The Persistence of Real Estate Fund Performance

A Paper Presented at the 19th Annual American Real Estate Society (ARES) Meeting Monterey California April 2003

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Abstract

This paper examines the short and long-term persistence of tax-exempt real estate funds in the UK through the use of winner-loser contingency table methodology. The persistence tests are applied to a database of varying numbers of funds from a low of 16 to a high of 27 using quarterly returns over the 12 years from 1990 Q1 to 2001 Q4. The overall conclusion is that the real estate funds in the UK show little evidence of persistence in the short-term (quarterly and semi-annual data) or for data over a considerable length of time (bi-annual to six yearly intervals). In contrast, the results are better for annual data with evidence of significant performance persistence. Thus at this stage, it seems that an annual evaluation period, provides the best discrimination of the winner and loser phenomenon in the real estate market. This result is different from equity and bond studies, where it seems that the repeat winner phenomenon is stronger over shorter periods of evaluation. These results require careful interpretation, however, as the results show that when only small samples are used significant adjustments must be made to correct for small sample bias and second the conclusions are sensitive to the length of the evaluation period and specific test used. Nonetheless, it seems that persistence in performance of real estate funds in the UK does exist, at least for the annual data, and it appears to be a guide to beating the pack in the long run. Furthermore, although the evidence of persistence in performance for the overall sample of funds is limited, we have found evidence that two funds were consistent winners over this period, whereas no one fund could be said to be a consistent loser.

Keywords: *real estate funds, performance persistence, contingency tables*

The Persistence of Real Estate Fund Performance

1. Introduction

As a result of the high transaction and management costs and low liquidity in the direct real estate market, institutional investors are increasing looking to indirect investment vehicles to gain the same risk-return advantages of direct real estate market without the corresponding disadvantages (Baum and Fear, 2001). Investment in an indirect real estate vehicle, however, involves conceding management of the properties in the fund to outside individuals. The question arises as to whether the managers of real estate funds are therefore able to consistently add value (Baum, 2000). Such a question is particularly important as the reputation and remuneration of fund managers is heavily influenced by their ability to achieve consistently superior performance (Fierman, 1994), while most of the marketing of funds is based on their track record (Hartman and Smith, 1990). In addition, information on the past performance of real estate funds, upon which to draw conclusions about whether those funds that have done well in the past will do so in the future, is difficult and costly to obtain. Thus, it is especially important to see whether real estate funds show persistence in performance.

This paper contributes to our understanding of the performance of real estate funds in two ways. First, it is the first paper to study the persistence of real estate funds in the UK, which is surprising, as several empirical studies suggest that the returns of property are persistent at the individual property level (Young and Graff, 1996, 1997, Graff, et al, 1999 and Lee and Ward, 2001). Persistence in individual properties would seem to suggest persistence at the fund level as well. Second, this paper examines whether any persistence in real estate funds is short or long-term in nature. The paper is set out as follows the next section discusses the methodology used to evaluate performance persistence. In section 3 we outline the data used and compare the persistence of the funds over varying time periods. Section 4 shows the advantages of investing in winners. Section 5 analyses the persistence of individual funds. Finally section 5 concludes the study and suggests further areas of research.

2. Methodology

In this paper persistence in performance refers to the ability of a fund to attain returns above the median, relative to comparable funds, for consecutive time periods. Such persistence in fund performance is particularly attractive to investors as it suggests the choosing funds that will perform well in the future is as simple as looking at those that performed well in the past. Gruber (1996) shows that investors who "chase past performance" are rational wealth maximises. Consequently, much effort has been expended recently to determine if such a rule exists in the equity and bond markets. However, the performance persistence literature is characterised by a number of studies that, although using generally similar methodology, have produced apparently inconsistent, and in some cases contradictory, results. For instance, a number of studies identify a tendency for mutual funds to provide consistent returns performance over time relative to other funds (e.g., Grinblatt and Titman, 1992, Hendricks et al, 1993, Brown and Goetzmann, 1995). On the other hand, Dunn and Theisen (1983); Bogle (1992); and Phelps and Detzel (1997) found no evidence of persistence in performance rankings of mutual funds.

