Real Estate Opportunity Funds

Past performance as an indicator of subsequent fund performance.

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Real estate opportunity funds (also known as opportunistic funds) are an investment option for institutional and high net worth investors that emerged in force starting in the early 1990s. These private equity funds invest in real estate with a high risk-high return profile, often focusing on development or turnaround properties. Opportunity funds have been one of the fastest-growing segments of the real estate investment industry in the past decade, with equity commitments growing from less than $5 billion in 1993 to over $100 billion ten years later (according to "Real Estate Opportunity Funds" [2003]).

Only now are these funds starting to build a significant track record that can be analyzed quantitatively. Although return targets have fallen from the 20%+ range in the early days to the 15%-20% range today, both the number of funds and the amount of capital invested are increasing. There are over 150 fund general partners, and capital commitments to individual funds have risen from an average fund size of $293 million in 1994 to $577 million in 2000 (see "Opportunistic Investing" [2002]).

With high return expectations, fund investments tend to be in assets allowing the manager to actively increase value in a short time and then resell the asset. Holding periods for typical assets tend to be from two to four years (see McGurk [2002]). The majority of return from opportunity funds comes from appreciation over a short time, as distinguished from the income-based return of core real estate. Because of the focus on high returns, managers tend to be "'traders' and 'value-

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enhancers' as opposed to 'operators,' frequently pursuing event-driven assets."[1]

Fund structures provide managers with the flexibility and discretion to pursue such assets—capital is committed for the life of the fund, and investors have little or no control over when capital is returned—and management fees are usually structured to provide fund managers with performance incentives.

While performance persistence in other investment vehicles has been thoroughly investigated, it has not been studied so far in real estate opportunity funds. This article is a first attempt to fill that void.

The question of investment performance persistence across funds launched by the same fund manager is important, because opportunity funds rely heavily on the skill and expertise of the fund managers and on the incentives they face. The nature of fund performance persistence across sequential funds is an important dimension of, and indicator of, such management performance. Like private venture capital funds, real estate opportunity funds are closed to further outside investment once their capital targets are met, so the only way for subsequent investors to benefit from or to reject a manager is to invest or refuse to invest in a subsequent fund.

We investigate the correlation between the performance of opportunity funds launched by the same manager, using statistical tests similar to those that have been used to examine mutual funds and hedge funds. Data provided by Pension Consulting Alliance, Inc., an investment consulting firm that has been compiling and tracking the performance of these funds for some time, cover the period 1991 through 2001.

BACKGROUND

Studies of performance persistence have focused mainly on mutual funds or hedge funds. There is a scanty literature on performance persistence in vehicles such as private equity funds, which have characteristics more similar to real estate opportunity funds. Kaplan and Schoar [2005] report findings that private equity fund performance persists across subsequent funds with a tendency to revert toward the mean. Overall, studies of mutual fund performance generally find evidence of serial performance correlation, while evidence of performance persistence in hedge funds is more mixed.[2]

The research suggests two points: first, that the theoretical expectation of zero persistence in a perfectly efficient market is frequently contradicted by the evidence; and second, that the form or pattern of persistence is not simple or constant across investment settings.

Although mutual funds and the markets in which they trade differ significantly from real estate opportunity funds, several of the tests used in these studies are appropriate for investigating persistence in private real estate funds, with some appropriate modifications. Our approach builds on the testing methods used for other asset classes to present evidence about persistence in real estate opportunity funds.

DATA

Pension Consulting Alliance conducts a survey of general partners operating in the opportunistic range of real estate funds. The surveys focus on industry returns, particularly internal rates of return (IRR), and on other factors of interest such as construction investment and leverage. Our data set consists of 43 managers with 110 funds started between 1991 and 2001. Of the 43 managers, 24 had more than one fund. (A manager is considered to be the sponsoring firm rather than an individual person or corporate officer.)[3]

Fund performance in this study is based on achieved internal rates of return. IRRs are the most appropriate measure of returns to opportunity funds because the fund manager controls the timing of investments into a fund, (capital flow), and because there are technical and measurement difficulties with the classic time-weighted return (TWR) measure used in securities performance measurement (e.g., lack of regular periodic marking to market of asset values, and a so-called J curve effect that occurs at the beginning of the fund life). Analysis uses both gross (before management fees) and net (after fees) IRRs, although PCA indicates less confidence in the net returns, due to variation among managers in calculating net returns.

