171
Semiannual data						
Stocks	0.843	0.557	0.450	0.365	0.317	0.301
Bonds	0.000	0.241	0.344	0.426	0.472	0.487
Cash	0.000	0.000	0.000	0.000	0.000	0.000
EREITs	0.157	0.202	0.206	0.210	0.212	0.212
Quarterly data						
Stocks	0.811	0.535	0.426	0.338	0.289	0.272
Bonds	0.189	0.451	0.518	0.572	0.603	0.613
Cash	0.000	0.000	0.000	0.000	0.000	0.000
EREITs	0.000	0.014	0.056	0.090	0.109	0.115
Monthly data						
Stocks	0.922	0.526	0.388	0.277	0.215	0.194
Bonds	0.078	0.376	0.466	0.538	0.579	0.592
Cash	0.000	0.000	0.000	0.000	0.000	0.000
EREITs	0.000	0.098	0.146	0.185	0.207	0.214

Notes: The table reports the optimal portfolio weights of stocks, bonds, cash, and REITs which are found using the utility function shown in equation 3 for assumed levels of risk aversion as measured by the parameter A. The means, standard deviations, and correlation matrices needed for input into the analyses are calculated from annual, semiannual, quarterly, and monthly returns

Table III.
Optimal porfolio allocations to stocks, bonds, cash, and REITs for different return interval data

more in many cases. The comparisons are most striking for more aggressive investors with A equal to 3 or less. If the more recent history of EREITs is, in fact, more indicative of their true nature, then using the full historical dataset could bias any results obtained.

Using monthly and quarterly returns instead of annual returns also has a notable impact on optimal portfolio allocations. With the full dataset and $A = 3$, optimal allocations to EREITs range from 55.9 per cent with annual data to 72.9 per cent with monthly data. For our most conservative investor with $A = 10$, suggested allocations to EREITs range from 19.4 per cent to 30.3 per cent depending on the return interval used. The general pattern of the recommended portfolio weights is the shorter the return interval used, the higher the optimal allocation to EREITs.

The differences due to the return intervals employed are even more pronounced using the more recent data as shown in panel B. While there are only minor differences in the optimal portfolio recommendations obtained using annual and semiannual data, the differences are quite notable when comparing optimal portfolio weights based on annual and quarterly returns. With $A = 2$, the recommended portfolio weights for EREITs are 24.3 per cent and 1.4 per cent for annual and quarterly return intervals, respectively. For more aggressive investors with $A = 8$, optimal portfolio weights for EREITs are 20.8 per cent with the annual data and just 10.9 per cent with quarterly data. One thought might be that since the annual results are based on only 15 observations, there may not be sufficient data points on which to draw conclusions. Comparing the optimal portfolio allocations based on quarterly returns (60 observations) vs those based on monthly returns (180 observations) also reveals widely varying recommendations regarding EREITs. Except for the case of $A = 1$, all of the optimal portfolio allocations to EREITs using quarterly inputs are 47 per cent or more less than those derived with monthly inputs.

Part of the divergence in the estimates of optimal portfolio weights shown in Table III is attributable to the annualized standard deviation figures and part is due to the differences in the correlation matrices obtained from the various return intervals used. The differences between the annual and annualized return figures are trivial. To remove any systematic bias associated with the annualized standard deviation calculations, we redid Table III using the mean and standard deviation figures from the annual returns. In other words, the annual mean and standard deviation figures are used as mean-variance inputs along with correlation matrices based on annual, semiannual, quarterly, and monthly returns. The results of this work are shown in Table IV. For the full dataset, shown in panel A, the optimal allocations to EREITs are now comparable regardless of the estimation interval used. Presumably, in this case, the bulk of the differences between them were associated with the annualized standard deviation calculations. For the more recent dataset, shown in panel B, the changes do not provide a resolution. Results with annual and semiannual correlation matrices are still comparable, but the comparisons break down with monthly and quarterly correlation matrices. Allocations to EREITs are considerably higher when using monthly correlation data as compared to quarterly data.

An examination of the correlation matrices shown in panel B of Table II reveals the factors driving the divergences. Using monthly and quarterly returns, the stocks-EREITs correlation coefficients are quite comparable at 0.363 and 0.396, respectively. These figures are both more than double the correlations based on semiannual (0.148) and annual (0.165) returns. These relatively high monthly and quarterly correlation coefficients make EREITs appear less attractive relative to stocks and bonds. The difference between the monthly and quarterly recommendations is likely to be driven by the stocks-bonds correlation. On a monthly basis, the stocks-bonds correlation

	1	2	3	5	8	10
A. 1972-2002						
Annual correlation matrix						
Stocks	0.117	0.271	0.224	0.158	0.097	0.076
Bonds	0.000	0.006	0.217	0.261	0.182	0.156
Cash	0.000	0.000	0.000	0.201	0.480	0.574
EREITs	0.883	0.723	0.559	0.381	0.241	0.194
Semiannual correlation matrix						
Stocks	0.000	0.151	0.139	0.101	0.063	0.051
Bonds	0.000	0.093	0.282	0.285	0.195	0.166
Cash	0.000	0.000	0.000	0.227	0.493	0.582
EREITs	1.000	0.756	0.579	0.387	0.248	0.202
Quarterly correlation matrix						
Stocks	0.000	0.155	0.155	0.119	0.078	0.064
Bonds	0.000	0.090	0.279	0.276	0.186	0.156
Cash	0.000	0.000	0.000	0.233	0.497	0.585
EREITs	1.000	0.755	0.565	0.372	0.239	0.195
Monthly correlation matrix						
Stocks	0.058	0.189	0.160	0.120	0.078	0.064
Bonds	0.000	0.101	0.280	0.312	0.205	0.170
Cash	0.000	0.000	0.000	0.171	0.460	0.556
EREITs	0.942	0.710	0.559	0.396	0.257	0.211
B. 1988-2002						
Annual correlation matrix						
Stocks	0.671	0.418	0.333	0.266	0.204	0.155
Bonds	0.069	0.339	0.429	0.501	0.471	0.378
Cash	0.000	0.000	0.000	0.000	0.117	0.295
EREITs	0.259	0.243	0.238	0.234	0.208	0.171
Semiannual correlation matrix						
Stocks	0.650	0.406	0.325	0.260	0.216	0.166
Bonds	0.109	0.349	0.429	0.493	0.506	0.407
Cash	0.000	0.000	0.000	0.000	0.039	0.231
EREITs	0.241	0.245	0.246	0.247	0.239	0.196
Quarterly correlation matrix						
Stocks	0.670	0.444	0.365	0.301	0.265	0.218
Bonds	0.330	0.488	0.535	0.573	0.594	0.502
Cash	0.000	0.000	0.000	0.000	0.000	0.156
EREITs	0.000	0.068	0.100	0.126	0.141	0.124
Monthly correlation matrix						
Stocks	0.667	0.400	0.310	0.239	0.186	0.147
Bonds	0.240	0.436	0.501	0.553	0.526	0.423
Cash	0.000	0.000	0.000	0.000	0.089	0.266
EREITs	0.093	0.165	0.189	0.208	0.199	0.163

Notes: The table reports the optimal portfolio weights of stocks, bonds, cash, and REITs which are found using the utility function shown in equation 3 for assumed levels of risk aversion as measured by the parameter A. In all cases, the means and standard deviations are based on annual returns. The correlation matrices needed for input into the analyses are calculated from annual, semiannual, quarterly, and monthly returns

Table IV. Optimal portfolio allocations to stocks, bonds, cash, and REITs using annual means and standard deviations, with correlation matrices based on annual, semiannual, quarterly, and monthly returns coefficient is 0.134 compared to −0.083 on a quarterly basis. Obviously a lower correlation provides more diversification benefits, and thus, assets with a lower correlation become more attractive. Rather than EREITs being particularly less desirable in the quarterly case, it is just that stocks and bonds are more desirable.

Conclusions

Many researchers arbitrarily pick different sample periods or return intervals in determining means, standard deviations, and correlation coefficients of asset returns to be used in their analyses. If the estimation period and return interval used do not affect the outcomes of the studies, then this would not be a problem. Our study with a mixed-asset portfolio including EREITs, however, suggests that both the estimation period and the return interval employed can severely impact optimal portfolio recommendations in mean-variance analysis.

We believe that researchers should carefully consider and justify the estimation period used. If, as is often suggested for REITs, more recent data is more relevant due to the changing nature of the particular environment, then this argument should be supported and employed. Our mean-variance analysis demonstrates the importance of the estimation period used. With mean-variance input data from our full sample period of 1972-2002 compared to just the more recent 1988-2002 data, recommendations regarding EREITs changed considerably. For the full period, EREITs dominate stocks with a higher return and lower risk, and this is not the case for the more current data.

The return interval (annual, semiannual, quarterly, or monthly) used for the calculation of mean-variance inputs also plays an important role in portfolio decisions. Decisions based on either annual or semi-annual data are generally comparable in the case of EREITs, but results using commonly employed quarterly or monthly return intervals diverge dramatically. Optimal portfolio recommendations based on annual and quarterly inputs varied the most, but recommendations for aggressive investors based on either annual or monthly data also varied considerably.

While we point out differences associated with employing various estimation intervals, we are comfortable making only limited statements as to whether one estimation interval is better than another. In the case of standard deviations, annualized figures based on semiannual, quarterly, and monthly standard deviations systematically understate the true annual volatility. If the desired holding period is a year, then we believe the annual return and standard deviation figures should be used. The standard deviation based on monthly returns would be appropriate if the desired holding period was a month. As to whether or not correlation coefficients based on monthly and quarterly returns are applicable to annual holding periods, we suggest that further research is necessary. Our results, though, show marked differences in the correlation matrices based on the return intervals employed. It may be that using monthly or quarterly returns provides additional observations of the true nature of the relationship between asset returns, but it could also be that short-term observations are really not applicable to longer periods.

References

Bajtelsmit, V.L. and Worzala, E.M. (1995), "Real estate allocations in pension fund portfolios", *Journal of Real Estate Portfolio Management*, Vol. 1, pp. 25-38.

Chang, W.C. and Weiss, D.E. (1991), "An examination of the time series properties of beta in the market model", *Journal of the American Statistical Association*, Vol. 86, pp. 883-90.

Clayton, J. and MacKinnon, G. (2001), "The time varying nature of the link between REIT, real estate and financial asset returns", *Journal of Real Estate Portfolio Management*, Vol. 7 No. 1, pp. 43-54.

Corgel, J.B., McIntosh, W. and Ott, S.H. (1995), "Real estate investment trusts: a review of the financial economics literature", *Journal of Real Estate Literature*, Vol. 3, pp. 13-43.

Dopfel, F.E. (2003), "Asset allocation in a lower stock-bond correlation environment", *Journal of Portfolio Management*, Vol. 30, pp. 25-38.

Ennis, R.M. and Burik, P. (1991), "Pension fund real estate investment under a simple equilibrium pricing model", *Financial Analysts Journal*, Vol. 47, pp. 20-30.

Firstinberg, P., Ross, S. and Zisler, R. (1988), "Real estate: the whole story", *Journal of Portfolio Management*, Vol. 14 No. 3, pp. 22-34.

Fogler, H.R. (1984), "20% in real estate: can theory justify it?", *Journal of Portfolio Management*, Vol. 7, pp. 6-13.

Giliberto, S.M. (1992), "The allocation of real estate to future mixed-asset institutional portfolios", *Journal of Real Estate Research*, Vol. 7 No. 4, pp. 423-32.

Giliberto, S.M. (2003), "Assessing real estate volatility", *Journal of Portfolio Management*, Vol. 31 No. 4 Summer 2005, September 2005, Special Real Estate Issue, pp. 122-8.

Goodman, J. (2003), "Homeownership and investment in real estate stocks", *Journal of Real Estate Portfolio Management*, Vol. 9 No. 2, pp. 93-105.

Groenewold, N. and Fraser, P. (2000), "Calculating beta: how well does the 'five-year rule of thumb' do?", *Journal of Business Finance and Accounting*, Vol. 27 No. 7, pp. 953-81.

Gyourko, J. and Keim, D.B. (1993), "Risk and return in real estate: evidence from a real estate stock index", *Financial Analysts Journal*, Vol. 49 No. 5, pp. 39-46.

Hawawini, G.A. and Vora, A. (1981), "The capital asset pricing model and the investment horizon: comment", *The Review of Economics and Statistics*, Vol. 63, pp. 633-6.

Hawawini, G.A. and Vora, A. (1982), "Investment horizon, diversification, and the efficiency of alternative beta forecasts", *The Journal of Financial Research*, Vol. 5 No. 1, pp. 1-15.

Hudson-Wilson, S. (2001), "Why real estate?", *Journal of Portfolio Management*, Vol. 27, pp. 20-32.

Kallberg, J.G., Liu, C.H. and Greig, W.D. (1996), "The role of real estate in the portfolio allocation process", *Real Estate Economics*, Vol. 24, pp. 359-77.