Performance persistence can be examined in various ways with a number of methodologies. For instance, studies have investigated performance persistence through the use of regression analysis, in which future performance is regressed against a measure of performance in the past (see Grinblatt and Titman, 1993 and Bers and Madura, 2000 among others). A significant and positive slope coefficient indicating performance persistence while a significantly negative slope coefficient indicates performance reversal. An alternative approach is to sort funds based on returns over pervious periods and evaluate the performance of the resulting portfolios (Hendricks, et al, 1993 and Carhart, 1997). Another common approach is to rank funds by past performance to examine whether the rankings are consistent over time (Elton, et al, 1996). A further approach is to evaluate persistence through the use of contingency tales, as utilised by Goetzmann and Ibbotson (1994), Malkiel (1995), Brown and Goetzmann (1995) and Khan and Rudd (1995).

Of the various methodologies used to evaluate persistence the one used here is the winner-loser contingency table approach for three reasons. First, contingency tables are more appropriate where there is doubt as to the distributional assumptions of the sample. This is especially important in studies of real estate markets, as property returns are not normally distributed (Lizieri and Ward 2000). Second, the application of contingency tables is relatively straightforward and so easier to understand by everyday investors, especially if raw returns are used. Third, contingency tables are preferred to the alternative methods when the sample of funds is limited.

Figure 1: Winner/Loser Contingency Table

Period	**T+1**	
T	**Winner**	**Loser**
Winner	**WW**	**WL**
Loser	**LW**	**LL**

The contingency table approach is used to identify the frequency with which funds are defined as winners and losers over successive time periods, see Figure 1. If the same number of funds in existence is the same in each period the definition is quite simple. In this approach each fund is either a winner (W) or a loser (L). Where a winner is defined as a fund with returns above the median. A loser fund is thus one with returns below the median. If a loser (L) in the first period is also a loser (L) in the future period, it is defined as a loser-loser (LL). In a similar way a winner (W) in the first period that remains a winner (W) in the future period is defined as a winner-winner (WW). If a fund shifts from a loser (L) to a winner (W) it is a loser-winner (LW) and a fund that moves from being a winner (W) to a loser (L) is a winner-loser (WL). However, if funds enter or leave the database the problem is more complex. For instance, suppose there are M funds in period t but N funds enter the data set in the next period, M+N funds need to be ranked in period t+1. Thus, in order to maintain the consistency of fund rankings through time only funds with returns in both periods are analysed in t+1. The frequencies with which funds are defined as winners and losers over successive time periods are then calculated. To test for the independence in the results three statistical criteria are used each of which tests for different forms of persistence.

The first statistical test is the repeat winner approach of Malkiel (1995). This test shows the proportion repeat winners (WW) to winner-losers (WL). Malkiel (1995) arguing that if p is the probability that a winner in one period continues to be a winner in the subsequent period a value of p less that or equal to ½indicates no persistence. Thus, a binomial test of p>1/2 can be used to test the significance of the proportion of WW to (WW+WL) as follows:

$$Z = (y - np) / \sqrt{np(1-p)}$$

where: y is the number of repeat winners (WW), n is the number of repeat winners and winner/losers (WW+WL). The test statistic is approximately normally distributed with zero mean and standard deviation one, when n is reasonably large. Thus, a percentage of WW to (WW+WL) above 50% and a Z-statistic above zero is indicative of performance persistence, while a percentage value below 50% and a Z-statistic above zero indicates a reversal in performance.

In the second approach Goetzmann and Ibbotson (1994) calculate the Odds Ratio (Christensen, 1990), also referred to as the Cross-Product Ratio (CPR) (Fienberg, 1980). The CPR test statistic is the ratio of the product of repeat winners (WW) and repeat losers (LL) divided by the product of winner-losers (WL) and loser-winners (LW), i.e. (WW*LL)/(LW*WL). A CPR of one would support the hypothesis that the performance in one period is unrelated to that in another. A CPR greater than one indicates persistence, while a value below one indicates that reversals in performance dominate the sample. The statistical significance of the CPR can then be determined by using the standard error of the natural logarithm of the CPR given by the square root of the sum of reciprocals of the cell counts[1] as follows:

$$\sigma_{\log(CPR)} = \sqrt{\frac{1}{WW} + \frac{1}{WL} + \frac{1}{LW} + \frac{1}{LL}}$$

For large samples the test statistic is normally distributed with mean log odds-ratio, however, where the sample size is small conclusions about the significance of the results can only be considered tentative.