A number of limitations on the data should be noted at the outset. The first is that very few of the funds have fully liquidated. While IRRs for fully liquidated funds represent definitive ex post historical returns, the IRRs reported for funds still in existence reflect not only the performance of completed (liquidated) investments within the funds, but also the managers' valuation of the residual assets remaining in the funds as of the end of the data history.[4]

It is also important to emphasize that opportunistic real estate private equity funds are less liquid than mutual funds. With no continuous exchange mechanism such as a stock market, it is impossible to calculate a daily, weekly, or annual return based on daily trading or net asset value.

With no market valuation for a fund during its life, a single IRR based on contributions and distributions is calculated for the life of the fund. Thus, while our tests resemble those used in the mutual fund-based literature, we have only one return data point for each fund, unlike the many data points used to calculate a series of time-weighted returns for a single mutual fund based on its trading history.

Exhibits 1 and 2 describe the average fund IRR by vintage year, illustrating the decline of achieved or reported returns from the early through the late 1990s. Of all the funds included in the database, only 48, or 44% of the 110 funds, achieved net returns exceeding 15%. Only 28, or 25% of the funds, achieved net returns exceeding 20%. Funds in the 1991–1997 cohorts were more successful in reaching their targeted return; 28, or 61% of the 46 funds, achieved a net IRR exceeding 15%, while 15 funds (33%) returned in excess of 20% net. Histograms constructed of opportunity fund returns indicate that returns are approximately normally distributed.

METHODOLOGY

The measure of investment performance we use is the relative performance within each fund's vintage-year cohort, based on the funds' achieved IRRs since inception through the time of our survey (2001), or the date of fund liquidation if earlier. The question is whether there is persistence in relative performance across subsequent funds issued by the same manager.

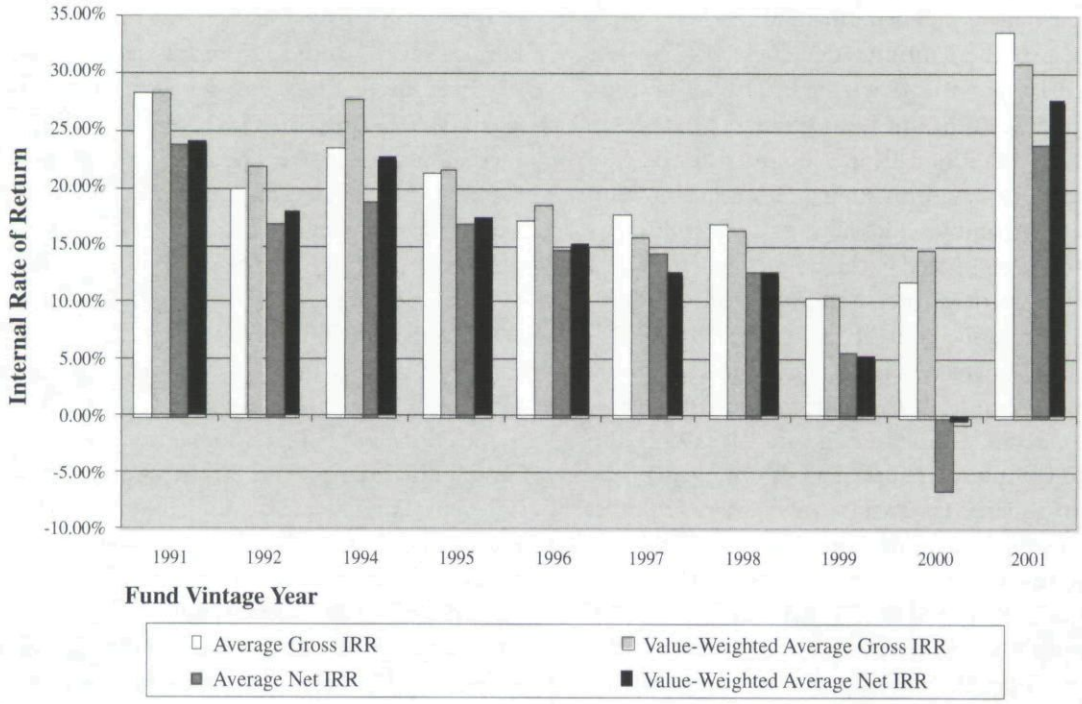
The entire analysis is replicated both for all funds and

