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The Value Added from Investment Managers: An Examination of Funds of REITs

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Abstract

This paper empirically analyzes REIT mutual funds. We show that, contrary to most mutual fund studies, the average and median alphas (net of expenses) are positive. We also find that time-varying positive alphas are much more likely to occur when the real asset market is performing poorly, suggesting that managers add more value in down markets than in up markets. We examine the cross-sectional determinants of both standard alphas and the average of time-varying alphas and find that both increase with assets and turnover. Cross-sectionally, we find that actively managed funds have higher alphas than passively managed funds.

I. Introduction

A central issue in investment management is whether portfolio managers add value. Grossman and Stiglitz (1980) developed a theoretical model where managers can possess superior information from asset selection or timing of transactions. However, recent research into mutual fund performance has provided little convincing evidence of the existence of significantly positive abnormal performance by investment managers.[1] In a survivorship bias-free sample of annual returns on 829 equity funds, Brown and Goetzmann (1995) find that the risk-adjusted performance of mutual funds persists, but that this persistence is confined to funds that lag the S&P 500. Gruber (1996) shows that the top performing decile is persistent, but he also finds that the average actively managed fund underperforms a passive index fund. Daniel, Grinblatt, Titman, and Wermers (DGTW) (1997) find that aggressive growth funds may have superior performance in ex-

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[1]Our review of the relevant literature is brief. A complete set of references can be found at http://www.stern.nyu.edu/~sbrown/performance/bibliography.html. See also Shukla and Trzcinka (1992).

cess of fees.[2] However, Carhart (1997b) argues that persistence in mutual fund performance is confined mostly to those funds that perform poorly. For funds with abnormal positive returns (variously defined) in a given year, the returns in the subsequent year are very weakly positively correlated. Thus, the key research question of whether investment managers add value through their informational advantage or timing ability remains in dispute.

These findings are not surprising; one would expect that detecting positive value added would be difficult in studies that focus on mutual funds investing in a very broad spectrum of financial assets trading in relatively transparent and efficient markets. However, there is a similar lack of evidence for abnormal positive performance in specialized funds. For example, Elton, Gruber, and Rentzler (1987) document the low return and high variability of commodity funds; similar results have been found for international funds. In addition, Elton, Gruber, and Blake (1993) show that bond funds underperform relevant indices after expenses.

While the existing empirical research inveighs against the existence of abnormal positive performance, it is reasonable to test the Grossman-Stiglitz hypothesis on a subset of mutual funds where it is more likely that investment managers could have an informational advantage. To the extent that previous studies have found any evidence in favor of the Grossman-Stiglitz hypothesis, it has been on *subsets* of mutual funds. Since it is plausible that the cost of information is higher for evaluating REITs than for typical equities, we hypothesize that mutual funds that invest exclusively in REITs are more likely to show that managers add value than other mutual funds. Since the REITs themselves can be viewed as a mutual fund of real estate properties, these mutual funds are "funds of funds." This means, rather than assuming that investment managers have an informational advantage over the entire universe of equities, we only assume that they have an incremental advantage within real estate investment. The existence of persistently valuable private information in this market seems more probable than in the equity market since a wide range of studies have documented the difficulties in determining good estimates of the risk and return in real estate. In addition, real estate markets are less liquid than financial asset markets and are subject to strong aggregate shocks. The belief that managers in this investment sector have superior information is documented in Damodaran and Liu (1993). They show that the appraisal process, which insiders access prior to its public release, provides information that has a material impact on the pricing of REITs. They find that insiders trade on this information, and, most significantly, they trade on negative information. This latter observation is relevant to our subsequent empirical findings.

The remainder of the paper is organized as follows. Section II discusses the relevant institutional environment. The third section describes the data and empirical methodology. Section IV describes our results and the final section presents our conclusions.

[2]DGTW find that the characteristic-based benchmarks exhibit abnormal returns, while the factor model of Carhart (1997a) does not. They argue that the characteristic-based benchmarks should have more ability to detect abnormal performance than the asset-pricing models. This is consistent with the theoretical results of Grinblatt and Titman (1989).

II. Institutional Background

Congress created Real Estate Investment Trusts (REITs) in 1960 to provide small investors a vehicle with which to own income-producing real estate through pooling arrangements. A REIT is not taxed at the firm level if it satisfies certain provisions.[3] These regulations are designed to ensure that REITs, which hold a portfolio of properties and/or long-term mortgages, will be passive investment vehicles similar in concept to open-ended mutual funds.

There are two major categories of REITs: an equity REIT invests in income-producing real estate assets; a mortgage REIT invests in real estate debt, mainly mortgages. The majority (91%) of REITs are equity REITs. Investors can also buy the equity of real estate operating companies (REOCs). In contrast to REITs, REOCs do not function as passive investment vehicles and are subject to double taxation, except for those companies structured as publicly traded master limited partnerships. For this study, we define REOCs as all real estate companies not structured as a REIT, i.e., not subject to REIT restrictions. REOCs include, but are not limited to, real estate owner-operators, construction companies, development companies, and homebuilders. Both REOCs and REITs trade on organized stock exchanges.

A real estate mutual fund is a specialized mutual fund that invests exclusively in real estate-related securities with a primary emphasis on equity REITs and, to a more limited extent, REOCs with large market capitalizations. Acton (1997), p. 7, notes a rationale for real estate mutual funds is that "many in the real estate community have felt that the inefficiency of the real estate market would allow better informed investors to 'beat the market'." For example, Bob Steers of Cohen Steers, the largest real estate mutual fund, noted "These stocks (REITs and REOCs) are somewhat different because you have to visit many properties to identify the right companies. Hundreds of thousands of properties are publicly owned. It's a labor-intensive endeavor" (*Los Angeles Times* (1997)). Another frequently cited reason is that real estate mutual funds provide diversification benefits since some REITs are specialized, e.g., own only apartment buildings or healthcare facilities. Additionally, proponents of these funds argue that they provide greater liquidity than REITs. The disadvantage of investing in these mutual funds is that since REITs are already mutual funds, investors pay two management fees—one with the REIT and one with the real estate mutual fund.

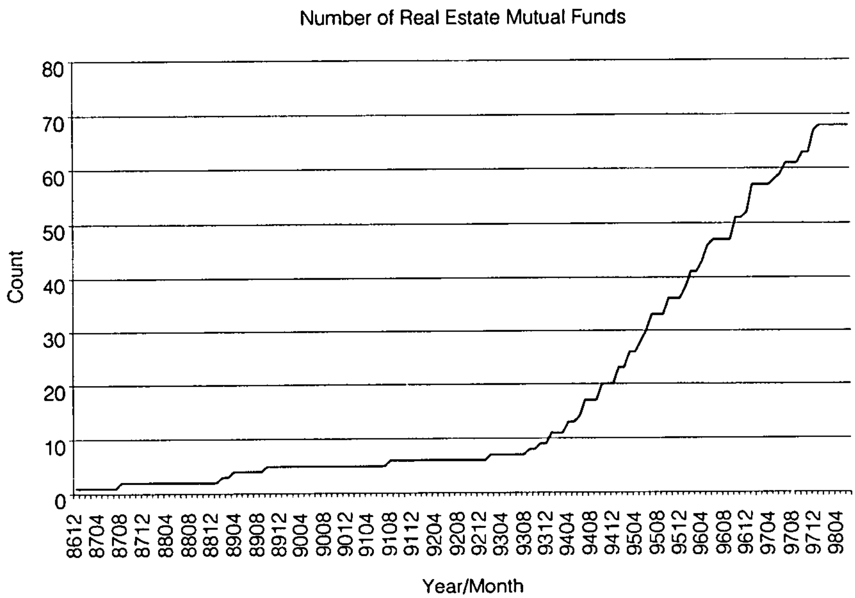
Until 1989, there was only one real estate mutual fund in existence. With the phenomenal growth of REITs, the number of real estate funds rose in the early