Lamb, R.P. and Northington, K. (2001), "The root of reported betas", *Journal of Investing*, Vol. 10 No. 3, pp. 50-3.

Levhari, D. and Levy, H. (1977), "The capital asset pricing model and the investment horizon", *The Review of Economics and Statistics*, Vol. 59, pp. 92-104.

Levy, H. (1984), "Measuring risk and performance over alternative investment horizons", *Financial Analysts Journal*, Vol. 40, pp. 61-8.

Levy, H., Guttman, I. and Tkatch, I. (2001), "Regression, correlation, and the time interval: additive-multiplicative framework", *Management Science*, Vol. 47 No. 8, pp. 1150-9.

Levy, H. and Schwartz, G. (1997), "Correlation and the time interval over which the variables are measured", *Journal of Econometrics*, Vol. 76 No. 1, pp. 341-50.

Liang, Y. (1998), "REIT style and performance", *Journal of Real Estate Portfolio Management*, Vol. 4 No. 1, pp. 69-78.

Peterson, J.D. and Hsieh, C. (1997), "Do common risk factors in the returns on stocks and bonds explain returns on REITs?", *Real Estate Economics*, Vol. 25 No. 2, pp. 321-45.

Reilly, F.K. and Wright, D.J. (1988), "A comparison of published betas", *Journal of Portfolio Management*, Vol. 14 No. 3, pp. 64-9.

Saniga, E.M., McInish, T.H. and Gouldey, B.K. (1981), “The effect of differencing interval length on beta”, *The Journal of Financial Research*, Vol. 4 No. 2, pp. 129-35.

Seiler, M.J., Webb, J.R. and Myer, F.C. (1999), “Diversification issues in real estate”, *Journal of Real Estate Literature*, Vol. 7, pp. 163-79.

Seiler, M.J., Webb, J.R. and Myer, F.C. (2001), “Can private real estate portfolios be rebalanced/diversified using equity REIT shares?”, *Journal of Real Estate Portfolio Management*, Vol. 7 No. 1, pp. 25-41.

Waggle, D. and Johnson, D.T. (2003), “The impact of the single-family home on portfolio decisions”, *Financial Services Review*, Vol. 12 No. 3, pp. 201-18.

Waggle, D. and Johnson, D.T. (2004), “Home ownership and the decision to invest in REITs”, *Journal of Real Estate Portfolio Management*, Vol. 10 No. 2, pp. 129-44.

Waggle, D. and Moon, G. (2005), “Expected stock returns, the stock-bond correlation, and optimal asset allocations”, *Financial Services Review*, Vol. 14 No. 3, pp. 253-67.

Wainscott, C.B. (1990), “The stock-bond correlation and its implications for asset allocation”, *Financial Analysts Journal*, Vol. 46, pp. 55-79.

Webb, J.R., Curcio, R.J. and Rubens, J.H. (1988), “Diversification gains from including real estate in mixed-asset portfolios”, *Decision Sciences*, Vol. 19 No. 3, pp. 434-52.

Ziering, B. and McIntosh, W. (1997), “Revisiting the case for including core real estate in a mixed-asset portfolio”, *Real Estate Finance*, Vol. 14, pp. 14-22.

Ziering, B., Liang, Y. and McIntosh, W. (1999), “REIT correlations with capital market indexes: separating signal from noise”, *Real Estate Finance*, Vol. 15 No. 4, pp. 61-7.

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The turn-of-the-month effect in real estate investment trusts (REITs)

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Abstract

Purpose – This study seeks to examine the market returns of five domestic real estate investment trust (REIT) indices to determine whether they exhibit a turn-of-the-month (TOM) effect.
Design/methodology/approach – A test is carried out for the TOM effect by employing a battery of parametric and non-parametric statistical tests that address the concerns of distributional assumption violations. An OLS regression model compares the TOM returns with the rest-of-the-month (ROM) returns and an ANOVA model examines the TOM period while controlling for monthly seasonalities. A non-parametric *t*-test examines whether the TOM returns are greater than the ROM returns and a Wilcoxon signed rank test examines the matched-pairs of TOM and ROM returns.
Findings – A TOM effect in all five domestic REIT indices is found: real estate 50 REIT, all-REIT, equity REIT, hybrid REIT, and mortgage REIT. More specifically, the six-day TOM period, on average, accounts for over 100 per cent of the monthly return for the three non-mortgage REITs, while the ROM period generates a negative return. Additionally, the TOM returns are greater than the ROM returns in 75 per cent of the months.
Research limitations/implications – The data are limited to five-years of daily returns and five different indices. Thus, the results could be biased on the selected time period.
Practical implications – These results are important to REIT portfolio managers and investors. Domestic REIT markets experience a TOM effect from which investors and portfolio managers can benefit.
Orginality/value – The daily returns of all five major domestic REIT indices are examined. Data are evaluated which include daily returns after the passage of the REIT Modernization Act of 1999 that resulted in numerous changes for REITs. Whether the TOM effect can be detected with both parametric and non-parametric tests is examined.

Keywords Real estate, Investment funds, Calendar events
Paper type Research paper

Introduction

Over the years researchers have analyzed the stock markets and identified many calendar anomalies including the turn-of-the-month (TOM) effect[1]. Since then, researchers have found the TOM effect not only in domestic stock returns, but also in international stocks and domestic bonds. Several studies show that financial markets respond efficiently to these market anomalies by trading them out of existence (Agrawal and Tandon, 1994; Chow *et al.*, 1997; Fortune, 1998; Jordan and Jordan, 1991; Kamara, 1997; Riepe, 1998). Other research concludes these market anomalies are confined to specific periods or are driven by a few outliers in the data.

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Some of these studies suggest that market anomalies may simply be artifacts of extensive data mining while other studies question the test methodologies sometimes used to confirm market anomalies, given the violations of OLS assumptions that have been identified in return distributions (Alford and Guffey, 1996; Connolly, 1989; Lindley and Liano, 1997; Pearce, 1996; Singleton and Wingender, 1994; Sullivan *et al.*, 2001; Kunkel *et al.*, 2003).

One way to response to these criticisms is to test new data with more robust methodologies. For example, if the TOM effect can be shown to exist not only in the domestic stock market, but also in the international stock markets and bond markets, then there is solid support for a TOM effect. Additionally, if tests more robust to violations of the OLS assumptions can identify a TOM effect in the market, then there is even stronger support for a TOM effect. In this study we examine the daily returns of five real estate investment trust (REIT) indices to determine whether there is a TOM effect or if investors have traded it out of existence. Using robust parametric and non-parametric tests, we find a strong TOM effect in all five indices. Additionally, we find the TOM effect is independent of the January effect and is not driven by outlier returns in a few months. More specifically, we find the six-day TOM period generates, on average, over 100 per cent of the monthly return for the three non-mortgage REIT indices which means the rest-of-the-month (ROM) period is generating a negative return[2]. Additionally, we find the TOM returns are greater than the ROM period in almost 75 per cent of the months.

Literature review

Ariel (1987) was the first to identify the TOM effect in stock returns. He evaluates the daily returns over the years 1963 to 1981 for an equal-weighted (EW) stock index and value-weighted (VW) stock index. Ariel defines the first half of the month to include the last trading day of the previous month and the first eight trading days of the month. He finds the first half of the month return is significantly greater than the last half of the month return. More specifically, Ariel finds the 19 year cumulative returns for the first half of the month to be 2552 per cent and 565 per cent on the EW and VW stock indices, respectively, while the last half of the month cumulative returns are negative for both the EW and VW stock indices. Furthermore, Ariel finds an exceptionally strong TOM period in the last trading day and first four trading days of the month. Additionally, he finds the TOM effect cannot be explained by the January effect and small-firm effect.

Lakonishok and Smidt (1988) use 90 years of daily stock returns from 1897 to 1987 to examine several calendar effects including the TOM effect. They analyze the eight days around the turn of the month and find a strong TOM effect. More specifically, they find the 0.473 per cent average four-day TOM return to be significantly greater than the 0.016 per cent average four-day return. They also find that over 56 per cent of the TOM returns are positive compared to less than 52 per cent for the average day.

The search for a TOM effect has expanded to include the domestic bond markets and the international stock markets. Jordan and Jordan (1991) examine daily bond returns over the years 1963 to 1986 for the Dow Jones Composite Bond Average which is a long-term corporate bond index and find the TOM return to be 0.62 basis points compared to a negative return (−0.38 basis points) for the ROM return. However, the difference is not significant at the ten per cent level. Cadsby and Ratner (1992) examine daily stock returns in ten countries to determine if a TOM effect exists and find a TOM effect in the stock returns of six countries: Australia, Canada, Germany, Switzerland, the United Kingdom, and the United States. However, they find no TOM effect in

France, Hong Kong, Italy, or Japan. They also conclude the TOM effect is independent of the turn-of-the-year effect and not unique to the United States stock market. Kunkel *et al.* (2003) examine daily stock returns in 19 countries with standard regression model, a general linear model, and a Wilcoxon signed rank (WSR) nonparametric test. They find a TOM effect in 16 of the 19 countries.

Several studies have analyzed what economic forces might be driving the TOM effect while others have illustrated how investors can exploit the TOM effect. Lakonishok and Smidt (1988) conclude the TOM effect may be a liquidity effect that is driven by pension fund managers buying and selling at the TOM. Ogden (1990) finds evidence that the liquidity effect is driving the TOM effect and concludes the "standardization of payments system" in the United States is responsible for this TOM effect. Cash receipts at the TOM include wages, retirement contributions, rent, interest and principal payments, and dividends. Much of these funds are quickly reinvested in the stock market which results in a surge in stock returns at the TOM. Henzel and Ziemba (1996) and Kunkel and Compton (1998) illustrate how the TOM effect can be exploited by institutional investors and individual investors, respectively. Both studies use a switching strategy where funds are invested in an equity portfolio during the TOM and invested in a interest bearing cash account during the ROM. The switching strategy not only generates a higher return, but also has lower return volatility.

Several papers have looked at various market anomalies in REIT returns. Colwell and Park (1990) examine daily returns over 1964 to 1986 for an equity REIT portfolio and a mortgage REIT portfolio. While they find a January effect in a portfolio of small REITs, they find the January effect disappears in a portfolio of large REITs. They also find January returns for the mortgage REIT portfolio are greater than those for the equity REIT portfolio. McIntosh *et al.* (1991) examine daily returns over 1974 to 1988 for three REIT portfolios and find a small-firm effect. Liu and Mei (1992) also examine a REIT portfolio using returns from 1971 to 1989 and find a strong January effect. Friday and Peterson (1997) examine the monthly returns over 1973 to 1993 for equity, mortgage, and hybrid REITs. They find a January effect for all sizes and classifications. They also conclude the January effect is associated with the tax-loss selling effect.

Redman *et al.* (1997) examine the daily returns over 1986 to 1993 for a portfolio of REITs and find a January effect, a TOM effect, a day-of-the-week effect, and a pre-holiday effect. To test for the TOM effect, they use a standard regression model and Kruskal-Wallis test. They find the TOM return is significantly greater than zero while the ROM return is not significantly different from zero. Friday and Higgins (2000) examine the daily returns over 1970 to 1995 for REITs and find a day-of-the-week effect. They also find autocorrelated returns from Friday to Monday in equity REITs, but not for mortgage REITs. Connors *et al.* (2002) also evaluate REITs for seasonal patterns by examining their daily returns over 1994 to 1999. They examine several REIT portfolios with standard regression models and find a TOM effect and holiday effect, but find no January effect or Monday effect.

In this study we update previous research on REITs in several ways. First, we examine the daily returns of all five major domestic REIT indices: real estate 50, all REITs, equity REITs, hybrid REITs, and mortgage REITs. Second, we evaluate recent data which includes daily returns after the passage of the REIT Modernization Act of 1999 that resulted in numerous changes for REITs. For example, REITs could now own up to 100 per cent of the stock of certain taxable REIT subsidiaries and the act lowered the minimum distribution requirement from 95 per cent to 90 per cent. Lastly, we examine whether the TOM effect can be detected with both parametric and non-parametric tests. Thus, we address concerns levied by Connolly (1989), Lindley and Liano (1997), Sullivan *et al.* (2001) and others who revealed potential problems with standard parametric tests.

Data

The REIT industry was created in 1960 by Congress to give investors the ability to invest in large-scale commercial properties. A REIT is a firm that owns (and often operates) income producing real estate and distributes at least 90 per cent of its taxable income to the shareholders. The REIT industry has recently experienced rapid growth with its market capitalization growing from $8.7 billion in 1990 to $224 billion in 2003. Investors can purchase REITs that are traded on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and the Nasdaq Stock Market. In 2003 REITs were included in various S&P indices with the S&P 500 Index, the S&P 400 Mid-Cap Index, and the S&P 600 Small-Cap Index containing six, seven, and eight REITs, respectively. The commercial real estate industry continues to play a vital role in the US economy and in 2002, it accounted for 7.2 per cent of the GDP.