EXHIBIT 1
Summary of Returns 1991–2001

Vintage Year	Value-Weighted Arithmetic Average Gross	Value-Weighted Arithmetic Average Net	Arithmetic Average Gross	Arithmetic Average Net
1991	28.30%	24.03%	28.30%	24.03%
1992	21.87%	17.89%	20.02%	16.97%
1994	27.90%	22.64%	23.53%	18.96%
1995	21.72%	17.26%	21.42%	17.06%
1996	18.56%	15.14%	17.30%	14.74%
1997	15.82%	12.61%	17.66%	14.51%
1998	16.27%	12.49%	16.99%	12.84%
1999*	10.45%	5.33%	10.59%	5.76%
2000	14.72%	-0.56%	11.87%	-6.53%
2001	30.95%	27.57%	33.77%	24.02%
Averages	20.66%	15.44%	20.15%	14.24%

**Return numbers exclude those of one fund with reported gross IRR over 2000%.*

EXHIBIT 2
Returns to Opportunity Funds 1991–2001



separately for a subsample of only those funds originated in the years 1991–1997. Although the 1991–1997 subsample is smaller, funds established prior to 1997 are more likely to have completed or to be reaching the end of their life cycle, and thus have more definitive return numbers based almost entirely on liquidated investments. Tests are performed based on both net and gross IRR for each fund. The difference reflects the effect of manager fees.

To permit comparison of fund performance across different vintage years (i.e., different inception dates), fund performance is ranked within each vintage-year cohort, and subsequently normalized to a zero-one scale. Fund performance is then analyzed on the basis of normalized ranking rather than on absolute performance or performance relative to a benchmark.[5]

The null hypothesis is that there is no relationship between the performance of a manager's past funds and that manager's later funds. (This is based on the efficient markets hypothesis.) The statistical tests are set up in the typical manner, to make it relatively difficult to disprove the null hypothesis. That is, statistically significant findings are equated with a low probability (typically 1%, 5%, or 10%) that we could observe the given empirical data if the null hypothesis were true.

As in the mutual fund literature, the primary statistical methods we use to test the null hypothesis are nonparametric tests. Four such tests are performed, two based on contingency tables and two based on rank correlation. A parametric test, a regression of fund performance on past fund performance, is also performed.

Consider first the contingency table test. This test is derived from Brown and Goetzmann [1995], and has been used in many studies of performance persistence. Pairs of funds are identified from sequential funds, and sorted into a matrix based on their rankings: win/win, win/lose, lose/win, and lose/lose.[6]

The matrix is compared to the frequency that would be expected if fund performance were independent of previous fund performance (i.e., if there were no persistence), and a chi-square test is then used to determine whether the deviation from the expected distribution is statistically significant. Carpenter and Lynch [1999] find this a strong test of performance persistence even in the presence of attrition bias (also known as survivorship bias, or the tendency of failing funds to drop out of a database).

A second test using contingency tables is the cross-product ratio test, also used by Brown and Goetzmann [1995]. In the case of no performance correlation, the expected ratio is one; the ratio can be tested statistically by calculating a z-statistic (see Kat and Menexe [2002]).[7]

Two rank correlation tests are used. In both cases, coefficients will have values between –1 and 1, with a value near zero indicating a lack of association. The null hypothesis of no association between fund rankings is then tested according to a t-statistic. The first rank correlation test is the Spearman rank correlation coefficient, or ρ. Pairs of funds are identified, as in the contingency tables, and the ranks of each pair are compared (see Sprent and Smeeton [1993, p. 243]). The second rank correlation test is Kendall's tau (see Gibbons [1993, p. 15] and Chen and Popovich [2002, p. 84]).