[3] i) At least 95% of net annual taxable income is distributed to shareholders; ii) at least 75% of annual gross income comes from rents, mortgage interest, gains from selling real estate, and dividends from investing in other REITs; iii) at least 75% of all assets consists of real estate, mortgages on real estate, shares of other REITs, cash, or government securities; iv) at least 95% of the REIT's gross income comes from items qualifying under the 75% income test, dividends and interest income, and gains from the sale of stock and other securities; v) at least 100 shareholders must exist with no more than 50% of the shares held by five or fewer shareholders; vi) it must elect to be treated as a REIT; vii) real property must not be held primarily for sale in the ordinary course of business (gains from the sale of property held for less than four years must comprise less than 30% of gross income); and viii) trustees, directors, or employees of a REIT are restricted from actively managing or operating REIT property, although they are permitted to make property decisions if such decisions relate to the business of the REIT itself.

1990s, from six funds having aggregate assets managed of just under $1 billion at the end of 1992, to 20 funds by December 1994. By the end of December 1997, there were 67 mutual funds specializing in real estate with the value of total assets managed equal to about $13.25 billion.[4] This represents approximately 9.5% of the $140.5 billion of REIT market capitalization at the end of December 1997. Figure 1 gives the number of real estate mutual funds at each time period in our observation period.

FIGURE 1

Distribution of Funds over Time



The number of REIT mutual funds in the sample over the observation period, December 1986–June 1998.

While the number of real estate mutual funds has grown over the years, a major portion of total assets is still managed by a few funds. In particular, Cohen & Steers and Fidelity Investments together manage $5 billion in assets; the Vanguard REIT Index Fund manages $760 million in assets. These three funds account for approximately 43% of the assets managed in the real estate mutual fund sector.

Investors use several real estate stock indices for evaluating real estate securities. The most common benchmarks are those associated with the National Association of Real Estate Investment Trusts (NAREIT) and Wilshire. Both the NAREIT and Wilshire indices are value-weighted. The monthly NAREIT index started on December 31, 1971. It consists of all exchange-listed REITs. NAREIT has several sub-indices including equity REITs (EQREIT), which represents ap-

[4]Based on the number of mutual funds that specialize in real estate as reported by *Morningstar*.

proximately 90% of the NAREIT index, mortgage REITs, and hybrid REITs (a mixture of equity REITs and mortgage REITs). In contrast to NAREIT, the Wilshire Real Estate Securities Index (WRES), includes REOCs in addition to REITs. REITs, however, account for 80%–87% of the WRES portfolio. The index does not include specialty REITs such as racetracks, healthcare, or mortgage companies. The WRES index measures the performance of real estate securities that appeal to institutional investors. Started on December 31, 1977, Wilshire also reports the performance of REITs and REOCs separately in its Wilshire Real Estate Investment Trust (WREIT) and Wilshire Real Estate operating company (WREOCs) indices.

As of December 31, 1997, the number of companies and the market capitalization of NAREIT (Wilshire) was 211 (123) and $140.5 ($129) billion, respectively. A major difference between the indices is that companies with initial public offerings (IPOs) enter the NAREIT index in the month following the IPO, while IPOs enter the Wilshire index in the quarter following the offering. Since IPOs tend to have positive returns during their initial trading period, the NAREIT indices tend to outperform the Wilshire indices.

III. Data and Empirical Methodology

The data set consists of monthly returns on and characteristics of 68 REIT mutual funds. Our data source is *Morningstar* from 1987 to the present. The first fund started in December 1986, and returns on all funds through June 1998 are used. These funds are almost exclusively invested in a universe of 128 REITs.[5]

We have available every *Morningstar* file sold to customers on a quarterly basis starting in March 1987.[6] We included every fund of REITs created during March 1987 to June 1998 and covered by *Morningstar.* As Brown, Goetzmann, and Ross (1992) observe, survivorship bias can occur because dead portfolios are excluded from the sample or because the methodology requires funds to exist for a specified period of time. Carhart (1997a) calls the former problem *survivor bias* and the latter *look-ahead bias.* In Carhart's terminology, our data are free from survivor bias but not from look-ahead bias since we use a minimum of 12 months of data to compute abnormal performance.[7]

For most calculations, this sample of 68 was reduced to 44 by eliminating funds that were identical except for different methods of charging fees. For this reduced analysis, we selected the single fund that used only a front-end load. All returns are the total return of the fund using the percentage change in net asset value plus any percentage distributions. The Securities and Exchange Commission rules require that net asset value be computed net of all fees and transactions costs, so that our returns represent the actual experience of the investors in the

[5] Funds with more than 10% investment in debt or in real estate other than these 128 REITs were excluded from the analysis.

[6] *Morningstar* started providing data on equity funds in machine-readable form to the general public in March 1987 through *Businessweek.* Each quarterly file contains data on all mutual funds in existence at the end of the quarter. By 1994, *Morningstar* was selling its data widely and the *Businessweek* product ended.

[7] No fund of REITs went out of business during this time period, but many changed names.

funds over the indicated time period. We test for the existence of significant alphas[8] based on various return-generating processes. The "traditional tests" of fund performance common in the mutual fund literature calculate alphas based on a fixed beta. However, it is reasonable to believe that betas are non-stationary, especially over time periods as long as those studied in this article. Thus, it is important to verify these unconditional tests by filtering out time variation. This problem was noted as early as Jensen (1972).

Ferson and Schadt (1997) develop a conditional performance evaluation technique by using pre-determined instrumental variables to account for time-varying expectations and risk premia. They find that using this type of conditioning improves the average performance of the mutual funds in their sample, raising the negative (unconditional) alphas to essentially zero. While they derived their conditional benchmarks from Euler conditions, the variables they chose for the model were ad hoc. We address their findings by using a time-varying regression technique that *endogenously* measures the change in the regression coefficients over time. This not only allows us to incorporate non-stationarity into the model, but, as will be seen below, the movement of the alphas with respect to returns provides us with additional insight into performance.

The return-generating processes used are the following:

Model 1. Single-Factor Model

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{Mt} - R_{ft}) + \varepsilon_i, \tag{1}$$

where R_{it} is the return on fund j in period t;

R_{ft} is the return on a 30-day Treasury bill in period t;

R_{Mt}, the single index return, can be either a REIT index or the S&P 500.

Model 2. Multi-Factor Model[9]

$$\begin{aligned} R_{it} - R_{ft} &= \alpha_i + \beta_i(R_{Mt} - R_{ft}) + \beta_{si}(R_{st} - R_{lt}) \\ &\quad + \beta_{gi}(R_{gt} - R_{vt}) + \beta_{di}(R_{dt} - R_{ft}) + \varepsilon_i, \end{aligned} \tag{2}$$

where $R_{st} - R_{lt}$ is the difference between small-cap and large-cap returns;

$R_{gt} - R_{vt}$ is the difference between growth and value returns;

$R_{dt} - R_{ft}$ is the excess return on a bond portfolio.