In this study, we analyze daily returns of five REIT indices: real estate 50 REIT, all REIT, equity REIT, hybrid REIT, and mortgage REIT. The real estate 50 index contains 50 REITs that represent the most widely held REITs. The index was started in January 2000 with 100 REITs (public equity 100) and was reduced to 50 REITs starting in January 2002. The All REIT index is the most comprehensive index and includes all tax-qualified REITs that trade on the NYSE, the AMEX, or the Nasdaq *National Market List*. As of year-end 2003, the all REIT index contained 171 REITs with a market capitalization of $224 billion. The 171 REITs invest in all nine different property sectors: industrial/office, retail, residential, diversified, lodging/resorts, self storage, health care, specialty, and mortgage. See Figure 1 for a breakdown of the property sectors. The equity REIT index includes REITs that own and operate income producing real estate while the Mortgage REIT index includes REITs that lend money

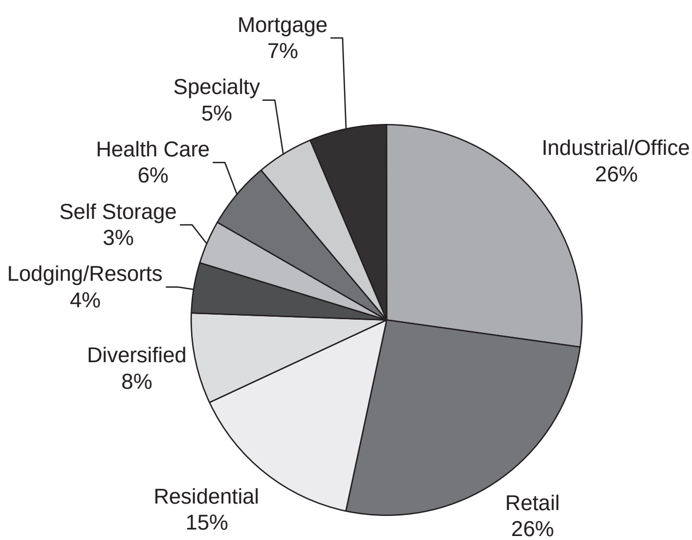

Figure 1.
REIT sectors and per cent of market capitalization ($241 billion as of January 31, 2004)

directly to real estate owners or indirectly through the purchase of loans and mortgage-back securities. Equity and mortgage REITs are defined as having 75 per cent or more of their investments in the equity or mortgage debt, respectively, of commercial properties. The remaining REITs are generally classified as hybrid REITs. Data on the REIT indices are reported in Table I.

Daily returns are obtained from January 1999 to December 2003 for all indices except the real estate 50 REIT® which has daily returns starting in January 2000. The data is obtained from the NAREIT (National Association of Real Estate Investment Trusts). Our time period enables us to determine whether the financial markets have responded efficiently to exploit the TOM effect which would be supported with a fading TOM effect. Summary statistics for the daily returns on each index are reported in Table II. The mean daily return for all indices was positive and ranged from 0.056 per cent for the equity REIT Index to 0.094 per cent for the mortgage REIT index. The standard deviation of the daily returns ranged from 0.73 per cent for the all-REIT index to 1.49 per cent for the mortgage REIT index.

Methodology and results

The validity of standard parametric tests used to identify seasonal market anomalies has been questioned because the return data often violates OLS assumptions. To correct for violations, some researchers have included adjustments that may not be appropriate (Connolly, 1989). While most parametric tests like OLS regression are fairly robust to mild violations of assumptions, these parametric tests can be very sensitive to small differences in the return magnitudes being measured. Bradley (1978) and Hunter and May (1993) show non-parametric tests are almost as powerful as parametric tests in detecting differences in analysis of variance procedures and when OLS assumptions are not met, non-parametric tests can even be more powerful. Ittenbach *et al.* (1993) compare four parametric and non-parametric analysis of

Indices	REITs	Property sectors	Market capitalization
Real estate 50 REIT	50	na	$120.9
All-REIT	171	9	224.2
Equity REIT	144	8	204.8
Hybrid REIT	7	na	5.2
Mortgage REIT	20	1	14.2

Table I. REIT indices, number of REITs in each index, property sectors, and market-capitalization as of 2003

Indices	Number of observations	Mean (%)	Median (%)	Standard deviation (%)	Skewness	Kurtosis
Real estate 50 REIT	1,004	0.0725	0.0934	0.8011	−0.1320	3.896
All-REIT	1,256	0.0571	0.0407	0.7309	0.2414	3.540
Equity REIT	1,256	0.0560	0.0301	0.7385	0.2531	3.584
Hybrid REIT	1,256	0.0630	0.0458	0.9792	0.0331	1.987
Mortgage REIT	1,256	0.0939	0.1783	1.4911	1.9019	68.066

Notes: All indices are market value weighted and daily returns are from January 1, 1999 to December 31, 2003 for all indices except the real estate 50 REIT which has daily returns from January 1, 2000 to December 31, 2003

Table II. Summary statistics for the daily returns of REIT indices variance procedures and find the patterns of significance and statistical power to be almost identical in three of the four approaches. Additionally, they find the non-parametric multivariate analysis of variance procedure showed a slight advantage over the other techniques. Non-parametric tests have been applied in anomaly studies, including Gultekin and Gultekin (1983), Agrawal and Tandon (1994), Alford and Guffey (1996), Ko (1998) and Kunkel *et al.* (2003).

When the data in Table II is examined, we find excess kurtosis and positive skewness in the returns of four of the five REIT indices. We then test for normality using the Kolmogorov-Smirnov and Bowman-Shelton tests. The Kolmogorov-Smirnov test compares the observed cumulative return distribution of the raw return data to a hypothesized cumulative distribution while the Bowman-Shelton test examines the degree of skewness and kurtosis in the return distributions. The normal distribution assumption is rejected by both tests at the one per cent level for all REIT indices. To address concerns of non-normal distributions, we use both parametric and non-parametric tests to analyze the returns of the REIT indices.

Day-of-the-month seasonality

To examine the day-of-the-month seasonality, we test the 18 trading days around the TOM with the following OLS regression to determine if any of the mean daily returns are significantly different from zero:

$$R_t = \beta_{-9}D_{-9,t} + \beta_{-8}D_{-8,t} + \cdots + \beta_8 D_{8,t} + \beta_9 D_{9,t} + \varepsilon_t \quad (1)$$

where R_t is the return on day t; $D_{i,t}$ are binary dummy variables for the first and last nine trading days of each month where $D_{-9,t}$ corresponds to trading day −9, $D_{-8,t}$ corresponds to trading day −8, continuing through $D_{9,t}$ which corresponds to trading day +9. The coefficients, β_{-9} to β_9, represent the mean returns for the 18 trading days, and ε_t is the error term. While we focus on the 18 trading days surrounding the TOM, none of the other days outside that range, which range from zero to five days in any particular month, changed our results.

The regression results are reported in Table III and show that most significant positive returns cluster around the TOM period, trading days −4 through +2. Over this six-day TOM period, all indices have at least one return that is positive and significantly different from zero and most indices have two to five returns that are positive and significantly different from zero. The table's last column to the right shows the *F*-test result which indicates there is a day-of-the-month effect for each REIT index. We report general statistics for the six-day TOM period and the 12-day ROM period in Table IV.

To test for a TOM effect, we use four parametric and non-parametric tests. The first test is a parametric OLS regression of returns onto a dummy variable for the TOM period. The second test is a parametric three-way analysis of variance (ANOVA) that tests the TOM period while controlling for the interaction effects of months and years. The third test is a non-parametric *t*-test to determine if the TOM return is greater than the ROM period in most months. The fourth test is a non-parametric WSR test that examines paired difference and controls for a January effect (or monthly effect).

OLS regression model

The first parametric test used to identify a TOM effect is the following OLS regression that compares the TOM returns to the ROM returns:

$$R_t = \alpha + \beta D_{\mathrm{TOM}} + \varepsilon_t \quad (2)$$

Table III. Mean percentage returns for the trading days of the month on REIT indices

Indices	−6	−5	−4	−3	−2	−1	1	2	3	4	5	6	*F*-test (*p*-value)
Real estate 50 REIT[A]	−0.147	0.143	0.215*	0.394*	0.201*	0.127	0.279*	0.218*	0.062	0.103	−0.043	−0.108	2.18 (0.0032)
All-REIT[B]	−0.119	0.088	0.171*	0.308*	0.132	0.257*	0.219*	0.152*	0.049	0.048	−0.050	−0.052	2.23 (0.0023)
Equity REIT[B]	−0.126	0.077	0.160*	0.322*	0.129	0.229*	0.231*	0.166*	0.051	0.046	−0.063	−0.057	2.20 (0.0027)
Hybrid REIT[B]	−0.159	0.216*	0.179	0.020	0.172	0.529*	0.157	0.030	−0.091	0.112	0.187	−0.197	2.35 (0.0012)
Mortgage REIT[B]	0.110	0.318*	0.419*	0.167	0.165	0.880*	−0.106	−0.138	0.027	0.051	0.064	0.095	1.10 (0.0046)

Notes: *Significant at the 10 per cent level for a two-tailed t-test that the return is different from zero. Regarding returns on trading days (−9, −8, −7, +7, +8, +9), there is only one trading day which experiences a positive return that is significantly different from zero. That return is on trading day +9 of the Hybrid REIT. Regarding the other REITs, none of their returns on trading days −9, −8, −7, +7, +8, +9 are significantly different from zero where R_t is the return on day t; α is the intercept representing the mean return for the ROM period, D_{TOM} is a binary dummy variable for the TOM period, the coefficients β represents the difference between the mean TOM return and the mean ROM return, and ε_t is the error term.

The F-test results are reported in Table V and show that five indices have positive TOM returns. Furthermore, the results show the ROM return for the indices are not significantly different from zero. The F-statistic for each regression allows us to reject the null hypothesis of equality of mean returns between the TOM period and ROM period for all five indices. Thus, our first test finds a TOM effect in the five indices.

Next we evaluate whether a January effect could explain the high TOM returns. While studies on the January effect show stock returns are significantly higher in January than the rest of the year, many studies report these higher returns are generated in the first few days of January. However, some studies show the TOM effect is not driven by the January effect (Jordan and Jordan, 1991; Pettengill and Jordan, 1988; Boudreaux, 1995). To test if the TOM effect exists independent of any January effect, we run the regression in equation 2 without January returns. We find that all five indices still show a significant TOM effect.

ANOVA model

Our next test of the TOM effect is a two-way analysis of variance model that directly controls for possible seasonal patterns across months. Due to the unbalanced design of the test, we use a general linear model procedure (GLM) which is a flexible and robust technique that detects if the TOM effect found with OLS regression is a result

Table IV.
Summary statistics for the returns over the TOM and ROM periods

Indices	TOM mean (%)	TOM standard deviation (%)	TOM skewness	TOM kurtosis	ROM mean (%)	ROM standard deviation (%)	ROM skewness	ROM kurtosis
Real estate 50 REIT	0.239	0.843	0.530	4.592	−0.009	0.768	−0.691	3.626
All-REIT	0.206	0.761	0.594	4.422	−0.019	0.682	−0.357	2.566
Equity REIT	0.206	0.769	0.578	4.487	−0.022	0.688	−0.358	2.445
Hybrid REIT	0.181	0.942	0.146	0.713	0.010	0.956	0.111	2.430
Mortgage REIT	0.231	1.771	6.745	93.361	0.062	1.251	−0.551	7.735

Table V.
Tests for the TOM effect

Indices	Alpha	Beta	F-test	GLM p-value	Non-parametric t-test	WSR test p-value
Real estate 50 REIT	−0.009	0.248*	18.62*	0.001	72.9*	0.001
All-REIT	−0.019	0.225*	24.13*	0.001	75.0*	0.001
Equity REIT	−0.022	0.229*	24.42*	0.001	78.3*	0.001
Hybrid REIT	0.010	0.171*	7.77*	0.024	65.0**	0.009
Mortgage REIT	0.062	0.169***	3.28***	0.096	58.3***	0.106

Notes: The alpha, beta and F-test values are from the OLS regression model. *Significant at the 1 per cent level; **significant at the 5 per cent level; ***significant at the 10 per cent level of the interaction of a monthly effect such as the January effect. The GLM model is as follows:

$$R_t = \sum R_{\text{Period},}t + \sum R_{\text{Month},}t + \varepsilon_t \quad (3)$$

where R_{Period} represents returns for the TOM and ROM periods and R_{Month} accounts for any interaction effects due to a monthly effect. In Table V we report the F-test results across periods (TOM versus ROM) and show the null hypothesis is rejected for all five REIT indices at the one per cent significance level. This supports a strong TOM effect in all five REIT indices, even after accounting for differences across months.