Besides non-parametric tests, we also perform regression analyses, testing for a relationship between the performance of a fund and the performance of a previous fund or funds. Additional regression analysis tests for relationships between fund performance and fund characteristics such as a previous fund, or parent company focus, fund size, and vintage year.

RESULTS AND ANALYSIS

We describe contingency table, rank correlation, and regression analysis results separately.

Contingency Tables

We construct contingency tables using pairs of funds from managers with more than one fund. Using all funds results in 68 pairs; restricting the funds to those started between 1991 and 1997 results in 23 pairs. The initial matrices divide funds into win/win, win/lose, lose/win, and lose/lose quadrants on the basis of above- or below-median performance. The null hypothesis is that the first ranking and second ranking are unrelated, giving an expected frequency in each cell of the matrix of one-quarter of the total number of pairs.

Exhibit 3 presents the results and the expected frequencies of distribution as an illustration of the table construction and analysis. A summary of all contingency table results appears in Exhibit 4.

Our results clearly identify a relationship between fund performance and subsequent fund performance. The chi-square statistic for all years and gross returns indicates only a 0.34% chance of obtaining the distribution seen if the rankings were in fact independent. For the period 1991–1997, there would be less than a 3% chance of the observed distribution if performance were truly independent. Interestingly, the lose-lose cell far outweighs

EXHIBIT 3

Contingency Tables: "Win" Equal to Above-Median Performance

Division by Median—All Fund Years
Observed Frequencies

GROSS

	W	L
W	19	11
L	12	26

NET

	W	L
W	20	10
L	12	26

Expected Frequencies

	W	L
W	17.00	17.00
L	17.00	17.00

Chi-squared: Gross 0.003383
Net 0.001897

Division by Median—1991–1997
Observed Frequencies

GROSS

	W	L
W	6	3
L	4	10

NET

	W	L
W	6	3
L	4	10

Expected Frequencies

	W	L
W	5.75	5.75
L	5.75	5.75

Chi-squared: Gross 0.025347
Net 0.025347

Chi-square statistics indicate probability of null hypothesis (expected frequencies).

EXHIBIT 4

Summary of Contingency Tables and Cross-Product Ratios

Vintage Years	Definition of "Winning" Peformance	IRR Measure	Chi-Squared (prob)*	Cross-Product Ratio	z-stat	Significance*
1991–2001	Above Median	Gross	0.0034	3.74	2.562	0.5%
		Net	0.0019	4.33	2.813	0.2%
1991–1997	Above Median	Gross	0.0253	5.00	1.746	4%
		Net	0.0253	5.00	1.746	4%
1991–2001	Top Third	Gross	0.0764	2.45	1.605	5%
		Net	0.1901	1.79	1.044	15%
1991–2001	Top Quartile	Gross	0.0025	6.85	2.851	0.2%
		Net	0.0829	2.87	1.663	5%
1991–2001	Above Median, using Average of Previous Funds	Gross	0.0075	2.08	1.475	7%
		Net	0.0066	2.39	1.736	4%
1991–1997	Above Median, using Average of Previous Funds	Gross	0.1245	2.00	0.828	20%
		Net	0.1245	2.00	0.828	20%

**Probability of observing the actual empirical results, given that the null hypothesis of no persistence (equal contingencies) is true. Low percentage implies greater statistical significance.*

the win-win cell, suggesting that persistence in underperformance may be stronger than in overperformance.

Because fund performance may not be known until several years after inception, and because investors may seek to identify a narrower range of manager performance, we construct additional contingency tables: 1) defining a win as a ranking in the top third or top quartile of funds, and 2) defining previous firm performance as the *average* normalized rank of *all* the manager's previous funds. Again, the results show a clear relationship between prior returns and subsequent funds, with confidence levels approximating 90%.[8]

Cross-product ratios, calculated per Brown and Goetzmann [1995], are consistent with the chi-squared statistics obtained from the contingency tables. The null hypothesis of no correlation can be rejected in nine cases at a 90% confidence level or higher. The weakest indication of correlation between fund performance and average previous returns is in the 1991-1997 period.