Model 3. Multi-Factor Model with a Real Estate Index

$$\begin{aligned} R_{it} - R_{ft} &= \alpha_i + \beta_i(R_{Mt} - R_{ft}) + \beta_{si}(R_{st} - R_{lt}) + \beta_{gi}(R_{gt} - R_{vt}) \\ &\quad + \beta_{di}(R_{dt} - R_{ft}) + \beta_{ri}(R_{rt} - R_{ft}) + \varepsilon_i, \end{aligned} \tag{3}$$

where $R_{rt} - R_{ft}$ is the excess return on the chosen real estate index.

In generating alphas from these models, the Newey-West correction was used to account for autocorrelated and/or heteroskedastic residuals.

[8]See Jensen (1968) for the basic methodology.

[9]This is the model used in Gruber (1996).

Our choice of REIT index is guided by the characteristic-based findings of DGTW and Daniel and Titman (1997). We do not have portfolio weights as these two studies do, but we do have available several indices of REIT performance that represent different characteristics of the REIT market. These are:

i) WRES is a value-weighted portfolio of both REITs and real estate operating companies;

ii) WREIT is a value-weighted portfolio of the REIT portion of the WRES index;

iii) NAREIT is a value-weighted index including all publicly traded REITs such as specialty, mortgage, healthcare, and finite life entities; and

iv) EQREIT is the value-weighted portfolio of the equity portion of all REITs in NAREIT.

The statistical characteristics of the indices used are given in Table 1. Note that the four real estate indices have significantly lower means and slightly lower standard deviations than the S&P 500 index. The four real estate indices are highly correlated—ranging from 0.930 to 0.969. Figure 2 shows the performance of the NAREIT and Wilshire indices since 1986. The peaks and troughs are more pronounced for WRES, since real estate operating companies tend to be more volatile than REITs.

TABLE 1

Return Index Characteristics

	S&P 500	WRES	WREIT	EQREIT	NAREIT	R_F
Mean	0.0143	0.0060	0.0073	0.0094	0.0075	0.0048
Standard deviation	0.0416	0.0394	0.0362	0.0344	0.0323	0.0014
Median	0.0172	0.0058	0.0044	0.0091	0.0046	0.0047
Skewness	−1.1412	−0.8808	−0.3571	−0.3242	−0.3312	0.2628
Correlations						
S&P 500	1					
WRES	0.596	1				
WREIT	0.521	0.962	1			
EQREIT	0.554	0.937	0.969	1		
NAREIT	0.541	0.930	0.963	0.969	1	
R_F	−0.014	−0.189	−0.174	−0.136	−0.184	1

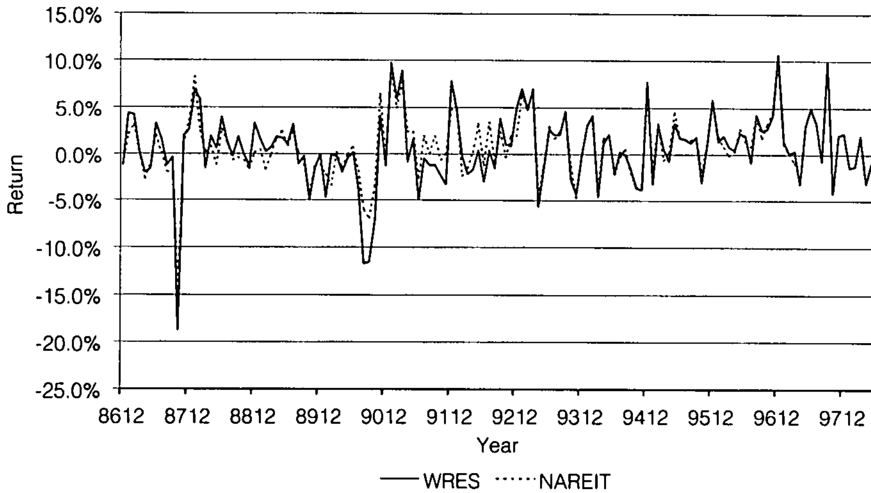
This table presents the key statistical characteristics of the four real estate indices analyzed in this paper. The indices are defined in Section III. S&P 500 is the realized monthly return on the S&P 500 index. R_F is the Merrill-Lynch realized return on holding a 90-day T-bill for 30 days.

It is worth mentioning that the best benchmarks for the typical investor are the WRES and WREIT indices. NAREIT contains REITs that are small and illiquid; in addition, it includes the IPO period. We include NAREIT and its subset, EQREIT, as benchmarks suitable for an institutional investor who is not interested in liquidity.

To account for non-stationarity, we use a time-varying regression technique called "flexible regression" developed by Kalaba and Tesfatsion (1989) and Lutkepohl and Herwartz (1996). In the terminology of Lutkepohl and Herwartz, we use the "standard form" of the model, which assumes that the regression coefficient vector, β_t, evolves smoothly over time in the linear model $y_t = x_t'\beta_t + \varepsilon_t$ where x_t is the $K \times 1$ vector of values of the independent variable at time t and ε_t is the error

FIGURE 2

REIT Benchmarks



This figure shows the monthly returns on the two major real estate indices used in this analysis. The high correlations noted in Table 1 are apparent.

term with $E[\varepsilon_t] = \mathrm{cov}(\varepsilon_t, \varepsilon_{t-j}) = 0$, and $\mathrm{var}(\varepsilon_t) = \sigma^2$. There are two sources of error. *Measurement error* is the (usual) difference between the dependent variable at time t, y_t, and its predicted value defined as

$$(4) \qquad \mathrm{sse} = \sum_{t=1}^{T} [y_t - x_t'\beta_t]^2 .$$

Dynamic error is the sum of squared changes in the coefficient vector from time t to time $t+1$,

$$(5) \qquad \mathrm{ssd} = \sum_{t=1}^{T} [\beta_{t+1} - \beta_t]'[\beta_{t+1} - \beta_t].$$

To estimate the model, Lutkepohl and Herwartz propose minimizing a weighted sum, γsse+$(1-\gamma)$ssd, where the user supplies the weight $\gamma \in (0,1)$. Following Lutkepohl (1993) and Tesfatsion and Veitch (1990), we weight the two sources of error equally, $\gamma = 0.5$. Our purpose is to estimate the time-varying regression coefficients as a description of how the coefficient vector evolves over time in a manner that equally balances the two types of errors.[10]

Kalaba and Tesfatsion (1989) show that the collection of all possible weighted sums attainable at time N, $\{\mathrm{sse}, \mathrm{ssd}|\beta, N\}$, is contained by a lower envelope that is

[10]Flexible regression is not a random coefficient model. Kalaba and Tesfatsion (1989) argue that random coefficients are explicitly excluded from the development of the model. However, Lutkepohl (1993) shows that the solution algorithm may be interpreted as the coefficient values that maximize the conditional density $g(\beta_1, \ldots, \beta_T | y_1, \ldots, y_T)$ assuming that $g(\beta_1)$ is a constant.

bounded away from the origin. If time variation in betas exists, there is an optimal combination of the two errors that will minimize the variation below the standard OLS solution. Nevertheless, Lutkepohl and Herwartz (1996) demonstrate that the model will find variation in betas even when the true betas are constant, since specifying the second error term forces periodicity onto a constant beta. Thus, if there are no a priori reasons to believe that coefficients vary, the technique may reduce the explanatory power of a regression model. However, numerous studies have documented that mutual fund betas and alphas are time varying. Lutkepohl and Herwartz (1996) also show that if the betas are periodic, the second error term will capture this periodicity well even if it is combined with a discontinuous shift.