Non-parametric t-test

Our next test of the TOM effect is a non-parametric (or binomial) t-test to determine if the TOM return is greater than the ROM return in more than 50 per cent of the months. The equation for the non-parametric t-test is:

$$\tau = \frac{p - 0.5}{[(0.5)(0.5)/n]^{0.5}} \quad (4)$$

where p is the observed sample proportion, n is the sample size, and $(n - 1)$ is the degrees of freedom.

We find the TOM return is greater than the ROM return in over 70 per cent of the months for the three non-mortgage REIT indices: real estate 50 REIT, all-REIT, and equity REIT. For the non-mortgage REIT indices, we find the TOM return is greater than the corresponding ROM return in 75 per cent of the months with a range from 73 per cent for the real estate 50 REIT Index to 78 per cent for the equity REIT index. The TOM return is greater in 65 per cent and 58 per cent of the months for the hybrid REIT and mortgage REIT, respectively. In Table V we report the t-test results and find the TOM return is greater than the ROM return in more than 50 per cent of the months. Thus, the third test supports a TOM effect in all five REIT indices.

WSR test

Our last test is the WSR test which is a non-parametric paired differences test. The WSR test parallels the layout of the parametric two-way ANOVA, but does not assume the data is normally distributed as does the regression and ANOVA procedures. The WSR procedure tests the difference in medians rather than means, is based only on the ranks of the paired differences between TOM and ROM returns, and controls implicitly for differences across months. This means the WSR procedure is more robust than a regression or two-way ANOVA when the data is not normally distributed or there is a violation of homogeneous variance in the data because the WSR test considers only the ranks of return differences while ignoring differences in return magnitude.

The WSR test consists of sorting the absolute values of the differences from smallest to largest, assigning ranks to the absolute values, and finding the sum of the ranks of the positive differences, which under the null hypothesis should be about the same as the sum of the ranks of the negative differences. If sum of ranks for the positive and negative differences are not the same, then the WSR test will be significant even if the magnitude is small. The WSR test statistic is asymptotically distributed as a chi-squared with $k - 1$ degrees of freedom. The WSR test results are reported in Table V and show a strong TOM effect in all the REIT indices, except the mortgage REIT index.

Conclusion

We obtain daily returns from 1999 to 2003 on five domestic REIT indices. We test for the TOM effect by employing a battery of parametric and non-parametric statistical tests that address the concerns of distributional assumption violations raised in previous studies. The first test is a parametric OLS regression model that compares the TOM returns to the ROM returns. The second test is a parametric analysis of variance (ANOVA) model that examines the TOM period while controlling for monthly seasonalities. The third test is a non-parametric *t*-test that examines whether the TOM return is greater than the ROM return in more than 50 per cent of the months. The fourth test is a non-parametric WSR test that examines the matched-paired of TOM and ROM returns.

All four tests find a strong TOM effect in four of the five domestic REIT indices: real estate 50 REIT, all-REIT, equity REIT, and hybrid REIT. More specifically, we find the six-day TOM period, on average, accounts for over 100 per cent of the monthly return for the three non-mortgage REITs while the ROM period generates a negative return. Additionally, their TOM returns are greater than the ROM return in 75 per cent of the months. We also find the hybrid REIT index (a mix of equity and mortgage REITs) exhibits a TOM effect. However, the results for the mortgage REIT Index are mixed. While the parametric tests conclude there is a TOM effect the nonparametric WSR test does not find a TOM effect. In summary, it is clear the TOM effect is a phenomenon that can be found not only in domestic stock markets, international stock markets, and domestic bond markets, but also in domestic non-mortgage REIT markets.

Notes

1. Calendar anomalies include: January effect (Rozeff and Kinney, 1976; Keim, 1983; Roll, 1983; Reinganum, 1983), weekend effect (Cross, 1973; French, 1980; Gibbons and Hess, 1981; Keim and Stambaugh, 1984); TOM effect (Ariel, 1987); holiday effect (Ariel, 1990); Friday the Thirteenth effect (Kolb and Rodriguez, 1987).
2. Our results are similar to Agrawal and Tandon (1994) and Kunkel *et al.* (2003) who found in many countries that the TOM period can generate between 70 and 87 per cent of the monthly return.

References

Agrawal, A. and Tandon, K. (1994), "Anomalies or illusions? Evidence from stock markets in eighteen countries", *Journal of International Money and Finance*, Vol. 12, pp. 83-106.

Alford, A. and Guffey, D. (1996), "A re-examination of international seasonalities", *Journal of Financial Economics*, Vol. 5, pp. 1-17.

Ariel, R. (1987), "A monthly effect in stock returns", *Journal of Financial Economics*, Vol. 18, pp. 161-74.

Ariel, R. (1990), "High stock returns before holidays", *Journal of Finance*, Vol. 45, pp. 1611-26.

Boudreaux, D. (1995), "The monthly effect in international stock markets: evidence and implications", *Journal of Financial and Strategic Decisions*, Vol. 8, pp. 15-20.

Bradley, J. (1978), *Distribution Free Statistical Tests*, Prentice-Hall, Englewood Cliffs, NJ.

Cadsby, C. and Ratner, M. (1992), "Turn-of-month and pre-holiday effects on stock returns: some international evidence", *Journal of Banking and Finance*, Vol. 16, pp. 497-509.

Chow, E., Hsiao, P. and Solt, M. (1997), "Trading returns for the weekend effect using intraday data", *Journal of Business Finance and Accounting*, Vol. 24, pp. 425-44.

Colwell, P. and Park, H. (1990), "Seasonality and size effects: the case of real-estate-related investment", *Journal of Real Estate Finance and Economics*, Vol. 3, pp. 251-9.

Connolly, R. (1989), "An examination of the robustness of the weekend effect", *Journal of Financial and Quantitative Analysis*, Vol. 24, pp. 133-69.

Connors, D., Jackman, M., Lamb, R. and Rosenberg, S. (2002), "Calendar anomalies in the stock returns of real estate investment trust", *Briefings in Real Estate Finance*, Vol. 6, pp. 61-71.

Cross, F. (1973), "The behavior of stock price on Fridays and Mondays", *Financial Analysts Journal*, Vol. 29, pp. 67-9.

Fortune, P. (1998), "Weekends can be rough: revisiting the weekend effect in stock prices", *Federal Reserve Bank of Boston*, working paper no. 98-6.

French, K. (1980), "Stock returns and the weekend effect", *Journal of Financial Economics*, Vol. 8, pp. 55-69.

Friday, H. and Higgins, E. (2000), "The day of the week effect in real estate investment trusts", *Journal of Real Estate Portfolio Management*, Vol. l, pp. 273-81.

Friday, H. and Peterson, D. (1997), "January return seasonality in real estate investment trusts: information vs. tax-loss selling effects", *The Journal of Financial Research*, Vol. 20, pp. 33-51.

Gibbons, M. and Hess, P. (1981), "Day of the week effects and asset returns", *Journal of Business*, Vol. 54, pp. 579-96.

Gultekin, M. and Gultekin, N. (1983), "Stock market seasonality: international evidence", *Journal of Financial Economics*, Vol. 12, pp. 469-81.

Hensel, R. and Ziemba, W. (1996), "Investment results from exploiting TOM effects", *Journal of Portfolio Management*, Vol. 22, pp. 17-23.

Hunter, M. and May, R. (1993), "Some myths concerning parametric and nonparametric tests", *Canadian Psychology*, Vol. 34, pp. 384-9.

Ittenbach, R., Chayer, D., Bruininks, R., Thurlow, M. and Beirne-Smith, M. (1993), "Adjustment of young adults with mental retardation in community settings: comparison of parametric and nonparametric statistical techniques", *American Journal on Mental Retardation*, Vol. 97, pp. 607-15.

Jordan, S. and Jordan, B. (1991), "Seasonality in daily bond returns", *Journal of Financial and Quantitative Analysis*, Vol. 26, pp. 269-85.

Kamara, A. (1997), "New evidence on the Monday seasonal in stock returns", *Journal of Business*, Vol. 70, pp. 63-84.

Keim, D. (1983), "Size-related anomalies and stock return seasonality: further empirical evidence", *Journal of Financial Economics*, Vol. 12, pp. 13-32.

Keim, D. and Stambaugh, R. (1984), "A further investigation of the weekend effect in stock returns", *Journal of Finance*, Vol. 39, pp. 819-35.

Ko, K. (1998), "Strategic international diversification and monthly seasonality", *Journal of Business Finance and Accounting*, Vol. 25, pp. 203-21.

Kolb, R. and Rodriguez, R. (1987), "Friday the thirteenth: part vii – a note", *Journal of Finance*, Vol. 43, pp. 1385-7.

Kunkel, R. and Compton, W. (1998), "A tax-free exploitation of the TOM effect: C.R.E.F", *Financial Services Review*, Vol. 7, pp. 11-23.

Kunkel, R., Compton, W. and Beyer, S. (2003), "The turn-of-the-month effect still lives: the international evidence", *International Review of Financial Analysis*, Vol. 12, pp. 207-21.

Lakonishok, J. and Smidt, S. (1988), "Are seasonal anomalies real? A ninety-year perspective", *Review of Financial Studies*, Vol. 1, pp. 403-25.

Lindley, J. and Liano, K. (1997), "An evaluation of anomalies across years: significance versus usefulness", working paper no. 97-03.

Liu, C. and Mei, J. (1992), "The predictability of returns on equity REITs and their co-movements with other assets", *Journal of Real Estate Finance and Economics*, Vol. 5, pp. 401-18.

McIntosh, W., Liang, Y. and Tompkins, D. (1991), "An examination of the small-firm effect within the REIT industry", *The Journal of Real Estate Research*, Vol. 6, pp. 9-17.

Ogden, J. (1990), "Turn-of-month evaluations of liquid profits and stock returns: a common explanation for the monthly and January effects", *Journal of Finance*, Vol. 45, pp. 1259-72.

Pearce, D. (1996), "The robustness of calendar anomalies in daily stock returns", *Journal of Economics and Finance*, Vol. 20, pp. 69-80.

Pettengill, G. and Jordan, B. (1988), "A comprehensive examination of volume effects and seasonality in daily security returns", *Journal of Financial Research*, Vol. 11, pp. 57-70.

Redman, A., Manakyan, H. and Liano, K. (1997), "Real estate investment trusts and calendar anomalies", *Journal of Real Estate Research*, Vol. 14, pp. 19-27.

Reinganum, M. (1983), "The anomalous stock market behavior of small firms in January: empirical tests for tax-loss selling effects", *Journal of Financial Economics*, Vol. 12, pp. 89-104.

Riepe, M. (1998), "Is publicity killing the January effect?", *Journal of Financial Planning*, Vol. 11, pp. 64-70.

Roll, R. (1983), "Vas ist das? The turn of the year effect and the return premium of small firms", *Journal of Portfolio Management*, Vol. 9, pp. 18-28.

Rozeff, M. and Kinney, W. (1976), "Capital market seasonality: the case of stock returns", *Journal of Financial Economics*, Vol. 3, pp. 379-402.

Singleton, J. and Wingender, J. (1994), "The nonparallel weekend effect in the stock and bond markets", *Journal of Financial Research*, Vol. 17, pp. 531-8.

Sullivan, R., Timmermann, A. and White, H. (2001), "Dangers of data mining: the case of calendar effects in stock returns", *Journal of Econometrics*, Vol. 105, pp. 249-86.

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REIT capital structure: is it market imposed?

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Abstract

Purpose – This study sets out to focus on the identification of determinants of real estate limited partnership (REIT) capital structure from a market perspective.

Design/methodology/approach – This study uses ordinary least squares regression to test whether REIT capital structure is impacted by various market variables.

Findings – The findings indicate that investors do appear to be attracted to specific debt characteristics of REITs or, simply put, REIT capital structure is influenced by market factors. REIT debt levels appear to be directly influenced by the price-to-book ratio and are inversely related to the percentage of institutional ownership and price-to-cash flow. Forecast growth rates do not appear to significantly influence debt while the type of REIT (mortgage, retail, etc.) does appear to influence the level of debt.

Research limitations/implications – Small sample size limits applicability of results, so further research with larger datasets is appropriate.

Practical implications – Investors do appear to consider capital structure when purchasing REITs. REIT managers should consider this when determining whether to incur additional debt.

Originality/value – The determination of various market factors linked to REIT capital structure.

Keywords Real estate, Capital structure, Market forces, Debt financing

Paper type Research paper

1. Introduction

The concept of an optimal capital structure for business firms remains a cornerstone of financial economics theory since the seminal works of Modigliani and Miller (1958; 1963) that focused on tax benefits and other costs of debt. While many aspects of the corporate capital structure puzzle have been filled in, many questions remain. The emphasis in current research has shifted to nontax-driven capital structure theories as extensively surveyed by Harris and Raviv (1991). While they reviewed over 150 papers on the topic (just since the mid-1970s), that number is now in the hundreds.

One of the four identified models or categories of the determinants of capital structure within the nontax theories is the agency theory approach and a desire to reduce the conflicts of interest that arise among the parties to the firm. Jensen and Meckling (1976) assert that as management owns less and less of a firm's equity, conflicts of two types arise. Conflict one is between managers and shareholders. Conflict two is between equity holders and debt holders.

