Real Estate Opportunity Funds:
Past Fund Performance as an Indicator of Subsequent Fund Performance

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ABSTRACT

Real estate opportunity funds are one of the fastest growing segments of the real estate investment industry. The real estate equivalent of the private equity and "alternative investments" asset classes that seek high returns by taking on more risk in highly illiquid private investments, opportunity funds rely heavily on the skill and expertise of the fund managers. This article investigates an important dimension, and indicator, of management performance, by examining whether the investment performance of real estate opportunity funds displays persistence between subsequent funds launched by the same manager. Analytical tests similar to those used to analyze performance persistence in stock mutual funds and hedge funds suggest that relative performance in real estate opportunity funds is persistent for consecutive funds (both for "winners" and for "losers"). However, relative performance appears to be mean-reverting or even reversing over longer time spans between fund launchings. We find less persistence in returns net of management fees, which suggests that successful managers are able to effectively charge higher fees on subsequent funds, while less successful managers must charge lower fees (at least relative to the successful managers).

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I. Introduction

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 1990's.. These private equity funds invest in real estate with a high risk/high return profile, often focusing on development or 'turnaround' properties. They first appeared in the early 1990s, and have been one of the fastest growing segments of the real estate investment industry over the past decade, with equity commitments growing from less than $5 billion in 1993 to over $100 billion today.[1] 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 into the 15-20% range today, both the number of funds and the amount of capital invested are still increasing. There are over 150 fund general partners,[2] and capital commitments to individual funds have risen from an average fund size of $293 million in 1994 to $577 million in 2000.[3]

With high return expectations, fund investments tend to be in assets where the manager can actively increase value in a short time and then resell the asset: holding periods for typical assets tend to be two to four years.[4] The majority of return from opportunity funds comes from appreciation over a short period of time, rather than the income-based return of 'core' real estate. Because of the focus on high returns, managers tend to be "'traders' and 'value-enhancers' as opposed to 'operators', frequently pursuing event-driven assets."[5] 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 previously been studied in real estate opportunity funds. This

article is a first attempt to fill that void. The question of investment performance persistence across consecutive 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. Unlike stock mutual funds, but like private venture capital funds, real estate opportunity funds are closed to further external investment once their capital targets are met, so the only way for subsequent investors to participate in, or to reject, a manager is to invest, or refuse to invest, in a subsequent fund.

In this paper 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 in previous literature. Data was provided by Pension Consulting Alliance, Inc. ("PCA"), an investment consulting firm that has been compiling and tracking the performance of these funds for some time and covers the period 1991 to 2001.

II. Background

Studies of performance persistence have focused mainly on mutual funds, with a second body of work focused on hedge funds. The literature is scarce for performance persistence in vehicles such as private equity funds that have characteristics more similar to real estate opportunity funds. However, recently Kaplan and Schoar have reported findings that private equity fund performance persists across subsequent funds with a tendency to revert toward the mean.[6] Overall, studies of mutual fund performance generally find evidence of serial performance correlation[7], while evidence of performance persistence in hedge funds is more mixed.[8] 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. The remainder of this paper therefore builds on the testing methods used for other asset classes to present evidence about persistence in real estate opportunity funds.

III. Data

Data used in this study was provided by PCA, which in addition to providing advisory services for pension funds also provides research and reporting on investment topics. PCA 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 (IRRs), and on other factors of interest such as construction investment and leverage.[9] The data set we employ in this study consists of 43 managers with 110 funds started between 1991 and 2001.[10] 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.)

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 (capital flow) into the funds, and because there are technical and measurement difficulties with the classical time-weighted return (TWR) measure used in securities performance measurement (e.g., lack of regular periodic marking to market of asset values, and the so-called 'J curve' effect which occurs at the beginning of the fund life). Analysis was done using both gross (before management fees) and net (after fees) IRRs.[11]

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 are 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. [12]

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 NAV. With no market valuation for the fund during its life, a single IRR is calculated for the life of fund based on contributions and distributions. Thus, although the tests employed in this study are conceptually similar to those used in the previous mutual fund based literature, only one return data point exists for each fund, in contrast to the many data points used to calculate a series of time-weighted returns for a single mutual fund based on its trading history.