IV. Empirical Results

A. Performance over the Full Sample

Table 2 presents the results of using Model 1 with various indices, including those, NAREIT and EQREIT, that contain small and illiquid REITs. The performance of these funds is, on average, significant and positive when measured against the most relevant benchmarks, WRES and WREIT. This indicates that real estate mutual funds, on average, appear to out-perform the passive real estate benchmarks over our study period.

TABLE 2

Single-Factor Alphas

	S&P 500		WRES		WREIT		EQREIT		NAREIT	
	α	R^2	α	R^2	α	R^2	α	R^2	α	R^2
Statistics										
μ	0.319	0.092	0.178	0.858	0.156	0.851	0.047	0.851	0.068	0.840
σ	0.484	0.105	0.254	0.152	0.264	0.174	0.277	0.165	0.275	0.158
T-Value	4.37	5.81	4.66	37.35	3.91	32.45	1.13	34.11	1.64	35.33
Prob(one-sided)	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.05	0.00
Percentiles										
Minimum	−0.614	−0.04	−0.276	0.30	−0.272	0.24	−0.379	0.25	−0.414	0.25
10%	−0.399	0.01	−0.074	0.61	−0.116	0.57	−0.243	0.60	−0.177	0.62
20%	−0.123	0.03	−0.028	0.84	−0.049	0.83	−0.158	0.84	−0.138	0.83
30%	0.073	0.04	0.028	0.86	−0.005	0.87	−0.130	0.87	−0.113	0.85
40%	0.314	0.04	0.063	0.90	0.053	0.89	−0.055	0.90	−0.075	0.87
Median	0.411	0.05	0.094	0.92	0.099	0.91	−0.001	0.91	−0.021	0.88
60%	0.527	0.07	0.210	0.93	0.193	0.93	0.048	0.92	0.086	0.90
70%	0.622	0.09	0.245	0.94	0.232	0.95	0.160	0.93	0.178	0.91
80%	0.769	0.16	0.330	0.95	0.266	0.95	0.178	0.94	0.218	0.94
90%	0.848	0.25	0.552	0.96	0.593	0.97	0.480	0.97	0.433	0.96

This table presents the alpha distribution from Model 1 with the excess return on the four real estate indices as the single index along with the S&P 500. For each single-index model, we show the statistics on the estimated α and R^2 for the 44 regressions. Prob(one-sided) is the one-sided (positive) p-value for the t-statistic.

Table 2 shows that the choice of a real estate benchmark is important. The percentiles of the distribution of real estate alphas associated with using the NAREIT indices (NAREIT and EQREIT) in comparison to the Wilshire indices (WRES and WREIT) show that a negative alpha is more likely for an individual real estate fund when the NAREIT and EQREIT indices are used. The fact that the positive alphas for EQREIT and NAREIT are not significant while they are significant for WRES and WREIT, suggests that mutual fund managers may be providing a service by investing in the small and illiquid REITs, since it is not possible for investors to invest in the NAREIT and EQREIT indices.

From a practitioner's perspective, real estate fund managers use both the WRES and NAREIT indexes as performance benchmarks. If the Grinblatt and Titman (1989) criterion is used, namely that the appropriate metric should include all assets under consideration in a fund portfolio, then WRES is the most appropriate choice for a benchmark. While most real estate mutual fund portfolios consist of REITs, a portion of most portfolios (5%–20%) consists of investments in real estate operating companies (REOCs). Table 2 confirms that the R^2 is slightly higher, on average, for WRES (0.858) relative to NAREIT (0.84). This is also evident when the percentile distribution of alphas corresponding to WRES is compared to that for NAREIT. The returns on real estate funds are more highly correlated with the WRES relative to the NAREIT portfolio, especially at the 40th to 70th percentiles.

To support our hypothesis that managers of mutual funds may be adding value by investing in small, illiquid REITs, we evaluate such a strategy. We construct a zero-transactions cost, dynamic, but essentially passive, strategy from the components of NAREIT to determine the maximum possible returns from investing in all REITs. Using the monthly returns on the components of the NAREIT from January 1994 to the end of our sample (June 1998), we conduct a style analysis of each index where we optimize the following model (see Sharpe (1992)) over the coefficients, b_{ik},

$$
\begin{aligned}
r_{it} &= \sum_{k=1}^{K} b_{ik} F_{kt} + \varepsilon_{ti}, \\
\sum_{k=i}^{K} b_{ik} &= 1.0, \\
b_{ik} &\geq -1.
\end{aligned}
\tag{6}
$$

We use the 10 sub-indices of NAREIT as factors[11] and assume that the investor updated the portfolio every quarter. We estimate the model (solve the above optimization problem) for the first 24 months of data, from January 1994 to December 1995, and then re-optimize for each of the following 11 quarters, each time using the latest 24 months of data. Assuming zero transaction costs, each optimization determines the weights of a passive portfolio of investing in each of the NAREIT sub-indices. The optimization differs for each index since each has a different b_{ik}. Each portfolio is held out of sample for one quarter and the portfolio weights are adjusted after three months. The return on this portfolio is compared to the return on WRES and WREIT. The annualized excess return of WREIT

[11]The sub-indices are: i) apartments, ii) diversified (includes all different property types), iii) healthcare facilities, iv) hotels and motels, v) industrial (includes research and development, industrial warehouse, and industrial office), vi) manufactured homes, vii) office, viii) factory outlet centers, ix) regional malls, and x) strip shopping centers.

against its benchmark was −2.13%, while the annualized excess return of WRES against its benchmark was −0.62%.[12] Table 3 gives complete distribution of the 30 returns from January 1996 to June 1998.

TABLE 3

Style Analysis of WRES and WREIT

	WRES		WREIT		S&P 500
	Index	Style Benchmark	Index	Style Benchmark	Index
Average monthly return	1.527%	1.565%	1.533%	1.676%	2.282%
Standard deviation	3.267	3.052	3.350	3.142	3.713
25th percentile	−0.688	−0.316	−0.320	−0.345	0.820
Median	1.700	1.127	1.320	1.414	2.344
75th percentile	2.658	3.179	2.603	2.869	5.388

This table presents the distribution of average monthly returns from the two real estate indices of liquid REITs against a zero-transaction cost, "style" benchmark for the period January 1996 to June 1998. The style benchmark is constructed by estimating the portfolio weights of 10 illiquid REIT indices that best represent WRES or WREIT for 24 months and then holding the portfolio for one quarter. The Style Benchmark returns are the out-of-sample returns from holding the portfolio of the 10 illiquid indices for one quarter. The initial optimization uses 24 months of data from January 1994 to December 1995. We then re-optimize for 11 more quarters.

Both indices lose money against a passive, but dynamic strategy of investing in the components of NAREIT using the statistical weights of a style model and updating the investment. This assumes no transactions costs for constructing the dynamic strategy, which is unlikely even for the largest mutual funds. Nevertheless, the superior performance of the passive strategy supports our contention that mutual funds may be adding value by actively investing in the small, illiquid REITs.