The conflict between management and equity holders arises when managers own less than 100 per cent of the equity. In that commonplace instance, managers do not receive 100 per cent of the gain when their actions enhance firm value. Therefore, management has an incentive to consume excessive levels of perquisites such as corporate limos, apartments, aircraft, etc. This inefficiency is naturally mitigated the larger management's ownership position. Increases in the portion of the firm financed

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by debt thereby increase the manager's equity share and somewhat mitigates management's loss from the manager-equity holder conflict.

The second conflict arises because equity holders have some incentive to invest in less-than-optimal projects. Larger than normal returns from an investment are more likely to be captured by equity holders than by debt holders. Additionally, bankruptcy costs can be increased if equity holders "shoot the moon" with risky investments and debt holders can be penalized. Several authors have also pointed out that agency costs can be mitigated through managerial incentives in compensations plans or convertible debt (see Brander and Poitevin (1989), Dybvig and Zender (1989), Narayanan (1987) and Haugen and Senbet (1987)).

However, a firm seeking external capital (either equity or debt) receives the scrutiny of these respective capital markets. Monitoring functions automatically take place that help ensure that management behaves in a manner consistent with maximizing shareholder wealth. Additionally, debt can also reduce agency costs by reducing free cash flow and forcing management to operate more efficiently to service the debt and reduce the threat of bankruptcy. Stultz (1990), Jensen (1986), and Maloney *et al.* (1993) all provide arguments supporting the assertion that debt can improve managerial decision-making.

Another factor that may work to mitigate agency costs and influence capital structure is institutional ownership. Demsetz (1983) and Shliefer and Vishny (1986) suggest that institutional investors have natural incentives to monitor management. Agarwal and Mandelker (1990), Brickley *et al.* (1988) and McIntyre and Rao (1993) all report evidence of various aspects of the firm being influenced by institutional investors. Friend and Lang (1988) suggest that managers can be motivated by a higher debt ratio demanded by at least one large non-managerial shareholder.

Chaganti and Damanpour (1991) and Grier and Zychowicz (1994) both find an inverse relationship between the level of institutional ownership and debt. Grier and Zychowicz contend that aggressive monitoring of managers by institutional owners through the corporate governance process may "substitute" for the monitoring role of debt. Perhaps large block shareholders have advantages in monitoring corporate activity that individual investors do not have.

However, contrary findings are presented by Casey and Anderson (1997) who examine capital structure in the petroleum industry and conclude that "higher levels of institutional ownership are significantly related to higher levels of debt". Certainly, though, their result may turn out to be industry specific.

Many studies report that industries tend to have target capital structures. Bowen *et al.* (1982), Bradley *et al.* (1984), Long and Malitz (1985), Kester (1986), and Titman and Wessels (1988) all find a link between industry affiliation and capital structure. Scott and Johnson's 1982 survey of CFOs finds that leverage determination is "benchmarked" with industry average factors. Logically, industry capital structure could evolve because exogenous variables tend to impact similar firms in similar ways.

Other researchers target only one industry at a time. McCue (1992) investigates hospital capital structure and Sharpe (1995) studies Australian trading banks. Capital structure determinants for real estate limited partnerships (REITs) have gotten some attention.

Maris and Elayan (1990) examine the relationship between capital structure and the cost of capital in REITs from 1981 to 1987. They report a "leverage clientele effect" as an incentive for REITs to use debt. A study by Theis and Casey (1999) comes the closest to a recent examination of REIT-like firms by analyzing property management firms in the UK. Their findings indicate that debt is inversely related to percentage of shares closely held, dividend yield and the price-to-book ratio.

REITs appear to be an ideal proxy for nontax-driven capital structure research since they commonly avoid corporate taxation. Additionally, in cases of being held in portfolios of pension funds, endowments, IRAs, 401Ks, etc. REITs can avoid personal taxes for many years.

In addition to Maris and Elayan (1990), the Bradley *et al.* (1984) study includes a sub-sample of REITs and finds that REITs are more heavily leveraged than 16 of the 25 industries they studied from the 1960s and 1970s. Howe and Shilling (1988) report positive wealth effects from announcements of REIT debt offerings. Providing a counter argument, Jaffe (1991) examines real estate partnerships and REITs and determines that capital structure does not influence firm value. Hamill's (1993) findings agree with Howe and Shilling in terms of REIT capital structure and the relationship with value.

Allen's (1995) examination of RELPs finds a negative link between growth rates and nondebt tax shields and a firm's level of debt. However, research identifying the important capital structure determinants for REITs is scarce. In addition to institutional ownership, this study examines other market variables suggested by the literature that might impact capital structure decisions for REITs including: price-to-book, price-to-cash flow, dividend yield, and forecast revenue growth. We also include a dummy variable coded one for mortgage REITs to see if REIT type impacts capital structure.

The rest of the paper is organized as follows. Section II discusses the data and methodology. Section III analyzes the findings and section IV provides some conclusions and makes recommendations.

2. Data and methodology

The data for this study were obtained from various free online sources such as Reuters Multex Investor and Yahoo Finance. A full set of data is available for 89 REITs listed on US stock exchanges. The methodology is a linear regression model with one dependent and six independent variables. A presentation of the model follows:

$$\mathrm{DEBT}_j = \alpha + \sum \beta_i \mathrm{X}_{ij} + \varepsilon$$

where DEBT = debt to equity ratio, and X_{ij} represents each independent variable i, for each firm j. These variables are:

GROWTH = % forecast five year growth rate in revenues;
INSTIT = % institutional ownership;
PBOOK = price-to-book ratio;
PCASHFLOW = price-to-cash flow ratio;
DIVY = % dividend yield;
MORTGAGE = dummy variable coded 1 for mortgage REITs, 0 otherwise;
ε = an error term.

A more detailed discussion of the variables and their measurement follows. The dependent variable, DEBT, is the percentage of long-term debt in the capital structure of each REIT for their most recent reporting period typically ending in 2003.

GROWTH is the consensus analyst forecast five-year growth rate in revenues. Firms expecting higher growth rates are assumed to also have greater needs for capital and thus would be expected to incur additional debt. We would expect GROWTH to be positively related to debt levels. However, Allen (1995), in his study of RELP capital structure, found the relationship between growth and debt to be negative.

INSTIT is the percentage of equity held by institutional owners. Grier and Zychowicz (1994) find the relationship between level of institutional ownership and debt to be negative. Their study maintains that institutional ownership may substitute for the monitoring role of debt in the agency model. Additionally, their study concluded that institutional owners may actually influence debt levels.

PBOOK[1], or the price-to-book ratio, is a recent market price divided by the book value per share. Fama and French (1995) find that firms with higher PBOOK ratios tend to generate higher returns and are also generally growth stocks. Therefore, PBOOK could serve as an investor proxy for future growth. Growth firms may be forced into the external market for additional debt financing, particularly in the REIT industry with greater stability of cash flows.

PCASHFLOW, or the price-to-cash flow ratio, should serve as a proxy for investor interest in a company. REITs with higher PCASHFLOW ratios could be considered investor favorites. The justification for including this variable is to examine whether investors are attracted to higher or lower debt REITs. The sign could, therefore, be positive or negative.

DIVY, or dividend yield (most recent annualized dividend divided by price), is another variable expected to proxy investor interest in the firm. Higher yields could signal lower levels of investor enthusiasm as a dollar of dividends received a lower market valuation. This variable is also included to determine whether investors are attracted to a certain REIT capital structure. This sign could also be positive or negative.

MORTGAGE, a dummy variable for mortgage REITs, was also included due to the cash flow certainty differences between mortgage REITs and other classes. Mortgage REITs are expected to carry higher levels of debt because of the predictability of cash flows.

3. Empirical results

Table I presents the ordinary least squares regression results achieved from running variations of the previously specified model. All three models are significant at the 0.05 level or better. However, it is obvious that model three, where a dummy variable for mortgage REITs was included, is far superior to the other two models. The explanatory power of the model increases from 0.158 (model 1) to 0.414 with the addition of the dummy variable MORTGAGE.

Note that the individual variables representing institutional ownership (INSTIT) and PCASHFLOW are both negative and significant in model one. However, when the dummy variable MORTGAGE is included, the model loses the significance attributed to institutional ownership. Conversely, PBook remains positive and significant in all three models.

Also note that forecast growth rates are not significant in any model, contrary to expectations about future growth serving as an indicator of financing needs. Dividend yield, also related to growth prospects, was also not significant in model 2.

4. Conclusions

The finding of a significant inverse relationship between institutional ownership and debt in model 1 partially confirms the research of Chiganti and Damanpour (1991) and

Variables	Regression model 1	Regression model 2	Regression model 3
Model: $\text{Debt}_j = \text{B}_0 + \sum \text{B}_1\text{X}_{ij} + \text{e}$			
CONSTANT	1.507 (1.598)	1.074 (0.917)	1.093 (1.372)
GROWTH	0.186 (1.415)	0.172 (1.294)	0.111 (1.000)
INSTIT	−1.858E-02 (−1.768)*	−1.724E-02 (−1.555)	−1.020E-02 (−1.136)
PBOOK	1.140 (2.685)*	1.107 (2.581)*	0.929 (2.588)*
P CASH FLOW	−0.184 (−2.296)*	−0.166 (−1.995)*	−0.122 (−1.779)*
DIVY		3.572E-02 (0.660)	
MORTGAGE			5.178 (5.291)*
F-statistic (*p*-value)	3.046 (0.023)	2.460 (0.042)	9.047 (0.000)
R^2	0.158	0.163	0.414

Notes: *Significant at the 0.10 level or better; DEBT = debt to equity ratio; GROWTH = % forecast five year growth rate in revenues; INSTIT = % institutional ownership; PBOOK = price-to-book ratio; P CASH FLOW = price-to-cash flow ratio; DIVY = dividend yield; MORTGAGE = dummy variable coded 1 for mortgage REITs, 0 otherwise

Table I.
REIT industry OLS regression results for the period ending 2003 *T*-values are in parentheses (Dependent = Debt)

Grier and Zychowicz (1994), at least as it pertains to REITs. However, when dividend yield or mortgage REIT variables are included, institutional ownership turns insignificant. This finding indicates that while for most REITs institutional owners might prefer lower levels of debt it appears that mortgage REITs are considered to be enough lower in risk, probably due to the predictability in cash flows and the availability of mortgage insurance, to support higher levels of debt.

The significance of the variable PCASHFLOW, and the inverse relationship, in all three models is intriguing. As PCASHFLOW increases debt levels go down. Investors appear to bid up the price of non-mortgage REITs relative to each dollar of cash flow depending on debt levels. The implications are that non-mortgage REITs should opt for lower levels of debt, while mortgage REITs should take on additional debt.

The positive relationship between debt and price-to-book is also interesting. It is possible that PBOOK is not a good proxy for investor growth expectations. However, this finding could be explained at least partially by the age of the assets. Non-mortgage REITs, in particular, could be carrying older assets that are closer to being paid for and thus investors will bid up the price relative to the book value. This discrepancy between true market value of the assets and book value could also inflate the debt to equity ratio and create this relationship.

When considering the overall models, investors appear to gravitate towards certain capital structures and REIT market values should reflect these preferences. Capital structure, at least for REITs, should be considered by managers attempting to optimize value and also investors looking for REITs likely to appreciate.

This area of investigation could be greatly expanded with additional data and thus is one limitation of this study. Further research could explore many other agency factors shown to impact capital structure in other industries.

Note

1. An anonymous reviewer suggested this variable might be correlated with GROWTH. Analysis of the correlation matrix indicates low correlation between the two growth measures with a coefficient of 0.251.

References

Agarwal, A. and Mandelker, G.N. (1990), "Large shareholders and the monitoring of managers: the case of antitakeover amendments", *Journal of Financial and Quantitative Analysis*, Vol. 25, pp. 143-61.

Allen, M.T. (1995), "Capital structure determinants in real estate limited partnerships", *The Financial Review*, Vol. 30 No. 3, pp. 399-426.

Bowen, R., Daly, L. and Huber, C., Jr. (1982), "Evidence on the existence and determinants of inter-industry differences in leverage", *Financial Management*, Vol. 11, pp. 10-20.

Bradley, M., Jarrell, G. and Kim, E.H. (1984), "On the existence of an optimal capital structure: theory and evidence", *Journal of Finance*, Vol. 39, pp. 857-78.

Brander, J. and Poitevin, M. (1989), "Managerial compensation and the agency costs of debt finance", working paper, University of British Columbia.

Brickley, J.A., Lease, R.C. and Smith, C.W., Jr. (1988), "Ownership structure and the monitoring of managers", *Journal of Financial Economics*, Vol. 20, pp. 267-91.

Casey, K.M. and Anderson, D.C. (1997), "A note on institutional ownership and capital structure: evidence from the petroleum industry", *Oil and Gas Tax Quarterly*, Vol. 45 No. 4, pp. 727-36.