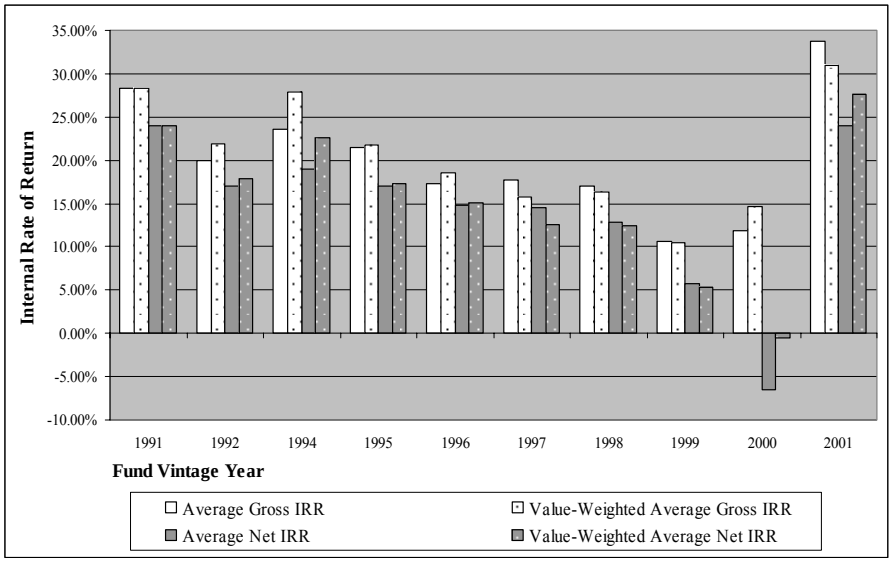
The data characteristics are described in depth in two reports issued by PCA.[13] Exhibits 1 and 2 describe the average fund IRRs by vintage year, illustrating the decline of achieved or reported returns from the early 1990's through the late 1990's. Of all the funds included in the database, only 48, or 44% of the 110 funds, achieved net returns exceeding 15%. Only 28, or 25% of the funds, achieved net returns exceeding 20%. Funds from the 1991 – 1997 cohorts were more successful in reaching their targeted return: 28, or 61% of the 46 funds from the period, achieved a net IRR in excess of 15%, while 15 funds (33%) returned in excess of 20% net. Histograms constructed of opportunity fund returns indicated that returns are approximately normally distributed.

Exhibit 1: Summary of Returns 1991 - 2001

Vintage Year	Value-Weighted Arithmetic Average Gross	Net	Arithmetic Average Gross	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 [1]	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%

[1] return numbers exclude those of one fund with reported gross IRR over 2000%.

Exhibit 2: Returns to Opportunity Funds 1991 – 2001



IV. Methodology

The measure of investment performance that we employ in this paper 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 date of fund liquidation if earlier). The question is whether there is persistence in such relative performance across subsequent funds issued by the same manager.[14] The entire analysis is replicated both for all funds and separately for a sub-sample consisting only of those funds originated in the years 1991 to 1997. Although the 1991 - 1997 sub-sample is smaller, funds established prior to 1997 are more likely to have completed or be reaching the end of their life cycle, and thus have more definitive return numbers based almost entirely on liquidated investments. Tests were 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 was ranked within each vintage year cohort, and this ranking was subsequently normalized to a zero-one scale. Fund performance was then analyzed based on normalized ranking rather than on absolute performance or performance relative to a benchmark.[15]

The "null hypothesis" is that no relationship exists 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 classical manner, to make it relatively difficult to "disprove" the null hypothesis. That is, statistically significant findings are equated with a small probability (typically 1%, 5%, or 10%) that we could observe the given empirical data if the null hypothesis were true. Consistent with the mutual fund literature, the primary statistical methods we use to test the null hypothesis are so-called "non-parametric" tests. Four such tests were performed, two based on contingency tables and two based on rank correlation. In addition, a parametric test, a regression of fund performance on past fund performance, was also performed.

Consider first the contingency table test. Based on Brown and Goetzmann (1995), this test has been used in many past studies of performance persistence. Pairs of funds are identified from sequential funds, and sorted into a matrix[16] based on their rankings: win/win, win/lose, lose/win, lose/lose.[17] The matrix generated 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 so-called "chi-square" test is then used to determine if the deviation from the expected distribution is statistically significant. This test was found by Carpenter and Lynch (1999) to be 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 the database).