Table 4 Panel A shows the alpha distribution from Model 2 and Model 3 with each of the four indices. Models 2 and 3 show large and significant alphas. The distribution indicates that an investor can earn a positive risk-adjusted return. These results are substantially different than previous studies of the mutual fund industry. All previous studies using factor model benchmarks report negative average alphas.[13]

It is also evident that the real estate index is the appropriate performance benchmark to evaluate real estate funds. Comparing Tables 2 and 4 reveals that when the S&P 500 is used alone as a benchmark of real estate fund performance, the average R^2 is 9% (median of 5%). The addition of a bond portfolio, a small-cap/large-cap portfolio and a growth/value portfolio to the S&P 500 increases the average R^2 to 30%. If a REIT index, such as WRES, is added to these four factors, the mean adjusted R^2 increases to 86%. However, the average R^2 is about 85%–87% if any of the real estate indices are used alone as the performance metric, also suggesting that real estate benchmarks may be the most appropriate measure for

[12]This probably understates the true return on the strategy since this figure assumes WRES and WREIT make up only half of the total benchmark.

[13]The findings of Tables 2 and 4 were checked by computing all measures over a shorter time period, January 1995 to June 1998, since many of the funds did not begin until 1995. Since the cross-sectional alphas were not materially different, we report only the results based on the full time period.

TABLE 4

Multi-Factor Alphas

Panel A. Distribution of Multi-Factor Alphas

	Model 2 Four-Factor		Model 3 Four-Factor Model + Real Estate Index							
			WRES		WREIT		EQREIT		NAREIT	
Statistics	α	R^2	α	R^2	α	R^2	α	R^2	α	R^2
μ	0.224	0.30	0.173	0.87	0.065	0.87	−0.018	0.86	0.022	0.85
σ	0.470	0.111	0.257	0.135	0.425	0.140	0.256	0.135	0.261	0.130
t-Value	3.16	17.98	4.47	42.68	1.75	41.15	−0.47	42.5	0.57	43.49
Prob(one-sided)	0.00	0.00	0.00	0.00	0.04	0.00	0.32	0.00	0.29	0.00
Percentiles										
Minimum	−0.782	0.10	−0.488	0.40	−0.588	0.39	−0.647	0.40	−0.625	0.40
10%	−0.503	0.18	−0.075	0.67	−0.187	0.66	−0.308	0.68	−0.218	0.68
20%	−0.235	0.20	−0.019	0.84	−0.114	0.85	−0.188	0.84	−0.181	0.82
30%	0.033	0.22	0.032	0.86	−0.020	0.88	−0.147	0.87	−0.083	0.86
40%	0.250	0.26	0.118	0.89	0.006	0.89	−0.082	0.90	−0.055	0.87
Median	0.353	0.30	0.151	0.92	0.050	0.92	−0.037	0.91	0.009	0.88
60%	0.388	0.32	0.240	0.93	0.107	0.94	0.039	0.92	0.058	0.89
70%	0.471	0.34	0.301	0.95	0.213	0.95	0.074	0.93	0.165	0.91
80%	0.610	0.36	0.409	0.95	0.258	0.96	0.168	0.95	0.216	0.94
90%	0.793	0.46	0.503	0.97	0.287	0.97	0.222	0.97	0.338	0.96

Panel B. Correlation of Single- and Multi-Factor Alphas Using All Observations

	Single-Factor Model					Multi-Factor Model				
	S&P 500	WRES	WREIT	EQREIT	NAREIT	4-Factor	WRES	WREIT	EQREIT	NAREIT
Single-Factor Model										
S&P 500	1.00									
WRES	0.27	1.00								
WREIT	0.38	0.96	1.00							
EQREIT	0.41	0.92	0.98	1.00						
NAREIT	0.26	0.95	0.97	0.97	1.00					
Multi-Factor Model										
Four-Factor	0.97	0.29	0.40	0.42	0.28	1.00				
WRES	0.30	0.76	0.73	0.73	0.79	0.29	1.00			
WREIT	0.47	0.79	0.83	0.85	0.84	0.48	0.94	1.00		
EQREIT	0.50	0.77	0.84	0.87	0.85	0.52	0.89	0.99	1.00	
NAREIT	0.39	0.76	0.81	0.84	0.85	0.41	0.93	0.98	0.98	1.00

This table presents the alpha distribution from the four-factor model (Model 2) and the four-factor model with alternative real estate indices for our sample of 44 funds. All numbers are in % per month.

evaluating real estate fund performance. This result is consistent with Grinblatt and Titman (1989) who argue that the appropriate benchmark does not necessarily have to include all asset classes, but only those assets under consideration.

The rank order correlations in Panel B, Table 4 are also consistent with this result. The correlations among the alphas generated with a single-factor REIT index model are much higher than the correlations among alphas generated using single-factor models and alphas computed using a multi-factor model. This suggests that when real estate funds are sorted by highest to lowest alphas, the resulting rankings are similar for all single-factor models that use a real estate benchmark. A similar result obtains for all multi-factor models that include a real estate benchmark. Once again, this suggests that a real estate index is the appropriate benchmark for evaluating real estate funds.

Finally, it is apparent from Table 4, Panel A, that using EQREIT or NAREIT eliminates the value-added of the average real estate manager. This is similar to the effect in Table 2, and indicates again that managers may be adding value by actively selecting small, illiquid REITs.

In summary, it is clear that funds of REITs do not behave like other equity funds. In contrast to previous studies, some using the identical non-real estate benchmarks as in the current study, our results are consistent with the Grossman-Stiglitz (1980) theory. After subtracting all fees and transactions costs, managers do not appear to lose value relative to the passive real estate benchmarks used as the evaluation metric in this study. In particular, the alphas associated with real estate funds are positive and substantially higher than those found in studies of the broad mutual fund industry.

B. Persistence of Performance

As in Carhart (1997b), we form five equally-weighted portfolios of mutual funds using the algorithm of Hendricks, Patel, and Zeckhauser (1993) to allocate funds. Performance of the resulting portfolios is then estimated. Specifically, at the beginning of each six-month interval, five equally-weighted portfolios are formed based on returns in the preceding six-month interval. These returns are net of all operating expenses and transactions costs (excluding sales charges). Funds are first sorted by returns from highest to lowest and then grouped into quintiles. The first (last) quintile thus contains those funds with the highest (lowest) returns in the previous six-month period. Portfolios are held for six months and then rebalanced. Our start date for portfolio formation is July 1994. This date was chosen since it is the first date with complete return data on at least 14 real estate mutual funds.[14] This process results in a time series of monthly returns for each quintile from January 1995 to June 1998. All real estate funds with data for a given six-month interval are included in the grouping process until they disappear. This procedure is replicated on lagged one-year returns. As in Tables 2 and 4, returns are net of all operating expenses and security level transactions costs, but we ignore the sales load.

Table 5 presents the results of the portfolios formed on one-year lagged returns. Panel A shows the alphas from the multi-factor benchmarks; Panel B shows the alphas from the single-factor benchmarks. In Panel A, there is little evidence of persistent excess returns based on the one-year trading strategy. The alphas for most portfolios and most benchmarks are insignificantly different from zero. This is in contrast to the findings of Tables 2 and 4, where the multi-factor alphas were significant. Panel A shows that even when the REIT benchmarks are excluded, the multi-factor model produces insignificant alphas. Panel B tells a different story. The alphas of the highest return portfolio are positive and significant for all but the NAREIT index, which is significant at the 5% level for a one-tailed test. Unlike Carhart (1997b), the alphas of the lowest lagged return portfolio are generally positive, although not significantly different from zero.