The final test of independence is the Chi-square statistic, as used by Kahn and Rudd (1995). The Chi-square statistic is calculated as:

$$Chi = (WW-D1)^2/D1+(WL-D2)^2/D2+(LW-D3)^2/D3+(LL-D4)^2/D4$$

where
$$D1 = (WW+WL)*(WW+LW)/N$$
$$D2 = (WW+WL)*(WL+LL)/N$$
$$D3 = (LW+LL)*(WW+LW)/N$$
$$D4 = (LW+LL)*(WL+LL)/N$$

where: N is the number of funds. The associated p-value can then be used to test for performance persistence. The Chi-square value, however, is only valid asymptotically

[1] Goetzmann and Ibbotson (1994) square the reciprocals, which is only valid for large sample sizes (Christensen, 1990).

and needs to be adjusted for possible small sample bias. The modification chosen is Yates's continuity correction (Everitt, 1992).

In summary we have a number of different tests of significance of the independence of the contingency tables each concentrating on different aspect of persistence. The approach by Malkiel (1995) concentrates on only one quadrant of the contingency table, the repeat winners (WW). The CPR ratio tests the persistence of both repeat winners (WW) and repeat losers (LL). While the Chi-square test considers the persistence of the contingency table as a whole. The latter, though, has the disadvantage of not being able to detect reversals in performance, since it is always positive. In contrast, a repeat winner percentage below 50 or a CPR calculation below one will indicate reversals in performance. Despite this Carpenter and Lynch (1999) find the Chi-square test is well specified, powerful and more robust than other tests of performance. Furthermore, the Chi-square test is more appropriate for testing the performance persistence of individual funds. However, as there is no compelling reason to prefer one test as opposed to another all three tests are considered.

Nonetheless, whichever methodology is used three issues need to be addressed: (1) survivorship bias; (2) the extent to which performance persistence depends on the period of evaluation, and (3) whether any risk-adjustment should be made to the raw returns and of what kind. The potential for survivorship bias exists because in studies of performance persistence the data set is truncated as funds disappear from the sample. However, the impact of such a bias on studies of performance persistence is open to considerable debate. On the one hand, Brown et al (1992) argue to the extent that the market disciplines poor performing funds will mean that in studies of persistence only good funds are evaluated. Indeed, based on simulations Brown et al (1992) show that the extent of persistence is directly related to the degree of truncation in the sample. In other words, studies that only have surviving funds in their sample are likely to overstate persistence (Malkiel, 1995). However, Shukla and Trzcinka (1992 and 1994) argue that survivorship bias depends on the ability and willingness of investors to penalise fund managers for poor performance. Since there is no evidence that investors do so, survivorship bias should not be a major issue. Nonetheless, a number of studies support this 'spurious persistent' argument including the work of Blake et al (1993); Brown and Goetzmann (1995); Malkiel (1995) and Gruber (1996). On the other hand, Grinblatt and Titman (1992) argue that performance persistence is more likely to appear in poor performing funds. This implies that the proportion of funds in the sample with inconsistent performance (i.e. reversals) will increase and so the bias favours non-persistence. Studies providing evidence in support of this 'spurious non-persistence' hypothesis include the work of Grinblatt and Titman (1993); Elton et al (1993); and Shulka and Trzcinka (1994). Finally, Garcia and Gould (1993) argue that there is no answer to any survivorship bias in the data as there is no rule telling us how to correct for it even if it exists. Indeed, Biltzer (1995) suggests that any attempt to adjust the results for survivorship bias may create even more errors. Thus, while it is agreed that survivorship bias is an important issue facing studies of performance persistence, the impact survivorship bias as on studies of performance persistence is unresolved. A second issue in studies of performance persistence is whether the length of the evaluation periods influences the chance of correctly predicting performance. In other words, is the pattern of overall persistence within the sample consistent for shorter and longer periods? Finally, there is a great deal of debate over the question of whether raw returns should