A second test based on contingency tables is the cross-product ratio test[18], 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[19] (Kat and Menexe, 2002)

Two rank correlation tests were 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 based on a t-statistic. The first rank correlation test used is the Spearman rank correlation coefficient , or rho. Pairs of funds are identified, as with the contingency tables, and the ranks of each pair are compared.[20] The second rank correlation test is Kendall's tau [21] [22]

In addition to the nonparametric tests conducted, regression analyses were also performed, testing for a relationship between the performance of a fund and the performance of a previous fund or funds. Additional regression analysis tested for relationships between fund performance and fund characteristics such as the existence of a previous fund, parent company focus, fund size, and vintage year.

V. Results and Analysis

Contingency Tables

Contingency tables were constructed using pairs of funds from managers with more than one fund. Using all funds resulted in 68 pairs, while restricting the funds to those started between 1991 and 1997 resulted in 23 pairs. The initial matrices divided funds into win/win, win/lose, lose/win, and lose/lose quadrants based on 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 as well as the expected frequencies of distribution as an illustration of the table construction and analysis: a summary of all contingency table results is found in Exhibit 4.

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

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

Our results clearly identify a relationship between fund performance and subsequent fund performance. The chi-squared 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 to 1997, there would be less than 3% chance of the observed distribution if performance were truly independent. Interestingly, the Lose-Lose cell far outweighs the Win-Win cell, suggesting that persistence in under-performance may be stronger than in over-performance.

In light of the facts that fund performance may not be known until several years after inception and that investors may seek to identify a narrower range of manager performance, additional contingency tables were constructed: (1) defining a 'win' as a ranking in the top third or quartile of funds ('lose' is simply "not win", that is, bottom two-thirds or bottom three-quarters of the funds), and (2) defining previous firm performance as the *average* normalized rank of *all* of the manager's previous funds. Again, the results showed a clear relationship between prior returns and subsequent funds, with confidence levels approximating 90%.[23]

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 9 cases at a 90% confidence level or higher, with the weakest indication of correlation between fund performance and average previous returns in the 1991-1997 period. In summary, the contingency tables and cross-product ratios indicate strong performance persistence based upon division by above or below-median performance, as well as based on average past ranking, top quartile, or top third ranking.

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%

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

Rank Correlation Statistics

Tests of rank correlation also indicate a relationship between previous and subsequent manager performance. The Spearman rank statistic was 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 below)

Repeating the test using the average normalized rank of all of 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 was tested. We looked at the relationship not between subsequent funds, but between funds separated by at least 5 years between inception dates. The coefficients calculated using these five-year lagged

rankings were found to be of the opposite sign (suggesting a reversal of performance), though these findings lacked statistical significance.

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.

The other statistical test of rank correlation considered was 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. However, for the 1991 – 1997 sub-sample, the coefficients are not statistically significant. (Though they are of the correct sign to indicate persistence. See Exhibit 6.) For the entire data set, these results are consistent with the results based on the Spearman rank correlation coefficient and on the contingency tables. For the 1991 – 1997 sub-sample, these results are weaker than the earlier results.[24]

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.

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 onto the investment performance ranks of one or more earlier funds by the same manager. We also regress fund performance onto 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 of the manager's previous funds. The formula being estimated takes the form $NR = \alpha + \beta(LR) [+ \delta(AR)] [+ \delta(LLR)]$. NR is the fund's normalized rank, LR is the lagged rank from the appropriate prior fund (immediate preceding, or 5 years prvious), 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 nonparametric tests, the regressions were 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 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, and the null hypothesis can be rejected with 90% to 99% confidence for all of the analyses (with the one exception of the effect of *average* previous fund performance based on the *net* returns for the 1991 – 1997 sub-sample). The adjusted R-squared statistics are somewhat mixed, but in the basic regression of the gross returns ranking onto that of the previous fund, some 20-24% of the variation in the data is being explained by the model. The coefficient on the immediately previous fund was strongly positive for all of the tests, confirming our basic persistence finding. The

coefficient was also positive on the average of all previous fund performance by the same manager, though lacking statistical significance in the net return on the smaller 1991-97 sub-sample.

The magnitude of the alpha and beta coefficients suggests a reversion to the median phenomenon. That is, if a manager's fund exceeded the median, then 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 fell below the median, then 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 5-year interval. That is, managers who remain in the business after five years tend to have funds that are performing opposite (relatively) to what their earlier funds did (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 only successful at certain times in the market cycle. Also, the effect of survivorship in the market, and the learning process, may be evident. 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 get bid up. Yet another consideration is that successful investment professionals may tend to leave their 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 over the longer run found in the regression analyses suggest 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.