[14]During 1991–1992, only three real estate mutual funds existed. In 1993, this number increased to six.

TABLE 5

Tests of Persistence Based on One-Year Lagged Returns

Panel A. Multi-Factor Benchmarks

	Monthly Excess Return	Std. Dev.	Model 2 Four-Factor α	Model 2 Four-Factor R^2	Model 3 WRES α	Model 3 WRES R^2	Model 3 WREIT α	Model 3 WREIT R^2	Model 3 EQREIT α	Model 3 EQREIT R^2	Model 3 NAREIT α	Model 3 NAREIT R^2
1 (High)	1.436	3.249	0.588 1.13	0.32	0.100 0.71	0.94	0.122 0.82	0.91	0.074 0.58	0.93	−0.013 −0.10	0.94
2	1.208	3.216	0.444 0.83	0.30	0.096 0.90	0.98	0.013 0.19	0.97	−0.126 −1.35	0.95	−0.037 −0.25	0.94
3	1.080	3.154	0.374 0.70	0.30	0.091 0.70	0.95	0.028 0.28	0.96	0.047 0.45	0.94	−0.004 −0.03	0.93
4	0.985	3.146	0.455 0.86	0.33	0.129 0.92	0.95	0.134 1.20	0.93	−0.069 −0.68	0.94	−0.063 −0.54	0.94
5 (Low)	1.200	2.985	0.739 1.38	0.33	0.151 0.85	0.90	0.117 0.89	0.91	0.010 0.10	0.92	0.062 0.51	0.89

Panel B. Single-Factor Benchmarks

	Monthly Excess Return	Std. Dev.	S&P 500 α	S&P 500 R^2	WRES α	WRES R^2	WREIT α	WREIT R^2	EQREIT α	EQREIT R^2	NAREIT α	NAREIT R^2
1 (High)	1.436	3.249	0.787 1.32	0.07	0.449 2.89*	0.92	0.486 2.60*	0.89	0.370 2.16*	0.90	0.241 1.58	0.92
2	1.208	3.216	0.736 1.24	0.03	0.114 1.04	0.96	0.049 0.39	0.94	0.033 0.29	0.95	−0.018 −0.13	0.93
3	1.080	3.154	0.679 1.15	0.04	0.024 0.22	0.95	0.147 1.19	0.95	−0.112 −1.03	0.96	−0.022 −0.17	0.93
4	0.985	3.146	0.704 1.19	0.04	−0.011 −0.13	0.96	0.004 0.05	0.96	−0.066 −0.56	0.94	−0.111 −0.92	0.93
5 (Low)	1.200	2.985	0.824 1.31	0.03	0.142 1.25	0.96	0.177 1.84	0.97	0.095 0.95	0.95	0.093 0.84	0.94

We form five equally-weighted portfolios of mutual funds on lagged one-year excess returns and estimate performance on the resulting portfolios. Returns are net of all operating expenses and security-level transactions costs but not sales load. In Panel A, each portfolio is evaluated with the multi-factor benchmarks. In Panel B, the single-factor models are used. The t-statistics for the alphas are given under each estimate; * indicates significance at the 5% level.

Table 6 replicates these results for portfolios based on six-month returns. Again, there is very little evidence of persistence. The tendency of the lowest performing quintile to reverse its performance in the subsequent period is clear; this quintile has the highest excess return and alphas that are consistently higher than all but the highest return quintile.

The implications of Tables 5 and 6 for the Grossman-Stiglitz hypothesis depend on the model selected. If the investor confines his investment entirely to REITs, then the highest return funds provide a persistent abnormal return. However, for investors who consider portfolios of REITs and other common stocks, the multi-factor benchmarks are more appropriate and there is little persistence in lagged returns.

A consistent implication of this analysis is that there is no evidence that funds of REITs destroy value. In Carhart (1997b), portfolios formed on lagged returns

TABLE 6

Tests of Persistence Based on Six-Month Lagged Returns

	Monthly Excess Return	Std. Dev.	S&P 500		WRES		WREIT		EQREIT		NAREIT	
			α	R^2	α	R^2	α	R^2	α	R^2	α	R^2
1 (High)	1.129	3.114	0.600	0.04	0.289	0.87	0.375	0.86	0.238	0.86	0.156	0.84
			1.07		1.92		2.26*		1.41		0.84	
2	1.017	3.053	0.516	0.03	0.065	0.96	0.112	0.97	−0.018	0.93	−0.073	0.90
			0.93		0.60		1.31		−0.15		−0.46	
3	0.987	3.208	0.558	0.03	−0.012	0.96	0.005	0.97	−0.130	0.95	−0.195	0.94
			0.97		−0.11		0.06		−1.14		−1.46	
4	0.925	2.968	0.527	0.04	0.073	0.96	0.142	0.96	−0.016	0.96	−0.087	0.92
			0.95		0.88		1.80		−0.21		−0.81	
5 (Low)	1.233	3.058	0.698	0.07	0.197	0.92	0.228	0.91	0.056	0.92	−0.028	0.92
			1.27		1.43		1.55		0.45		−0.21	

We form five equally-weighted portfolios of mutual funds on lagged six-month excess returns and estimate performance on the resulting portfolios. Returns are net of all operating expenses and security level transactions costs but not sales load. Each portfolio is evaluated with the single-factor model benchmarks. Multi-factor benchmark models cannot be used for the six-month period using the Carhart approach. The t-statistics for the alphas are given under each estimate.

of all equity funds produce negative alphas. This means that investing in high-return funds is inferior to investing in passive benchmarks. Portfolios of funds of REITs produce either zero or positive alphas. There are no significant negative alphas in Tables 5 and 6. The fact that all returns are after management fees and security level transaction costs indicates that some funds may have gross returns in excess of a risk-adjusted return. However, we cannot conclude this without directly observing the gross return of the fund. Note the statistical tests in Tables 5 and 6 assume a null hypothesis of zero alpha.

The finding of positive alphas and little persistence is somewhat troubling. A reasonable explanation is the non-stationarity of the data. In particular, it is plausible that portfolio managers may be shifting the betas of their portfolios as real estate markets fluctuate. This motivates us to attempt to capture the time-varying nature of the betas through the flexible regression approach, which we describe in Section IV.C below. In addition, since the alphas are quite different than those typically found for mutual funds, Section IV.D analyzes the cross-sectional determinants of alpha. Any evidence of persistent patterns in these factors is evidence in favor of the Grossman-Stiglitz hypothesis.

C. Time-Varying Performance

Table 7 shows the alpha distribution from the flexible regression on the reduced sample of 43 funds.[15] Column four shows the results aggregated over all funds; column five shows the alphas over time. The results from the OLS alphas are included for comparison. Note that the mean alpha over funds is significantly lower with the flex regression than with the OLS regression, but the medians are quite close. This suggests that some of the positive performance can be attributed to time-varying betas. The alpha distribution over time shows a much bigger vari-

[15]One fund had sufficiently stable alphas so that the model could not be estimated.

ation than over funds. Note, in particular, the large differences in alphas in the highest and lowest deciles.