be adjusted for risk and what form of risk-adjustment should be made. Studies in the equity market have typically used risk-adjustments measures based on the Capital Asset Pricing Model (CAPM), especially Jensen's alpha. However, in applying the Jensen alpha several assumptions have to be made, for instance, the unconditional mean-variance efficiency of the benchmark portfolio (Roll, 1978); the existence of a riskless asset (Dybvig and Ross, 1985 and Green, 1986) and no binding constraints on investors (Best and Grauer, 1990 and Grauer, 1991) all of which are unlikely to be observable in reality. In addition, studies by Grant (1977) and Fama (1972) argue that Jensen' alpha is biased in the face of market timing by fund managers. Thus, it is unclear whether Jensen's alpha represents a legitimate and meaningful benchmark to evaluate the fund manager's performance. Moreover, Hendricks et al (1993) and Sirri and Tufano (1992) show that investors base their decisions on raw returns rather than on risk-adjusted returns.

The potential for survivorship bias is a real problem for studies in the equity mutual funds because of the large number of funds that have closed down. In the UK real estate market, this problem does not exist to a material extent, since none of the funds covered in the database used here have as yet closed down. In addition, any survivorship bias will be partially mitigated as we compare surviving fund with surviving funds and not against some overall benchmark of performance (Goetzmann and Ibbotson, 1994). The issue as to whether the length of the time period is important in the study of performance persistence is addressed by testing a wide variety of evaluation periods. The remaining issue, namely whether persistence exists once the returns are adjusted for risk is not addressed in this study, for a number of reasons. First, there is a good deal of controversy as how to define risk-adjusted performance. Secondly, the funds evaluated here are all of a similar nature and organisational structure so that they can be considered to have the same level of risk. Third, it is unclear which benchmark of performance to use, as a large number of indices are available in the UK. Finally, Capon et al (1996) and Lawrence (1998) argue that investors pay more attention to performance rankings reported by consultants and in periodicals, which are based on raw returns. Hence, from an investor's point of view it is the consistency of raw returns that is the most important criteria for testing persistence.

3. Data and Results

The database used in this study has only recently become available through a joint venture between the Hong Kong and Shanghai Bank (HSBC) and the Association of Property Unit Trusts (APUT), with the data complied by the Investment Property Databank (IPD). The data set is especially useful to studies of persistence as the returns are calculated on a consistent basis and covers a reasonably long enough time period to make substantive conclusions. The data set used consists of quarterly returns for tax-exempt real estate funds in the UK over the 12 years from 1990 Q1 to 2001 Q4. In the early years returns data on only 16 funds are available but this number grows steadily over the period to 27 funds by the end. The quarterly returns are compounded to produce returns at half-yearly, one, two, three, four and six yearly intervals.

The returns in each evaluation period were analysed and funds classified as a winner (W) or loser (L), relative to the median fund. The winner/loser performance of the

fund in consecutive time periods (of the same length) is then concatenated to identify whether the fund was a WW, WL, LW or LL. The frequencies of these winner-losers proportions were then tested for significance using the three criteria discussed above. The results presented in Table 1.

Table 1: Overall Performance Persistence: Various Evaluation Periods

Period of Evaluation	Quart	Semi	1 Year	2 Year	3 Year	4 Year	6 Year
Number of WW	234	123	65	29	14	10	3
Number of WL	268	122	49	24	18	11	8
Number of LW	269	121	49	24	17	8	5
Number of LL	269	143	80	34	17	15	7
Total	1040	509	243	111	66	44	23
Repeat Winners %	0.47	0.50	0.57	0.60	0.44	0.48	0.27
Z-Test	-1.52	0.06	1.50	0.69	-0.71	-0.22	-1.51
p-value	0.13	0.95	0.13	0.49	0.48	0.83	0.13
CPR	0.87	1.19	2.17	1.71	0.78	1.70	0.53
Z-test	1.95	1.90	2.11	1.50	0.45	1.01	-0.53
p-value	0.05	0.06	0.03	0.13	0.65	0.31	0.59
Chi-Squared test	1.19	0.97	8.80	1.97	0.26	0.75	0.52
p-value	0.27	0.32	0.00	0.16	0.61	0.39	0.47
Yates correction	1.06	0.74	6.33	1.24	0.07	0.22	0.07
p-value	0.30	0.39	0.01	0.27	0.79	0.64	0.80