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 = α + βLR								
Observations	68				23			
Adjusted R2	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 = α + βAR								
Observations	68				25			
Adjusted R2	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 = α + βLR + δLLR								
Observations	41				11			
Adjusted R2	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 = α + βLR								
Observations	13							
Adjusted R2	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 shown in bold text are those that are statistically significant with 95% or greater confidence. Those shown in italics are statistically significant with 90% or greater confidence.

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

dummy variable indicating if real estate is the primary investment focus of the fund manager's parent company found that a real estate focus has a positive association with fund performance that is statistically significant at the 10% level.[25] However, when analyzed in combination with a variable for previous fund return, the coefficient on the real estate-focused variable is not significant, although it remains positively signed.

VI. 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 quartile of funds of a vintage year, we still 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 applies 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 give performance incentives to managers, it also underscores the need for fees and their impact on returns to be closely tracked by investors to ensure investors 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 the fund life, possibly after the next investment decision must be made.

It is interesting to note that the findings in this study of persistence in real estate opportunity funds closely parallels the findings in a concurrent study of private equity funds by Kaplan and Schoar (noted previously). Both studies have documented strong evidence for persistence in fund performance by the same manager. While it is beyond the scope of the present study to delve deeply and rigorously into the question of why such persistence occurs, we may offer a few thoughts on this important consideration in closing.

It seems logical to assume that fund performance itself does not cause correlated subsequent fund performance. Rather, such correlation must be an empirical proxy for factors or characteristics that persistently impact returns. As noted, some fund characteristics that one might think would influence performance were not found to do so in our study, including fund size and geographical focus. But this still 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 suggest several such factors could be operating to cause persistence. In essence, fund managers are not just 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 are the factors determining the quality of real estate opportunity fund investment performance, their impact on a firm apparently persists for at least a while.

In this regard, it is interesting to note that the difference between our short-run (say, two consecutive funds) and longer-run (more than two consecutive funds) findings, as indicated in our regression analyses, provides some perspective on the question of why (and how) manager performance persistence occurs. In particular, 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", such 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 informational 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 exists also on the downside. That firms can persist with sub-normal 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). However, this concern is mitigated by our longer-term findings regarding 5-year lagged persistence and "third fund" results (which differ from Kaplan and Schoar's findings for private equity funds). In any case, our results in this paper clearly suggest that manager selection among firms operating in the real estate opportunity fund industry is a critical factor to an investor's overall success. Evidence that performance persistence exists in these vehicles can at least begin to guide investors until further work clarifies the 'why' of persistence.

VII. Endnotes

[1] Pension Consulting Alliance, "Real Estate Opportunity Funds: Déjà vu All Over Again," May 2003, p. 5.
[2] Ernst & Young, "Opportunistic Investing: Real Estate Private Equity Funds," 2002.
[3] Based on data provided by Pension Consulting Alliance.
[4] McGurk, John, "Opportunity Funds – Impact of Loads, Leverage, and Incentive Interest," Institute for Fiduciary Educations, 2002, p.2.
[5] Peter Linneman and Stanley Ross, "Real Estate Private Equity Funds," white paper, Zell/Lurie Real Estate Center, 2002, p.8.
[6] Kaplan and Schoar (2004).
[7] Hedricks, Patel and Zechauser (1993); Malkiel (1995); Goetzmann and Ibbotson (1994); Brown and Goetzmann (1995); Elton, Gruber, and Blake (1996);
[8] Brown, Goetzmann, and Ibbotson (1998); Kat and Manexe (2002); Agarwal and Naik (2001); Bares, Gibson, and Gyger (2002); Getmansky, Lo, and Makarov (2003).
[9] Care was taken by PCA to limit the sample of funds to a relatively "style pure" sample that, while the funds may reflect diversity in strategy and focus, are all similar in degree of investment risk, as indicated by their similar investment return targets.
[10] PCA gathered data from fund general partners by questionnaires and interviews. 55 firms representing 187 partnerships during the period 1988 to 2000 participated in the initial survey, reported in "Real Estate Opportunity Funds: The Numbers Behind the Story," April 2001. The second survey collected information from 51 firms and 255 funds for "Real Estate Opportunity Funds: Déjà vu All Over Again," May 2003. Manager and fund identity were masked to preserve confidentiality.
[11] Note however that PCA indicated a lower degree of confidence in the net returns, due to variation among managers in calculating net returns.
[12] Investors have noted inconsistency in reporting and measurements among opportunity fund managers. (PCA, "Real Estate Opportunity Funds: The Numbers Behind the Story," page 59, and Sally Haskins, Russell Real Estate Advisors, 'Perspectives on Reporting', presented May 29, 2003 at the Real Estate Opportunity and Private Fund Investing Forum, New York City.) 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 reflects the highest level of consistency possible.
[13] See: "Real Estate Opportunity Funds: The Numbers Behind the Story,"; and "Real Estate Opportunity Funds: Déjà vu All Over Again". These reports are available from PCA at: http://www.pensionconsulting.com.
[14] This is in contrast to the persistence literature focusing on mutual funds, which tests for a relationship with subsequent performance of the same fund.
[15] For each group of funds with a common year of inception, each individual fund was ranked from 1 for highest to n for the lowest-performing fund based on the calculated IRR. Then, a normalized ranking (NR) with a value from 1 to 0 inclusive was 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, only one fund exists in the data set: it was assigned a normalized rank of 0.5.
[16] For example, with one manager's funds A, B, and C in three subsequent years, two pairs are established (A-B and B-C).
[17] 'Win' is defined as a ranking in the top half (NR > 0.5), third (NR > 0.66), or quartile (NR > 0.75), depending on the analysis. In the few cases where a manager had 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.
[18] 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. [(WWxLL)/(WLxLW)]