In summary, the contingency tables and cross-product ratios indicate strong performance persistence based on division by above- or below-median performance, as

EXHIBIT 5
Summary of Spearman Rank Correlation Coefficients

Vintage Years	Method	Pairs of Variables	IRR Measure	r_s	t-statistic	Significance*
1991–2001	Normalized rank	68	Gross	0.465	7.11	0.00%
			Net	0.413	5.76	0.00%
1991–1997	Normalized rank	23	Gross	0.527	5.22	0.00%
			Net	0.445	3.76	0.12%
1991–2001	Average normalized rank	68	Gross	0.310	3.68	0.05%
			Net	0.256	2.82	0.64%
1991–1997	Average normalized rank	25	Gross	0.369	2.87	0.87%
			Net	0.300	2.10	4.73%
1991–2001	5-year lagged rank	13	Gross	-0.651	-1.37	19.92%
			Net	-0.474	-1.11	28.91%
1991–2001	Average 5-yr lagged rank	13	Gross	-0.517	-1.18	26.30%
			Net	-0.330	-0.86	40.87%

** Probability of observing the actual empirical results, given that the null hypothesis of zero serial correlation is true. Low percentage implies greater significance.*

EXHIBIT 6
Summary of Kendall's Tau

Vintage Years	Method	Pairs of Variables	IRR Measure	t_k	t_b	t-stat	Significance*
1991-2001	Normalized rank	68	Gross	0.238	0.245	2.997	0.38%
			Net	0.209	0.211	2.586	1%
1991-1997	Normalized rank	23	Gross	0.117	0.119	0.836	41%
			Net	0.107	0.110	0.769	45%

** Probability of observing the actual empirical results given that the null hypothesis of zero serial correlation is true. Low percentage implies greater significance.*

well as based on average past ranking, top quartile, or top third ranking.

Rank Correlation Statistics

Tests of rank correlation also indicate a relationship between previous and subsequent manager performance. The Spearman rank statistic is calculated first using the normalized rank of a manager's fund as the first variable and the normalized rank of the manager's next fund as the second variable. Our results indicate a strong correlation. The null hypothesis of no persistence can be rejected at a 99% confidence level for both the entire data set and for the 1991–1997 data (*see Exhibit 5*).

Repeating the test using the average normalized rank of all a manager's previous funds as the first variable and the normalized rank of the manager's next fund as the second variable, the calculated coefficients again indicate a strong correlation. The null hypothesis of no persistence can be rejected with at least 95% confidence for both the full data set and for the 1991–1997 period.

In a final series, a somewhat different hypothesis is tested. We look at the relationship not between subsequent funds, but between funds separated by at least five years between inception dates. The coefficients calculated using these five-year lagged rankings are found to be of the opposite sign (suggesting a reversal of performance), although these findings lack statistical significance.

The other statistical test of rank correlation considered is Kendall's tau. Results from the entire data set are strongly significant, and the null hypothesis of no correlation between rankings can be rejected with 99% confidence. For the 1991–1997 subsample, the coefficients are not statistically significant (although they are of the correct sign to indicate persistence; see Exhibit 6).

For the entire data set, these results are consistent

EXHIBIT 7
Summary of Regression Analyses

	All Years				1991-1997			
	Gross		Net		Gross		Net	
Model	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
Fund Ranking on Previous Fund Ranking $NR = \alpha + \beta LR$								
Observations	68				23			
Adjusted R^2	0.2045		0.1458		0.2441		0.1435	
β	**0.4939**	4.2686	**0.4145**	3.5260	**0.5296**	2.8469	**0.4055**	2.1650
Intercept α	**0.2462**	3.7502	**0.2799**	4.0912	**0.2383**	2.2443	**0.2932**	2.6743
Fund Ranking on Average of Previous Rankings $NR = \alpha + \beta AR$								
Observations	68				25			
Adjusted R^2	0.0869		0.0385		0.0912		0.0148	
β	**0.3835**	2.7162	*0.2805*	1.9185	*0.3733*	1.8459	0.2420	
Intercept α	**0.2967**	3.7535	**0.3467**	4.1937	**0.3084**	2.9026	**0.3664**	3.3207
Fund Ranking on Two Previous Fund Rankings $NR = \alpha + \beta LR + \delta LLR$								
Observations	41				11			
Adjusted R^2	0.1628		0.1557		0.2895		0.2363	
β	**0.5716**	3.0795	**0.5216**	2.9100	*0.7876*	2.0565	0.4913	1.4002
δ	-0.1852	-1.0799	*-0.2821*	-1.7069	*-0.6807*	-2.1167	*-0.7260*	-2.1118
Intercept α	**0.2980**	2.9176	**0.3583**	3.2120	*0.4074*	2.0040	**0.5628**	2.6471
Fund Ranking on 5-Year Lagged Ranking $NR = \alpha + \beta LR$								
Observations	13							
Adjusted R^2	0.5072		0.2613					
β	**-0.6770**	-3.6537	**-0.5395**	-2.2899				
Intercept α	**0.8232**	7.0999	**0.7887**	5.0738				