TABLE 7

Alpha Distribution from Flex Regression

	Full Sample OLS α	Reduced Sample OLS α	Flex α over Funds	Flex α over Time
Mean	0.0695	0.1728	0.0649	0.1271
Standard deviation	0.3615	0.2566	0.3804	0.6050
10th percentile	−0.1335	−0.0746	−0.2326	−0.5702
20th percentile	−0.0638	−0.0191	−0.0472	−0.3379
30th percentile	−0.0125	0.0319	0.0116	−0.1374
40th percentile	0.0475	0.1181	0.0717	−0.0522
Median	0.1158	0.1513	0.1323	0.0628
60th percentile	0.1529	0.2395	0.1683	0.2095
70th percentile	0.1982	0.3010	0.1981	0.3307
80th percentile	0.2986	0.3180	0.2923	0.6006
90th percentile	0.4569	0.5027	0.4151	0.9423

This table presents the alpha distributions from Model 3 with the NAREIT index as the real estate factor as well as the alphas from the flex regression. The second and third columns are from Table 2 and are repeated here for comparison purposes. The fourth and fifth columns represent the alphas from the flex regression using WRES as the REIT index. Column four is the distribution over all funds and column five is the distribution over time. Note that the averages in columns four and five are not equal because of the different number of funds at each point in time. This is illustrated in Figure 1. All numbers are in % per month.

The effect of the time-varying regression estimates can be seen very clearly in Figure 3, which shows the monthly, cross-sectional average alpha from the flex regression vs. returns on the National Real Estate Index (NREI), an index of the returns from real estate transactions in the U.S.[16] Almost all of the positive alphas occur during the period from the beginning of 1990 to the end of 1993—a period when real estate returns were generally low—very strongly suggesting that positive performance in these funds occurs primarily in down markets. This result can at least partially explain the lack of persistence in our earlier results. Portfolio managers with superior skill are best able to achieve abnormal positive performance only in certain market settings; by forming portfolios over longer periods that include both good and bad markets, this better performance is masked.

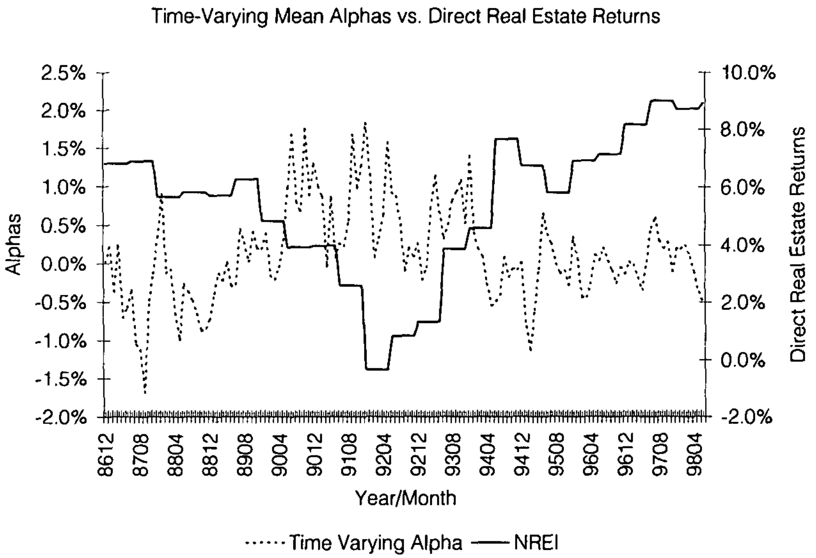
Another possible explanation for the pattern in the time-varying alphas is conditions in the credit market. In particular, during the early 1990s, banks reduced their lending to corporations in general, and to real estate firms especially.[17] To test this conjecture, we use two proxies for conditions in the credit market from Basic Economics.[18] These proxies are the basic variables used in the empirical

[16]The NREI is a transactions-based index of real estate. It includes the transactions of REITs and REOCs. The index, which began in 1986, reports prices and cash flow on a quarterly basis. Prior to 1993, prices and cash flow were reported on a semi-annual basis. Currently, CB Richard Ellis is the publisher of the index. The index attempts to keep quality constant by tracking only those commercial real estate transactions that have certain property characteristics. In constructing the price index, the average prices from over 65 metropolitan areas in North America are weighted by the property stock in local markets in the office, warehouse, retail, and apartment sectors using regional and local market property stock weights from the F.W. Dodge building stock database.

[17]See Berger and Udell (1994), (1998) for discussion of the credit crunch and associated empirical tests.

[18]Basic Economics is an economic database maintained by DRI/McGraw Hill. It contains economic indices such as the CPI, most of which are released by various federal agencies.

FIGURE 3
Alphas and REIT Returns



This exhibit shows the time-varying alphas (left axis) and the monthly returns on the NREI index over the observation period.

analysis of the credit crunch in Berger and Udell (1994), (1998). They are in billions of dollars outstanding as of the middle of our time period (December 31, 1992) and are defined as: FCLCI (Commercial and industrial (C&I) loans outstanding); FCLRE (the subset of C&I loans made to real estate).[19]

However, the proxies are uncorrelated with the time series of average alphas from the flexible regression. Table 8 shows the correlation matrix of the time-varying alphas, the NREI Index, the S&P 500, three REIT indices, and the variables used by Berger and Udell. It is clear that the time-varying alphas are related to the NREI index, but not to any other variable. The correlations are low with every variable but NREI. The commercial loan variables are positively related to NREI, but they have a low correlation with time-varying alphas.

Any linear combination of these variables will show the same result. Panel B shows there are three eigenvalues of this matrix greater than 1.0 explaining 86% of the variation in the matrix. The fourth eigenvalue explains an additional 7.6% of the matrix, indicating that there are no more than four factors in the matrix. It is common in factor analysis to choose the number of factors equal to the number of eigenvalues greater than one. Panel C shows the loading (with orthogonal rotation) of a three-factor Maximum Likelihood Factor analysis. Naming factors is

[19]Since these series are level data, i.e., the amount of C&I loans at the end of some period, we calculate an estimate of the net flow (amount of new C&I loan volume) by taking first differences and also percentage changes. The first difference is approximately new loans issued minus loans repaid. None of our results materially changed with the flow measures so we report the level data for brevity.

TABLE 8

Analysis of Time-Varying Alphas

Panel A. Correlations

	Time-Varying Alpha	S&P 500	WRES	WREIT	NAREIT	FCLCI	FCLRE
S&P 500	0.0194	1					
WRES	−0.0381	0.5957	1				
WREIT	0.0654	0.5206	0.9622	1			
NAREIT	0.1626	0.5412	0.9301	0.9625	1		
FCLCI	−0.0438	0.1369	0.0778	0.0811	0.0971	1	
FCLRE	0.1384	0.0960	0.0940	0.1071	0.1562	0.8518	1
NREI	−0.4885	0.0804	0.0859	0.0400	−0.0080	0.5710	0.3636

Panel B. Eigenvalues of Correlation Matrix

	1	2	3	4	5	6	7	8
Eigenvalue	3.384	2.182	1.322	0.605	0.327	0.112	0.046	0.023
% of variability	0.423	0.273	0.165	0.076	0.041	0.014	0.006	0.003
Cumulative %	0.423	0.696	0.861	0.937	0.977	0.991	0.997	1.000

Panel C. Three-Factor Analysis of Correlation Matrix

Var./Factors	1	2	3	Commonalties
Time-Varying Alpha	0.058	−0.230	0.848	0.776
NREI	0.149	0.631	−0.413	0.591
S&P 500	0.568	−0.037	−0.040	0.325
WRES	0.969	−0.178	−0.154	0.995
WREIT	0.953	−0.195	−0.040	0.948
NAREIT	0.953	−0.193	0.076	0.952
FCLCI	0.290	0.963	0.190	1.048
FCLRE	0.278	0.733	0.343	0.732

This table presents the correlation of the average monthly flex alpha with possible explanatory variables. The variables are the average time-varying alpha, S&P 500, the three indices of REITS (WRES, WREIT, and NAREIT), two commercial loan variables: FCLCI is C&I loans at all commercial banks and FCLRE is real estate loans at commercial banks.

always subjective, but it seems clear that the first factor is closely associated with the REIT indices and the S&P 500; essentially this is a stock market factor. The second factor is associated with NREI and the commercial loan variables. The third factor is the time-varying alpha and NREI (with a negative coefficient). We conclude that the time-varying alphas represent the result of active management and not the effect of credit supply variables.