[19] equal to ln(CPR)/ $\delta_{ln(CPR)}$, where the standard error of the natural log of the cross product ratio, $\delta_{ln(CPR)} = \sqrt{(1/WW + 1/WL + 1/LW + 1/LL)}$.

[20] P. Sprent and N.C. Smeeton, Applied Nonparametric Statistical Methods, 3rd edition, p. 243. The formula for Spearman's rho is: $r_s = 1 - 6T/n(n^2-1)$, where $T = \sum_i(r_i - s_i)^2$, with (r_i, s_i) indicating the ranks of each pair. The t-statistic is calculated using $t = r_s\sqrt{(n-2)}/\sqrt{(1-r_s^2)}$ with d.f. = n – 2.

[21] Jean Dickinson Gibbons, Nonparametric Measures of Association,, Sage University Papers, Quantitative Applications in the Social Sciences, vol. 91. (Newbury Park, California: Sage Publications, Inc., 1993), p. 15. Again, pairs of variables are identified: the first member of each set is called the x-rank, and the second the y-rank. The pairs are arranged with the x-ranks in ascending order and then the differences between consecutive y-ranks are scored as a concordance if the difference is positive and a discordance if negative. The number of concordances (n_c) and discordances (n_d) are then used to calculate Kendall's tau,

$$t_k = (n_c - n_d)/\{(1/2)n(n-1)\}$$

A simple variation,tau_b, allows for adjustment due to ties in ranks:

$$t_b = 2(n_c - n_d)/\sqrt{(n^2 - n - 2t')}\ \sqrt{(n^2-n-2u')}$$

with $t' = (\sum t2 - \sum t)/2$ where t is equal to the number of tied observations at any given value in the x-ranks and u' is the same calculation for the y-ranks.

[22] The t-statistic is calculated: $t = 3t_k\{\sqrt{[n(n-1)]} / \sqrt{[2\ (2n + 5)]}\}$, where n = number of paired ranks. Peter Chen and Paula Popovich, Correlation: Parametric and Nonparametric Measures, Sage University Papers, Quantitative Applications in the Social Sciences, vol. 139. (Thousand Oaks, California: Sage Publications, Inc., 2002), p. 84.

[23] For the table based on funds separated by at least five years, expected frequencies were below the 5 per cell necessary to perform a robust test. However, 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 for additional funds.

[24] The lack of statistical significance in the older sub-sample should be considered in the light of the other findings in this study. It is important to note that failure to reject a null hypothesis does not prove that the hypothesis is true. Classical statistical tests make it difficult to reject a null hypothesis when such hypothesis is true, but they do not necessarily make it difficult to fail to reject the null hypothesis when that hypothesis is in fact false.

[25] This variable selected for independent firms specializing in real estate investment.

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