Note: Coefficients in bold face are statistically significant at 95% or greater confidence. Coefficients in italics are statistically significant at 90% or greater confidence.

with the results based on the Spearman rank correlation coefficient and on the contingency tables. For the 1991–1997 subsample, these results are weaker than the earlier results.[9]

Regression Analyses

The regression analysis allows us to obtain the type of additional insights that a parametric model can provide. We test for persistence through several different regression models. First, we regress the investment performance ranks of funds on the investment performance ranks of one or more earlier funds by the same manager. We also regress fund performance on that of funds launched at least five years earlier by the same manager. And we regress fund performance rank onto the average rank of all a manager's previous funds.

The formula estimated takes the form:

$$NR = \alpha + \beta(LR) \; [+ \delta(AR)] \; [+ \delta(LLR)]$$

where NR is the fund's normalized rank, LR is the lagged rank from the appropriate prior fund (immediate preceding, or five years previous), AR is the average rank of all previous funds of the manager, and LLR represents the rank of an additional earlier fund by the same manager. As with the non-parametric tests, the regressions are run on the entire data set and again for the period 1991–1997, using investment performance rank based on both net and gross returns. The results are in Exhibit 7.

The regression results are broadly consistent with the findings from the non-parametric tests, but they add nuance to those results. The regression results are strongly statistically significant—the null hypothesis can be rejected with 90% to 99% confidence for all the analyses (with the one exception of the effect of *average* previous fund per-

formance based on the *net* returns for the 1991–1997 subsample).

The adjusted R-square statistics are somewhat mixed, but in the basic regression of the gross returns ranking on that of the previous fund, some 20%-24% of the variation in the data is explained by the model. The coefficient on the immediately previous fund is strongly positive for all the tests, confirming our basic persistence finding. The coefficient is also positive on the average of all previous fund performance by the same manager, although lacking statistical significance in the net return on the smaller 1991-1997 subsample.

The size of the alpha and beta coefficients suggests a reversion to the median phenomenon. That is, if a manager's fund exceeds the median, a subsequent fund will also tend to exceed the median of its cohort but by a smaller degree (smaller normalized rank difference). Symmetrically, if the first fund falls below the median, the manager's subsequent fund is also likely to fall below the median but closer to the median than the first fund.

Interestingly, the coefficient on the five-year lagged ranking is negative in all cases, suggesting a rank-reversal phenomenon across the five-year interval. That is, managers who remain in the business after five years tend to have funds that are performing in a different direction from their earlier funds (the leaders tend to become followers, and followers tend to become leaders).

Somewhat the same type of phenomenon is indicated by the negative sign on the twice-back fund performance (the LLR coefficient, δ). In other words, a manager's second fund tends to perform in the same relative manner as its first fund (albeit less so), but its third fund (if there is one) tends to reverse the first fund's relative performance.

Possible explanations of these longer-run performance phenomena may be that manager performance is not persistent over longer periods, or that managers pursue a consistent strategy that is successful only at certain times in the market cycle. Also, the effect of survivorship in the market, and the learning process, may be at work. Managers who at first perform poorly must learn and improve, or they will not survive in the marketplace. On the other hand, managers who at first do particularly well may find it difficult to repeat such relative performance over the long run as competitors copy their success, and it becomes more difficult to find the same kinds of opportunistic investments as the supply becomes exhausted or prices are bid up.