Chaganti, R. and Damanpour, F. (1991), "Institutional ownership, capital structure, and firm performance", *Strategic Management Journal*, Vol. 12, pp. 479-91.

Demsetz, H. (1983), "The structure of ownership and the theory of the firm", *Journal of Law and Economics*, Vol. 26, pp. 375-90.

Dybvig, P. and Zender, J. (1989), "Capital structure and dividend irrelevance with asymmetric information", working paper, Yale School of Organization and Management.

Fama, E.F. and French, K.R. (1995), "Size and book-to-market factors in earnings and returns", *Journal of Finance*, Vol. 50, pp. 141-55.

Friend, I. and Lang, L. (1988), "An empirical test of the impact of management self-interest on corporate capital structure", *Journal of Finance*, Vol. 43, pp. 271-81.

Grier, P. and Zychowicz, E.J. (1994), "Institutional investors, corporate discipline, and the role of debt", *Journal of Economics and Business*, Vol. 46, pp. 1-11.

Hamill, J.R. (1993), "A note on taxes and capital structure of partnerships, REITs, and related entities", *Journal of Real Estate Research*, Vol. 8, pp. 279-86.

Harris, M. and Raviv, A. (1991), "The theory of capital structure", *The Journal of Finance*, Vol. 46 No. 1, pp. 297-355.

Haugen, R. and Senbet, L. (1987), "On the resolution of agency problems by complex financial instruments: a reply", *Journal of Finance*, Vol. 42, pp. 1091-5.

Howe, J.S. and Shilling, J.D. (1988), "Capital structure theory and REIT security offerings", *Journal of Finance*, Vol. 43 No. 4, pp. 983-93.

Jaffe, J.F. (1991), "Taxes and the capital structure of partnerships, REITs and related entities", *Journal of Finance*, Vol. 46, pp. 401-7.

Jensen, M.C. and Meckling, W. (1976), "Theory of the firm: management behavior, agency costs and capital structure", *Journal of Financial Economics* Vol. 3, pp. 305-60.

Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance and takeovers", *American Economic Review*, Vol. 76, pp. 323-9.

Kester, W.C. (1986), "Capital and ownership structure: the comparison of United States and Japanese manufacturing corporations", *Financial Management*, Vol. 15, pp. 5-16.

Long, M. and Malitz, E. (1985), "The investment-financing nexus: some empirical evidence", *Midland Corporate Finance Journal*, Vol. 3, pp. 53-9.

Maloney, M., McCormick, R.E. and Mitchell, M.L. (1993), "Managerial decision making and capital structure", *Journal of Business*, Vol. 66 No. 2, pp. 189-217.

Maris, B.A. and Elayan, F.A. (1990), "Capital structure and the cost of capital for untaxed firms: the case of REITs", *AREUEA Journal*, Vol. 18 No. 1, pp. 22-39.

McCue, M.J. (1992), "Determinants of capital structure", *Hospital and Health Services Administration*, Vol. 37, pp. 333-46.

McIntyre, J.E., Jr. and Rao, V.K. (1993), "The effects of institutional ownership on bank CEO compensation", *Journal of Business and Economic Perspectives*, Vol. 19 No. 2, pp. 25-31.

Modigliani, F. and Miller, M.H. (1958), "The cost of capital, corporation finance, and the theory of investment", *American Economic Review*, Vol. 53 No. 3, pp. 261-97.

Modigliani, F. and Miller, M.H. (1963), "Corporate income taxes and the cost of capital", *American Economic Review*, Vol. 53 No. 3, pp. 433-43.

Narayanan, M.P. (1987), "On the resolution of agency problems by complex financial instruments: a comment", *Journal of Finance*, Vol. 42, pp. 1083-90.

Sharpe, I.G. (1995), "Determinants of capital structure of australian trading banks", *Asian Pacific Journal of Management*, Vol. 12, pp. 97-121.

Shleifer, A. and Vishny, R. (1986), "Large shareholders and corporate control", *Journal of Political Economy*, Vol. 94, pp. 461-88.

Stultz, R. (1990), "Managerial discretion and optimal financing policies", *Journal of Financial Economics*, Vol. 26, pp. 3-27.

Theis, J. and Casey, M. (1999), "An empirical investigation of agency relationships and capital structure of property management firms in the UK", *Journal of Property Investment and Finance*, Vol. 17 No. 1, pp. 27-34.

Titman, S. and Wessels, R. (1988), "The determinants of capital structure choice", *The Journal of Finance*, Vol. 43, pp. 1-20.

Further reading

Financial Economists Roundtable (1998), Statement on Institutional Investors and Corporate Governance, Annual meeting in July 1998, Boothbay Harbor, Maine, pp. 1-5.

Oppenheimer, P. (2000), "An investigation of current debt levels of equity REITs", *Journal of Real Estate Portfolio Management*, Vol. 6 No. 3, pp. 225-37.

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Manager characteristics and real estate mutual fund returns, risk and fees

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Abstract

Purpose – The purpose of this paper is to analyze the effects of individual manager characteristics on real estate mutual fund (REMF) performance. Human capital theory predicts that factors like education, experience and professional certifications improve skill sets and thus performance. Conversely, capital markets theory suggests that these things may be irrelevant in the management of mutual funds.

Design/methodology/approach – A total of 63 REMFs were sampled over the period 2001-2003 and equations were estimate regressing, alternatively, risk-adjusted return, market risk and management fees on a series of fund variables and manager characteristics including the manager's tenure, whether the fund manager holds a professional certification, whether the manager has specific real estate experience, and whether the fund is team-managed.

Findings – Modest evidence is found that team-managed funds have lower risk-adjusted returns than solo-managed funds. Managers with longer tenure tend to pursue higher market risk levels, and there is no relation between manager characteristics and management fees.

Research limitations/implications – This study considers only one cross-sectional time period. Future research might use longitudinal data.

Practical implications – Despite real estate being a specialized field of finance, there is little if any support for the predictions of human capital theory that experience, education and training result in greater performance among managers of REMFs.

Originality/value – This paper extends prior work in mutual fund management characteristics and fund performance to real estate funds.

Keywords Real estate, Managers, Human capital, Market economy

Paper type Research paper

Introduction

The real estate segment has been one of the fastest-growing in the mutual fund industry. In 1991, Morningstar reports that there were nine such mutual funds with combined total assets of $200 million. By 2003, excluding multi-share class funds, there were over 70 real estate sector mutual funds with combined net assets of almost $20 billion. Growth in the sector has been due to two factors: investors increasingly use real estate as a diversifying tool within an equity portfolio, and during the past several years, the real estate sector has been a high performer that has attracted increased investment.

As the size of the sector increases, so does investor interest in identifying performance-related characteristics of individual real estate mutual funds (REMFs). Prior work has identified several factors that influence REMF returns. We examine REMF manager-specific characteristics and their effects on fund returns, risk and fees. Our analysis provides insight into the value of human capital in this segment of the mutual fund industry.

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Fund and manager characteristics and performance

A large number of studies examine performance-related characteristics of mutual funds. Generally, these studies examine the performance effects of any number of fund-specific variables, including prior returns, size, fees and portfolio turnover. Recently, a much smaller number of studies have examined performance-related characteristics of REMFs. O'Neal and Page (2000) examine a sample of 28 REMFs and find that the average fund does not provide positive abnormal returns when measured against a multi-index model. They also find that individual fund abnormal returns are inversely related to fund expense ratios and directly related to the fund's portfolio turnover rate. The findings regarding overall performance and expense ratios are consistent with an efficient asset market, while the turnover finding is not and suggests that unique manager skill exists in REMFs.

Similarly, Gallo *et al.* (2000) find evidence of REMF manager skill. They examine fund asset allocation among sectors within the real estate market and find that REMF managers on average show skill in selecting the best performing sectors, and that the allocation of fund assets among sectors explains most of the abnormal performance in their sampled funds. Kallberg *et al.* (2000) also find evidence of management value in a sample of 44 REMFs over the period 1987-1998. The funds in their sample have positive average abnormal returns, and fund managers tend to show greater out-performance during down markets than in rising markets. Further, like the O'Neal and Page (2000) findings, Kallberg *et al.* find that abnormal returns are positively related to active management as measured by portfolio turnover. These findings tend to support the existence of manager skill in REMFs.

Evidence from more recent time periods, however, calls these findings into question. Lin and Yung (2004) examine a sample of REMFs over the time period 1993-2001, and find that the average abnormal returns are statistically non-positive, and that the performance of any given fund is largely determined by the returns to the real estate sector. They do find some evidence of performance persistence among individual REMFs, but find no relation between individual fund performance and individual fund characteristics.

Pursuing a slightly different research tack, Golec (1996) examines management effectiveness by studying the relationship between individual manager characteristics and fund performance characteristics for a sample of 530 mutual funds with a variety of fund objectives (including growth, growth and income, balanced, etc. but not REMFs). Golec finds that individual fund risk-adjusted performance is directly related to manager youth, tenure and education level. Also, large management fees do not decrease performance; this finding is consistent with the prospect that managers who distinguish themselves by their ability extract higher fees from fund investors as a result.

REMF management

We examine REMF manager characteristics and fund performance characteristics, after Golec (1996). Efficient markets theory suggests that, given information symmetry and after adjusting for risk, fund managers' returns should be independent of fund manager characteristics. However, human capital theory posits that experience, education, training, and job structure all have effects on productivity. Thus an investigation of relations between REMF manager characteristics and individual REMF performance, risk and fees may provide insight to potential REMF investors, but also to students of capital markets and management theory.

An investigation of REMF managers differs from an investigation of general mutual fund managers because of the specific market segmentation nature of the REMF industry. That is, the REMF manager is concerned with only a single segment of the equity market, yet that segment is highly specialized. Thus, there may be competing hypotheses about the value of managerial expertise in REMFs. On the one hand, the single-sector nature of REMF management may make managing a REMF easier than a typical equity growth or income fund, since there is only one major sector to monitor. Alternately, because the real estate sector is very specialized, there may be a need (and greater return and compensation) for managers with specialized real estate expertise.

Data and method

We sample real estate mutual funds listed in Morningstar Mutual Funds in February, 2004. In the event of multi-share-class mutual funds we include the "A" class (typically having a front load and no deferred charges or 12b-1 fees), or if the fund does not use this taxonomy, we include data for the share class that is indicated as intended for sale to retail individual investors. After Golec (1996), we use a three-year performance period (2001-2003). Such a short time period limits the effects of survival bias that are common in mutual fund studies. This sampling procedure yields 63 REMFs.

For each of the 63 sampled funds, we collect observations for the following variables:

(1) ALPHA is the fund's CAPM risk-adjusted return vs the S&P 500 index.

(2) BETA is the fund's CAPM beta vs the S&P 500 index.

(3) MGMTFEE (management fee) is that part of total fund expenses that is compensation for management.

(4) TURNOVER is the fund's portfolio turnover rate.

(5) ASSETS is the fund's total net assets, in millions of dollars.

(6) TENURE is the tenure, in years, of the fund's manager. If the fund is managed by more than one named manager, then the most senior is used. If the fund is team managed with no named manager, then tenure equals three years.

(7) CERTIFICATION takes the value 1 if any manager indicates a professional certification (CPA, CFA, or CFP), 0 otherwise.

(8) TEAM takes the value 1 if the fund has more than one manager, 0 otherwise.

(9) EXPERIENCE takes the value 1 if any manager of the fund indicates real estate experience other than managing a REMF (e.g. broker, leasing manager, appraiser), 0 otherwise.

Each of the first three variables will serve as a dependent variable in separate equations. In addition, ALPHA and MGMTFEE will serve as independent variables in other equations. Selection of these variables follows Golec (1996). We examine management fees rather than expenses because although the two are correlated, management fees better measure manager compensation, which is of greater interest to our analysis. We also exclude loads and 12b-1 fees as explanatory variables because our selection of "A" class shares largely controls for such charges. TURNOVER and ASSETS are often cited as mutual fund performance explanatory variables (with inconsistent findings). TENURE, CERTIFICATION, TEAM and EXPERIENCE are manager-specific variables, and their inclusion generally follows the Golec analysis.

An exception is the CERTIFICATION variable, which is designed to measure manager education. Golec measures manager education by whether the manager has an MBA degree. Because the MBA has become ubiquitous among fund managers, we use three leading financial certifications as a measure of advanced education. Specific models and hypothesized relations among variables are developed in greater detail in the discussion of the results.

Table I contains sample descriptive statistics. Interestingly, the sample had very large positive abnormal returns over the sample period. This is not surprising, given that these alphas are measured vs the S&P 500 index, and that during the sample period the real estate sector outperformed the equity sector as a whole. When returns are measured against the Wilshire REIT index, the average alpha falls to only 2.0 per cent. It is well known that single-index models may not be adequate for measuring absolute abnormal performance; however, our study requires only a relative measure of risk-adjusted performance that will provide a ranking of funds. Also, the alphas measured vs the S&P 500 are strongly correlated ($\rho = 0.804$) with the alphas measured vs the Wilshire REIT index.