D. Cross-Sectional Determinants of Performance

The alphas presented in Tables 2 to 7 are intercepts from various regression models. They should measure performance over standard benchmarks, but intercepts capture the average effect of many types of model misspecification. To determine whether these intercepts are actually capturing the excess returns of these funds, we regress these numbers against reasonable determinants of performance.

Alphas should be positively related to the size of the fund, since larger funds can pay more for information and can negotiate lower transactions costs. Alphas should be positively related to the expense ratio for the same reason, but Ippolito (1992) and Sirri and Tufano (1998) suggest that expense ratios are agency costs that drag down the performance of the fund. Turnover is similar to expenses. If managers, on average, have information, then the more the fund turns over, the better the performance, since management buys and sells REITs because they are either under- or over-valued. However, turnover generates transactions costs and soft dollars, which are a means of keeping expenses out of the expense ratio. If management has no information and wants to generate fees, turnover will be negatively associated with performance. The age of the fund should be positively associated with performance, since the longer the fund is in existence, the more experience management has in gaining information about real estate. Institutional holdings should also be positively associated with alpha since institutional investors presumably are more sophisticated than individual investors. Finally, we use dummy variables for passively managed funds and funds that have a high percentage of non-U.S. assets.

Table 9 defines the variables and presents their correlations with the OLS and the flex regression alphas. The correlations from the two techniques are very similar. The strongest positive correlations are with asset size and turnover. The strongest negative correlations are with global funds.

TABLE 9

Cross-Sectional Variables

Variable	Definition	Mean	Standard Deviation	Correlation with Jensen's Alpha from Model 3 with WRES Index	Correlation with Flex Regression Alpha
FLOAD	Maximum load	1.796	0.00257	−0.225	−0.181
EXP	Percentage of assets charged as expenses	1.261	2.443	−0.252	−0.258
E12B1	12B1 expenses	0.121	0.133	−0.072	−0.049
LNASSETS	Logarithm of total assets (in millions)	4.000	1.753	0.459	0.302
LNAGE	Logarithm of the number of months fund has been in existence	3.595	0.647	−0.174	−0.069
TURNOVER	% of $−volume sold in last year	66.603	60.892	0.353	0.345
PASSIVE	A dummy variable with 1 indicating funds that are passively managed	0.0682	0.255	−0.296	−0.048
GLOBAL	A dummy variable with 1 indicating funds that are global	0.0682	0.255	−0.428	−0.418
PCTINST	% institutional holding	0.296	0.442	0.024	0.098

This table defines and gives the basic characteristics of the variables used in the cross-sectional regressions on the performance variables. The last two columns represent the correlations with Jensen's alpha from Model 3 with WRES index and the alphas from the flexible regression. Data on fund characteristics are from *Morningstar.*

In Table 10, for the OLS alphas, three of the independent variables are significant at the 0.01 level: LNASSETS, indicating that larger funds have higher average alpha; TURNOVER, indicating that more active funds have higher alphas; and PASSIVE, a dummy variable for funds reporting a passive management style, which also indicates that more active funds have a higher alpha. The coefficient on the dummy variable indicating funds focusing on global real estate is negative and significant at the 0.034 level. The results for the flex regression are very similar, although the overall fit is inferior. This is not surprising given that the OLS alphas are averages of time-varying alphas and betas, and the variables in Table 10 are defined at the end of the sample. In this regression, only the coefficients on global funds and on turnover are significant, with the same interpretation as for the OLS alphas.

TABLE 10

Cross-Sectional Regression Results

Variable	Jensen's Alpha Estimate ($\times 10^{-2}$)	t-Value	Significance	Flexible Regression Estimate ($\times 10^{-2}$)	t-Value	Significance
EXP	−0.0950	−1.282	0.208	−0.0837	−1.129	0.267
LNASSETS	0.0562	3.190	0.003	0.0401	1.758	0.087
LNAGE	−0.0812	−1.490	0.145	−0.0181	−0.3173	0.753
TURNOVER	0.0015	3.154	0.003	0.0015	3.485	0.001
PASSIVE	−0.2396	−3.481	0.001	−0.1551	−1.985	0.055
GLOBAL	−0.2986	−2.209	0.034	−0.3729	−3.652	0.001
PCTINST	0.0021	0.0314	0.975	0.0237	0.3944	0.696
Constant	0.2953	1.34	0.189	0.1230	0.5800	0.566
R^2 (adj.)	48.78			38.72		

This table presents the cross-sectional regressions on the performance variables using Jensen's alpha and the alphas from the flex regression. All regressions are run with 44 observations.

It is worth noting that previous studies have found contrasting results when equity mutual funds as a whole are examined. Carhart (1997b) finds that expenses and turnover are negatively related to alphas. Malkiel (1995) finds no relationship between alpha and the advisory part of the expense ratio, but a negative relationship between alpha and the non-advisory part of the expense ratio.[20]

It is clear from Table 10 that the intercepts from the time-series regressions of Tables 2–7 are very probably capturing the value-added of the fund. The statistical problems of the models are unlikely to vary positively with LNASSETS and TURNOVER, and negatively with PASSIVE and GLOBAL.

V. Conclusions

Our analysis has focused on a specialized class of mutual funds, real estate investment trust funds. These funds should only exist if REIT fund mangers have superior ability to select REITs or to time movements in the real estate market. Otherwise, the existence of these funds is evidence of agency costs. Our investigation provides evidence that REIT mutual fund managers can add value by active portfolio management. The empirical work shows that, contrary to most other mutual fund studies, the average and median alphas (net of expenses) are positive and significant using the standard benchmarks from previous mutual fund studies. This finding is not sensitive to the type of equity return-generating process

[20]Our data do not allow us to split the expense ratio into the advisory and non-advisory components.

assumed, but it is sensitive to the time period over which the standard estimation is employed. We find that the tests of persistence used in the previous literature yield zero or positive alphas depending on the benchmark employed, in contrast to previous studies, which have found negative profits. When we used a statistical model to endogenously capture the time variation in conditional expectations, we find that the average alpha is again significant.

We find evidence that managers add value when the returns from real estate are poor. The manager alphas are negatively related to the returns on real estate and do not appear to be linearly related to variables representing commercial loan activity or the returns on REITs.

Recognizing that alphas are intercepts of regression models and, thus, contain many of the sins of a regression model, we specify a cross-sectional regression model to determine if the variation across funds is determined by variables that represent informational advantages of managers or agency costs of managers. Unlike previous studies, we find that actively managed funds have higher alphas than passive funds, turnover is positively related to the alpha of the fund, expenses are not significantly related to the alpha, and, the larger the fund, the higher the alpha. Our conclusion is that, for the time period studied, managers of funds of REITs appear to have produced an incremental annual return of about 2% over passive strategies.

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