Yet another consideration is that successful investment professionals may tend to leave an employer after two good rounds and start something on their own or get hired by a competitor.

In general, the type of mean-reversion and rank-reversal found in the regression analyses suggests a marketplace that is operating fairly effectively over the long run. While the underlying private real estate market (and the even less liquid private funds studied here) may lack the kind of perfect efficiency and transparency that would tend to eliminate performance persistence in the short run, over the longer run market forces and learning may have a stronger effect.

Regression analyses are also performed to analyze the effect of fund characteristics on relative investment performance. In this regard, the findings are generally negative. Neither fund size, the amount of capital raised in the inception year of a fund, nor geographic focus is found to have a statistically significant relationship to relative investment performance.

Interestingly, analysis that regresses fund performance on a dummy variable indicating whether real estate is the primary investment focus of the fund manager's parent company finds that a real estate focus has a positive association with fund performance that is statistically significant at the 10% level. When analyzed in combination with a variable for previous fund return, however, the coefficient on the real estate-focused variable is not significant, although it remains positively signed.

CONCLUSION

For real estate opportunity funds, the performance of a manager's fund is an indicator of that manager's next fund's performance. Even using particularly stringent criteria to define success, such as performance in the top third or top quartile of funds of a vintage year, we find evidence of this type of performance persistence.

Our results indicate that performance of a manager's earlier fund may account for as much as 20%-24% of a next fund's ranking relative to its vintage year peers. Individual fund returns are more indicative of the next fund's performance than is the average performance of all of a manager's previous funds. Given that most of our data for this young industry apply to first and second funds, it may be that these findings apply in particular to such start-up situations.

For investors, the finding of return correlation may be tempered by the fact that performance is apparently less persistent when measured by IRR net of management fees than when measured on a gross IRR basis. This suggests

that fund managers benefit most from persistent above-average returns, and suffer most from persistent below-average returns. While this is consistent with incentive fee structures that provide managers performance incentives, it also underscores the need for investors to closely track fees and their impact on returns to ensure they as well as managers benefit from selecting managers with above-average returns.

Another inherent difficulty facing investors who hope to capitalize on performance persistence is the life cycle of real estate opportunity funds. With an expected investment commitment of five years or more, performance cannot be accurately measured until well into fund life, possibly after the next investment decision must be made.

It is interesting to note that our findings closely parallel the findings in Kaplan and Schoar [2005] for private equity funds. Both studies document strong evidence of persistence in fund performance by the same manager. While it is beyond the scope of our research to delve deeply into the question of why such persistence occurs, we can offer a few thoughts in closing.

It seems logical to assume that fund performance itself does not cause correlated subsequent fund performance. Rather, correlation must be an empirical proxy for factors or characteristics that persistently impact returns. We noted that some fund characteristics that one might think would influence performance were not found to do so, including fund size and geographic focus. But this leaves a variety of factors that could persistently influence performance. Quality of management and underwriting, transaction execution, consistency or flexibility in investment strategy, performance incentives, and attraction or retention of human capital are all obvious candidates. Access to deal flow may have momentum or "memory," as results become self-reinforcing.

In their study of private equity funds, Kaplan and Schoar [2005] suggest several such factors could be operating to cause persistence. In essence, fund managers are not simply passive external investors playing in a level playing field among homogeneous competitors. Rather, they represent scarce suppliers of valuable expertise in the selection and even in the operation of the underlying assets that fundamentally produce the subsequent performance. Whatever the factors determining the quality of real estate opportunity fund investment performance, their impact on a firm apparently persists for at least some time.

In this regard, it is interesting to note that the difference between our short-run findings (say, two consecutive funds) and longer-run findings (more than two consecutive funds), as indicated in our regression analyses, provides some perspective on why (and how) manager performance persistence occurs. It suggests that successful strategies become relatively more difficult to maintain over longer terms and more repetitions (at least in relative performance, as the competition learns from others' success), and that less successful strategies get weeded out, so that firms that are less successful at first but that survive over time learn to succeed. These types of results are consistent with a marketplace that functions pretty effectively, at least over the medium to long term.