The mean values of management-specific variables are also noteworthy. The average tenure of the REMF manager (or senior manager) is 5.71 years. Just over one-fourth of the REMFs had a manager who reports holding a professional certification (CPA, CFA or CFP). Almost half of the REMFs are managed by a team, being either multiple named managers or an anonymous committee. Finally, 31.7 per cent of the sampled REMFs list at least one manager who has real estate experience other than managing a REMF. Most frequently, this experience is in appraisal, lease management or real estate lending.

Results

We examine the effects of REMF manager characteristics on REMF returns, risk and fees by estimating three regression equations. Our primary estimation method is ordinary least squares (OLS). However, in the model specifications some explanatory variables may be endogenous, that is they are also determined by the dependent variable and thus correlated with the model error term. For example, asset size may determine performance, yet good performance may in turn attract assets to the fund. In such a situation, standard OLS estimates may be inconsistent, inefficient and biased. We confirm the OLS results using a three-stage least squares (3SLS) method similar to Golec (1996). In our estimations, the 3SLS parameter estimates did not differ in sign or significance relative to the OLS estimates. Therefore, for simplicity, we report the OLS estimates only.

Variable	Mean	Minimum	Maximum
ALPHA	18.65%	14.24%	34.31%
BETA	0.239	0.17	0.77
MGMTFEE	0.79%	0.26%	1.72%
TURNOVER	88.27%	2.0%	2,478.0%
ASSETS (millions)	$427.87	4,409.0	5.0
TENURE (years)	5.71	0	23
CERTIFICATION	26.9%	NA	NA
TEAM	49.2%	NA	NA
EXPERIENCE	31.7%	NA	NA

Table I. Sample statistics for variables used in regression analyses of 63 REMFs: 2001-2003

Performance

Our first estimation examines the effect of manager characteristics on fund performance. The dependent variable, ALPHA, is the fund's three-year CAPM abnormal return measured against the S&P 500 index, and is modeled as:

$$\text{ALPHA} = \text{f: (MGMTFEE, TURNOVER, ASSETS, TENURE, CERTIFICATION, TEAM, EXPERIENCE)}$$

While conventional wisdom (and several studies) suggests that mutual fund performance is inversely related to fund expense ratios, we focus only on the management fee component of expenses. There are competing hypotheses regarding management fees. The first is the traditional argument used for expense ratios – in an efficient market, funds with higher fees will have lower returns. Alternately, if certain managers show superior skill, we would expect them to capitalize by charging higher fees; this is the "you get what you pay for" argument. Table II contains regression coefficient estimates. The MGMTFEE coefficient is positive and significant ($t = 2.354$), indicating that the better compensated managers do provide better performance. This finding agrees with Golec's (1996) findings concerning equity funds in general.

The next two variables, TURNOVER and ASSETS, are commonly examined in mutual fund studies. Conventional wisdom suggests that in an efficient market, excessive trading (high turnover) will increase costs faster than returns, and thus decrease net returns. Similarly, in equity mutual funds, large asset size is seen as hampering the fund's ability to take significant positions in high-growth issues, thus decreasing returns. Kallberg *et al.* (2000) find the opposite in both cases in their study of REMFs. In our sample and time period, however, we find no effect of either variable on fund performance.

The last four variables, TENURE, CERTIFICATION, TEAM and EXPERIENCE, are designed to measure management qualification and capability. Under human capital theory, TENURE is would be expected to positively affect returns, and Golec (1996) finds this is the case in equity funds. Humans tend to learn the longer they have been at an activity, and this knowledge should result in better performance. On the other hand, efficient market theory would suggest that barring an information advantage, tenure should have no effect on performance. Our result indicates no relation between REMF manager tenure and performance. Similarly, CERTIFICATION measures manager education level. Golec (1996) finds that managers who hold MBA

Table II. Regression coefficient estimates, *t*-statistics and *p*-values for model of dependent variable ALPHA for 63 REMFs over the period 2001-2003

Variable	Coefficient	*t*-statistic	*p*-value
Intercept	14.7746	7.095	<0.0001
MGMTFEE	4.9049	2.354	0.0221
TURNOVER	0.0011	0.720	0.4744
ASSETS	0.0003	0.052	0.9587
TENURE	0.1572	1.213	0.2304
CERTIFICATION	0.7137	0.708	0.4818
TEAM	−1.7336	−1.863	0.0678
EXPERIENCE	−1.1643	−1.186	0.2407

Note: Model adjusted $R^2 = 0.1286$; model $F = 2.307$; $p = 0.0388$

degrees produce better returns than non-MBAs. We use certification (Certified Public Accountant, Certified Financial Planner, or Chartered Financial Analyst) rather than education level, as the MBA degree has since become very widespread as a degree for fund managers. Our results indicate that professional certification has no affect on REMF excess returns.

Almost half of the funds in our sample are managed by more than one manager. There are competing hypotheses regarding team management in mutual funds. The first is that more managers equates with more experience and insight, and thus should increase returns. The alternative is that when mutual funds are team managed, individual manager agency problems increase because returns responsibility is spread among more than one manager. We find modest evidence of the agency prediction ($t = -1.863$; p-value = 0.0678), that is, team-managed funds may tend to underperform solo-managed REMFs.

Real estate is a unique and well-defined sector of the broader equity market. This is evidenced by the large number of licenses (e.g. salesperson, broker, or appraiser) and certifications (GRI, etc.) available to real estate professionals. As such, it is possible that a REMF manager with a specialized real estate background may be better suited to managing a REMF than someone with a general equity investment background. Our data do not support this conjecture, as there is no performance difference among funds based on manager real estate experience.

Risk

We also examine the effects of manager and fund characteristics on the risk levels assumed by fund managers. The dependent variable BETA is the REMF's three-year CAPM beta measured against the S&P 500 index, and it is modeled as:

$$\text{BETA} = \text{f: (MGMTFEE, TURNOVER, ASSETS, TENURE,}\\ \text{CERTIFICATION, TEAM, EXPERIENCE)}$$

Table III contains estimation results. Mutual funds that charge high management fees may have incentive to take higher levels of risk than lower-fee funds. Since managers are likely to be evaluated based on net returns, high-fee funds must produce high gross returns in order to offset their fees. In an efficient market, that would equate to a higher level of systematic risk for higher-management fee funds. Our sample confirms this

Variable	Coefficient	t-statistic	p-value
Intercept	0.0824	1.286	0.129
MGMTFEE	0.1855	2.890	0.006
TURNOVER	0.0008	1.834	0.072
ASSETS	0.0001	0.238	0.812
TENURE	0.0110	2.739	0.008
CERTIFICATION	−0.0305	−0.982	0.329
TEAM	−0.0107	−0.374	0.709
EXPERIENCE	0.0031	0.104	0.918

Note: Model adjusted $R^2 = 0.1933$; model $F = 3.124$; $p = 0.008$

Table III. Regression coefficient estimates, t-statistics and p-values for model of dependent variable BETA for 63 REMFs over the period 2001-2003 result, with the REMFs' systematic risk being directly related to their management fees ($t = 2.890$).

We would also expect funds that pursue a strategy of active trading (high portfolio turnover) to have higher risk than passively-managed REMFs. A fund manager who does not expect to hold positions for very long may be more likely to take on greater risk and actively monitor these risky positions, being willing quickly to take gains or cut losses. There is at best slight evidence that the funds in our sample follow this pattern, with BETA marginally related to TURNOVER ($t = 1.834$; p-value = 0.072). Given the very small coefficient estimate value (0.0008), it is unlikely that there is a practical relation between turnover and risk levels in REMFs.

A mutual fund's size may affect it's manager's risk-taking propensity. Gorman (1991) has suggested that managers of large mutual funds may find it in their best interest to minimize risk and maximize their asset-based compensation by attracting and maintaining existing accounts. We find no relationship between fund size and risk.

All of the manager-specific variables are expected to be directly related to fund risk levels. Managers with longer tenure in their positions are likely more secure in their positions, and would be comfortable subjecting the fund to a high-risk level. Team-managed funds may show greater risk than individually managed funds because responsibility for potential losses is spread among multiple managers. Managers with advanced certifications or real estate specific experience would both predict investment expertise and individual manager comfort with risk, and thus would be expected to be directly related to REMF risk levels. Of these four variables, only TENURE appears to have a relationship to systematic risk, with longer-serving managers pursuing higher risk levels.

Management fees

Finally, we consider the effects of manager and fund characteristics on REMF management fees. The dependent variable MGMTFEE is the REMF's management fee component of expenses expressed as a percent of net assets, and it is modeled as:

$$\text{MGMTFEE} = \text{f: (ALPHA, TURNOVER, ASSETS, TENURE, CERTIFICATION, TEAM, EXPERIENCE)}$$

REMF managers who exhibit superior performance should be able to extract higher management fees from their customers. As the estimates in Table IV show, this is the

Variable	Coefficient	t-statistic	p-value
Intercept	0.4842	2.928	0.0050
ALPHA	0.0187	2.355	0.0221
TURNOVER	<0.0001	0.079	0.9372
ASSETS	−0.0009	−2.308	0.0248
TENURE	0.0015	0.179	0.8578
CERTIFICATION	0.0166	0.267	0.7905
TEAM	−0.0658	−1.124	0.2660
EXPERIENCE	0.0647	1.065	0.2913

Note: Model adjusted $R^2 = 0.1319$; model $F = 2.3460$; $p = 0.0360$

Table IV. Regression coefficient estimates, t-statistics and p-values for model of dependent variable MGMTFEE for 63 REMFs over the period 2001-2003 case in our sample. Funds with higher ALPHA have higher management fees ($t = 2.355$). Also, we would expect REMFs that pursue an active management strategy with high portfolio turnover to have higher management fees than passively managed REMFs; active managers likely spend more effort on investment analysis and monitoring and require greater compensation. This is not the case in our sample; there is no relationship between the TURNOVER variable and MGMTFEE.

Conventional wisdom suggests and most prior studies show some degree of economies of scale in mutual fund management. One would expect that competition in the REMF market would tend to force management fees as a percent of net assets lower as the assets under management increase. In fact, this is common practice in the money management industry; our sample REMFs follow this same trend, with a negative relationship ($t = -2.308$) between assets and management fee percentage. However, the very small absolute size of the coefficient estimate would indicate that the economy of scale, while significant statistically, is practically slight.

Human capital theory suggests that greater training, expertise and qualifications should result in greater compensation for the laborer. This is not the case in our sample, as none of the variables TENURE, CERTIFICATION, TEAM nor EXPERIENCE are related to management fees. This result is explainable within human capital theory in the light of the return equations. Recall that none of these management-related variables were related to risk-adjusted returns. It follows that tenure at a fund, professional certifications, committee management and specific real estate experience, having no positive effect on the marginal revenue product of the REMF managers, are not compensated by the market.

Conclusion

We have examined the effects of REMF manager characteristics on REMF risk-adjusted returns, risk levels and fees. Generally, there is very little support for the predictions of human capital theory that investment in manager skill, manager experience or a team approach to fund management will improve fund returns for fund investors, or, at a personal level, the compensation of the managers themselves. Managers tend to take greater risks the longer their tenure with a fund, yet the senior managers do not tend to provide higher abnormal returns than their younger competitors.

One interesting finding is the relation between fund management fee and fund performance. Higher-compensated managers tend to outperform lesser-compensated managers. For the individual investor, the implication is that while conventional wisdom supports avoiding funds with high total expense ratios, funds with high management fees need not be shunned on this basis alone.

References

Gallo, J.G., Lockwood, L.J. and Rutherford, R.C. (2000), "Asset allocation and the performance of real estate mutual funds", *Real Estate Economics*, Vol. 28 No. 1, pp. 165-84.

Golec, J.H. (1996), "The effect of mutual fund managers' characteristics on their portfolio performance, risk and fees", *Financial Services Review*, Vol. 5 No. 2, pp. 133-48.

Gorman, L. (1991), "A study of the relationship between mutual fund returns and asset size", *Akron Business and Economic Review*, Vol. 22 No. 4, pp. 53-61.

Kallberg, J.G., Liu, C.L. and Trzcinka, C. (2000), "The value added from investment managers: an examination of funds of REITs", *Journal of Financial and Quantitative Analysis*, Vol. 35 No. 3, pp. 387-408.

Lin, C.Y. and Yung, K. (2004), "Real estate mutual funds: performance and persistence", *Journal of Real Estate Research*, Vol. 26 No. 1, pp. 69-94.

O'Neal, E.S. and Page, D.E. (2000), "Real estate mutual funds: abnormal performance and fund characteristics", *Journal of Real Estate Portfolio Management*, Vol. 6 No. 3, pp. 239-47.