With regard to persistent superior performance, it is clear that both the opportunity fund market itself and the direct property real estate market that provides the underlying assets in these funds lack the degree of transparency and information efficiency that would provide the type of firm entry, strategy replication, and trading arbitrage opportunities that are necessary for the type of market perfection that can rapidly eliminate persistent supernormal profitability.

Perhaps more surprising—and more troubling—is our finding that persistence prevails also on the down side. That firms can persist with subnormal performance raises questions about the economic rationality or incentive structure of the decision-making on the demand side of the market (that is, the capital suppliers or fund clients). This concern is mitigated by our longer-term findings regarding five-year lagged persistence and third fund results.

In any case, our results clearly suggest that manager selection among firms operating in the real estate opportunity fund industry is a critical factor in an investor's overall success. Evidence of performance persistence in these vehicles can at least begin to guide investors until further work clarifies why.

ENDNOTES

[1]See Linneman and Ross [2002, p. 8].

[2]For the first see Hedricks, Patel, and Zeckhauser [1993]; Goetzmann and Ibbotson [1994]; Brown and Goetzmann [1995]; Malkiel and [1995]; and Elton, Gruber, and Blake [1996]. For more mixed results, see Brown, Goetzmann, and Ibbotson [1998]; Agarwal and Naik [2001]; Bares, Gibson, and Gyger [2002]; Kat and Menexe [2002]; and Getmansky, Lo, and Makarov [2003].

[3]PCA gathered data from fund general partners by questionnaires and interviews. 55 firms representing 187 partnerships over 1988–2000 participated in the initial survey, reported in "Real Estate Opportunity Funds" [2001]. The second sur-

vey collected information from 51 firms and 255 funds for "Real Estate Opportunity Funds" [2003]. Manager and fund identity were masked to preserve confidentiality.

[4]Investors have noted inconsistency in reporting and measurement among opportunity fund managers (see "Real Estate Opportunity Funds" [2001] and Haskins [2003]). PCA investigated and confirmed return calculations where possible, using cash flow information provided by both general partners and investors. Thus, although terminal valuations remain dependent upon managers' valuations, the data reflect the highest level of consistency possible.

[5]For each group of funds with a common year of inception, each individual fund is ranked from 1 for highest to n for the lowest-performing fund according to the calculated IRR. Then, a normalized ranking (NR) with a value from 1 to 0 inclusive is calculated using:

$$NR = (n - r)/(n - 1)$$

where n = number of funds in the vintage year, and r = absolute rank of the fund. In vintage year 1991, there is only one fund in the data set; it is assigned a normalized rank of 0.5.

[6]Win is defined as a ranking in the top half (NR > 0.5), top third (NR > 0.66), or top quartile (NR > 0.75), depending on the analysis. In the few cases when a manager has more than one fund in a vintage year, the first variable for the next pair is defined as a win or lose by an average of the rankings for the preceding-year funds. If one manager has funds A, B, and C, in three subsequent years we form two consecutive pairs: A-B and B-C.

[7]The cross-product ratio is obtained by dividing the product of the win/win and lose/lose cells by the product of the win/lose and lose/win cells [(WW × LL)/(WL × LW)]. A z-statistic is equal to $\ln(CPR)/\delta_{\ln(CPR)}$, where the standard error of the natural log of the cross-product ratio, $\delta_{\ln(CPR)} = \sqrt{(1/WW + 1/WL + 1/LW + 1/LL)}$.

[8]For the table based on funds separated by at least five years, we did not have the five per cell necessary to perform a robust test, but it is interesting to note that observed frequencies in this matrix were weighted toward the win-win and win-lose cells, suggesting that only winning managers are afforded the opportunity to manage additional funds.

[9]The lack of statistical significance in the older subsample should be considered in light of the other findings in this study. Note that failure to reject a null hypothesis does not prove that the hypothesis is true. Classic statistical tests make it difficult to reject a null hypothesis when it is true, but they do not necessarily make it difficult to fail to reject the null hypothesis when it is in fact false.

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