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The strong building: a case study in direct investment

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Abstract

Purpose – The purpose of this case study is to examine direct investment in commercial real estate from the perspective of the individual. While most research is dominated by studies concerning direct investment by institutions (REITs, pension funds, etc.), the bulk of direct investment in commercial property is still conducted by individuals.

Design/methodology/approach – The paper presents accounting and financial data from the original purchase, management and disposal of a small-scale office building. Cash flows, returns and risks are measured and analyzed.

Findings – The case demonstrates that successful direct investments may be characterized by short-term time horizons involving older, small-scale properties.

Practical implications – This case illustrates the non-academic nature of real world direct investment in commercial property. The case demonstrates that emotion and good timing are just as important to a successful venture as are cash flows and thorough risk estimates. The case also shows that successful direct investment in commercial property may be limited to smaller, older properties held for short-term time horizons.

Originality/value – This case study is unique because it identifies the property, the investor, the purchase price, the operating revenues and the sale price and net proceeds. Most case studies conceal many of these facts in order to preserve anonymity.

Keywords Real estate, Direct investment, Buildings

Paper type Case study

Introduction

Direct investment in real estate dominates the marketplace in the USA. The total market value of equity in US commercial real estate in 2003 was approximately $2.5 trillion (Ling and Archer, 2005, pp. 383 ff). Of this total, just 6.5 per cent ($168 billion) was held in publicly traded form, while the balance of almost $2.4 trillion was privately held.Of this $2.4 trillion about 90 per cent ($2.166 trillion) was held by non-institutional investors, i.e. direct investors. Direct investment offers the individual investor more leverage, higher returns, more control and useful tax benefits (in certain tax brackets). Direct investment avoids the fee structure and dilution of returns which accompany indirect investment.

The "A-list" of wealthy Americans who have invested directly in real estate includes John Rockefeller, Joseph Kennedy, Ted Turner, Arnold Schwarzenegger, Sam Zell, Donald Trump and George Steinbrenner, to name but a few. The reader will discover, after a little research, that many of these individuals made their initial fortunes in volatile industries such as energy, securities and entertainment. Seeking stability, they invested much of their wealth in commercial real estate. It seems that, having made a high return "on" their initial investments, these individuals shifted their attention to either preservation or return "of" capital by investing in real estate.

There is another way to look at the question of direct investment. Someone has to own and operate the commercial and residential rental property that is unsuitable for REIT funds. The strong building case looks at direct investment from the perspective of a real investor. The case identifies the property, the investor (the author of the case) and the financial details. It is a story presented within the complete cycle of property

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ownership over a period of eight months: making the purchase, operating the property and selling the property. A section which discusses the estimation of the risks involved is also included.

Making the purchase

In late summer of 1978, I traveled to Beloit, Wisconsin to see an "investment opportunity". The property was located in the heart of downtown. The strong building, as it was called, was constructed in the art deco style and built in the 1920s. The building had four floors and a basement, a portion of which was rentable. There were 24 office and retail units and about two-thirds occupied. The list of tenants included a union, various attorneys and insurance agents, a beauty shop, a barber shop, physicians, a dentist, an accountant and a stock broker. The structure had about 10,000 square feet, and roughly 8,800 were rentable. The roof was flat, recently rebuilt and did not leak. Parking was limited to a few spaces in front of the property and a city parking lot about 200 feet behind the building. The furnace ran on natural gas. It was old and it leaked – money. The gas bills were so high an investor or property manager could be forgiven for thinking it might be more efficient just to shovel paper dollars into the boiler. Cash flows looked to be enough to cover the loan payment and operating expenses as long as I did not pay myself a salary to manage the place.

Beloit is located in Rock County, Wisconsin, along the Wisconsin-Illinois state line. It is located at the junction of I-90 and I-43 about 75 miles southwest of Milwaukee, 100 miles northwest of Chicago, and 10 miles north of Rockford, Illinois, an important manufacturing regional city. In 1978 40 per cent of area workers were employed by the manufacturing, warehousing and distribution divisions of such Fortune 500 firms as Beatrice Foods, Taylor Freezer, Frito-Lay, Warner Electric Brake & Clutch. and Hormel. Dairy farming was the second important industry next to manufacturing. The population of the city of Beloit was 35,000 at the time.

The economic environment in 1978-1979 was one of total confusion as Americans learned for the second time in five years about the scandalous relationship between oil and interest rates. Inflation raged at an annualized rate of more than 10 per cent. Business loans and home mortgages cost between 9.5 per cent and 10 per cent. Gold pushed past $250, beef prices doubled, and the Iranian oil minister predicted oil at $35 to $50 per barrel.

Table I shows that I paid $130,000 for the property with a down payment of $15,000, but the effective cash outflow was only a thousand bucks. I purchased the property

Table I.
Strong building closing statement: purchase September 1978

	Seller credit ($)	Buyer credit ($)
Purchase price	130,000	
Down payment		15,000
Pro-rations		
Real estate tax		1,714
Special assesments		404
Rents		1,161
Elevator contract		55
Trash contract		16
Hazard insurance	314	
Totals ($)	130,314	18,350
Land contract to balance	111,964	

through a closely-held corporation (I was the only stockholder). The corporation borrowed $9,000 from relatives (at 12 per cent interest) and I also persuaded the broker to forego his commission in exchange for a company note in his favor of $5,000. After credits on the closing statement were applied, the sellers financed the balance of around $112,000 via a land contract bearing interest at 9.8 per cent for 30 years with a balloon payment due at the end of five years. Monthly payments were $1,050. The equity stake of $1,000 against a purchase price of $130,000 makes the LTV work out to 0.993. Financial leverage indeed.

Operating the property

The building produced positive cash flows as shown in Table II. The only caveat is that the utility system generated high costs in winter which had to be offset by summer savings. Since I took over the ownership in the fall, there were no savings to work with. In order to cover winter heating expenses, I put the property on deferred billing with the gas company.

The property also achieved positive financial leverage, generating eight months of net operating cash flows totaling $13,535. This number converts to an annual NOI of $20,300 ($20,300 = $13,535 × 12/8) or 15.6 per cent annualized overall rate of return (0.156 = $20,300/$130,000). The monthly NOI and before tax cash flow (BTCF) are shown in Table III. The cash on cash return from operations is calculated by dividing the BTCF by the equity invested. Against the initial equity stake of $1,000, the BTCF returned $5,138 during the eight months of operation. The raw return is 513.8%. Multiplying 513.8 by 12/8 annualizes the return at 770.7%, which probably qualifies as entry level loan sharking. Both the ROR of 15.6 per cent and the cash-on-cash ROE of 770% exceed the rate paid to the underlying loan of 9.8 per cent. The impact of the deferred gas billing is picked up in the closing statement.

Selling the property

With such great returns from operations, why sell? First, I lacked a good marketing plan to fill up the vacant offices. Second, I lacked the time to execute such a plan, due to

Gross potential income		$3,997
Less vacancies		−1,085
Effective gross income		2,912
Expenses		
Elevator inspection	86	
Trash service	25	
Cleaning	54	
Supplies	111	
Ads	11	
Repairs	279	
Utilities	502	
Property tax and assessments	222	
Miscellaneous	23	
		1,313
NOI		1,599
Debt service		1,050
BTCF		$549

Table II. Strong building operating cash flows: October 1978

Table III.
Summary of monthly operating cash flows

NOI ($)	Month	BTCF ($)
1,599	September	549
1,599	October	549
1,829	November	780
2,149	December	1,099
1,914	January	865
1,446	February	396
1,133	March	83
1,866	April	817
13,535[a]		5,138[a]

Note: [a]Winter gas bills were deferred until May and totaled $3,000

other business ventures. Third, there was an offer on the table. The real estate broker who had sold me the property called to say he had a contract to buy us out. He asked me to prepare an annualized pro forma income statement for the property.

The gross potential income for the property was $47,820 per year, but due to vacancies the effective gross income was about $2,900 per month or $34,800 per year. However, the strong building held the potential for much more, as shown in the Pro forma in Table IV. Assuming that a marketing plan would reduce vacancies to 10 per cent and allocating an additional $4,800 per year toward capital improvements to update the premises, the property still had the ability to generate a NOI of over $22,000 per year. Table IV shows that capitalized at 12 per cent, the NOI of $22,520 indicates a property value of more than $187,000.

In April 1979 a group of investors paid $156,000 for the property. Table V shows that the "gross-net" from the sale was over $40,000. However, Table VI shows that the "net-net" was just under $23,000 by the time all of the bills and loans were paid.

Adding the net from the settlement with the broker to the $5,138 from operations produces a total BTCF of $28,118 ($22,980 + $5,138). Against the $1,000 equity stake, this amounts to an ROE of more than 2,800%, which exceeded the 1978-1979 T-Bill rate of just under 9 per cent.

Estimating the risk

It is always best to estimate risk *before* investing money. In this case, the *ex ante* risk estimate considered the vacancy rate of the building, the time involved to operate and

Table IV.
Selling the pro forma potential of the strong building

Gross potential income	$47,820
Less hypothetical vacancies of 10%	−4,800
Effective gross income	$43,020
Less current operating expenses	−15,700
Less capital improvements	−4,800
Net operating income	$22,520
Less current debt service	−12,600
Before tax cash flow	$9,920
Indicated property value (NOI/0.12)	$187,666

	Seller credit ($)	Buyer credit ($)
Purchase price	156,000	
Down payment		3,000
Recording fee		3
Pro-rations		
Real estate tax		635
Special assesments		152
Rents		1,286
Elevator contract		52
Trash contract		16
Supplies	55	
Hazard insurance	535	
Totals ($)	156,590	5,144
Less buyer credits	−5,144	
Sub-total	151,446	
Assignment of land contract	−111,134	
Cash due at closing from buyer ($)	40,312	

Table V.
Strong building closing statement: sale April 1979

market the property weighed against the probable disappointment of the relative who had suggested I make the purchase. That relative was my father – a seasoned real estate entrepreneur. Not wishing to disappoint him weighed more heavily than the risks of making the purchase, so logic lost out to emotion and I bought the place. It may not be academic, but it is the real world.

Balance from closing due seller		$40,312
Down payment		3,000
Sub-total		$43,312
Charges against seller		
Pro-ration of accrued interest on land contract		
($111,134×0.098)/360 = $30.25 per day		
$30.25×30 days (from 3/19) =	$908	
Title insurance	465	
Gas company (deferred gas billing)	3,854	
Legal	85	
Commission	5,300	
Sub-total	$10,612	
Less charges against seller		−10,612
Cash due seller		$32,700
Pay off loan and eight month interest to relative		−9,720
BTCF from sale of strong building		$22,980

Table VI.
Broker's settlement statement: strong building April 1979

$$4{,}217\% = 9\% + \beta(18.6\% - 9\%)$$
$$4{,}217\% = 9\% + 9.6\%\beta$$
$$4{,}208\% = 9.6\%\beta$$
$$438.3 = \beta$$

Table VII.
CAPM estimate of riskiness β (beta) for the strong building

However, it is still possible to estimate the risk of the strong building after the fact using the capital asset pricing model (CAPM). In 1979 the risk free rate for one-year Treasury bills was about 9 per cent. The "market" rate of return was about 1 per cent because the Dow languished from 811 in January 1979 to 824 in January 1980. A better measure of market returns is the FRC/NCREIF index for real estate commercial property during 1979, which was 18.6 per cent (Dasso *et al.*, 1995, p. 62). The strong building returned an astounding 4,217% annualized (4,217% = 2,811% × 12/8). Therefore, it is possible to estimate β (beta) or the risk level as shown in Table VII.

The β (beta) of 438 indicates the strong building investment carried 438 times the risk of the average real estate investment included in the NCREIF index. High risk, high return. I never paid myself a salary during my tenure as landlord. Even supposing I had paid myself as much as $12,000 (a grand a month was decent money in 1978), and subtracting this from the $28,118 leaves a return of $16,118 – a mere 1,600% rate of return.

Conclusions

REITs offer stabilized cash flows through diversified property investment on a massive scale. Unfortunately, REIT share prices constantly change to reflect the impact of interest rates and other factors. Some investors may be troubled by the fact that the securities issued against real property trade in a market which is more volatile than the underlying properties. Direct investment provides no diversification until the investor has purchased a number of properties, but it does provide stability in terms of property value, because the investor is not required to report changes in property value on a continuous basis. That is, no property index is found on the front of the subject property to reflect ever instantaneous change in value. The strong building case illustrates the non-academic nature of real world direct investment in commercial property. The case demonstrates that emotion and good timing are just as important to a successful venture as are cash flows and thorough risk estimates. The case also shows that successful direct investment in commercial property may be limited to smaller, older properties held for short-term time horizons.

References

Dasso, J.E., Shilling, J.D. and Ring, A.A. (1995), *Real Estate*, 12th ed., Prentice-Hall, Englewood Cliffs, NJ.

Ling, D.C. and Archer, W.R. (2005), *Real Estate Principles: A Value Approach*, McGraw-Hill Irwin, New York, NY.

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