Table 1 shows that based on the results of the Chi-square statistic (1.19), for the quarterly data, there is little evidence of performance persistence (p=0.27). In addition, the proportion of repeat winners is only 47%, i.e. less than half, and a CPR of 0.87, i.e. less than one, which shows that if any persistence is present it is due to repeated losing performance (p=0.13 and 0.05 respectively). The half-yearly results are slightly more encouraging with the repeat winner and CPR criteria indicating some evidence of positive persistence, with a repeat winner percentage of 50% and a CPR of 1.19. Although, only the CPR indicates that this persistence is significant (p=0.06)[2], while the repeat winner and Chi-square statistics are insignificant at the usual levels of significance (p=0.13 and 0.32 respectively).

The one-year and two-year data, however, is more encouraging. Table 1 shows that for the one-year data there is a repeat winner ratio of 57% (p=0.13) and a CPR of 2.17 (p=0.03) and Chi-square value of 8.80 (p=0.00). The two-year data showing some evidence of positive performance persistence, with a repeat winner ratio of 60%, a CPR of 1.71 and a Chi-squared value of 1.97, although none of the results are significant at the usual levels of significance (p=0.49, 0.13 and 0.16 respectively).

In contrast, the three-year data shows evidence of reversals in performance, with a repeat winner ratio of 44%, a CPR of 0.78 and a Chi-squared value of 0.26, with none of the statistics significant at the usual levels of significance (p=0.48, 0.65 and 0.79 respectively). The results for longer periods are no more encouraging. The repeat winner results for the four and six-year evaluation periods showing large repeat losing ratios of 48% and 27% respectively although neither is significant at the usual levels of significance (p=0.83 and 0.13). Results re-enforced by the CPR and Chi-square tests, which show even lower levels of significance p=0.31 and 0.64, respectively for the four year and p=0.59 and 0.80 respectively for the six year data. However, given

[2] Due to space constraints the results for the individual periods are not presented but are available upon request.

the small sample size for the four and six year data conclusions about the significance of the results can only be considered tentative.

These results require careful interpretation, however, as the contingency table tests are only valid asymptotically and may need adjustment for possible small sample bias. To test for this the last two rows of Table 1 show the use of Yates's continuity correction to the Chi-square test. An examination of the adjustment leads us to conclude that small sample bias is indeed present. For instance, in all cases the p-values are worse than without the correction, especially for those periods with few data points. For instance, the p-value the four-year data increases from 0.39 to 0.64 and rises from 0.47 to 0.80 for the six-year data. Nonetheless, since the Chi-square statistics for the quarterly, half-yearly and one-year data as a whole have reasonable frequencies the correction is minor and the conclusions are still consistent with the results above.

4. Performance of the Annual Winner Strategy

The results in Table 1 show that using annual data an investor can identify funds that will show significant performance persistence over the coming year. Table 2 shows the risk and return advantages of investing in winners compared to investing in losers and against the Investment Property Databank Annual (IPDA) and Monthly (IPDM) indices, which are used are benchmarks of performance for real estate funds in the UK.

Table 2: Winning Versus Losing Strategy Returns: Annual Data 1991-2001

Year	WW	LL	W	L	IPDA	IPDM
1991	9.04	-3.43	1.57	-0.40	-3.1	-0.7
1992	6.25	-4.38	2.93	-2.19	-1.7	-0.1
1993	21.22	10.85	15.97	18.41	20.3	16.4
1994	15.15	11.09	13.00	13.09	11.9	15.3
1995	6.16	-0.13	3.36	2.08	3.6	3.2
1996	10.91	7.86	9.36	9.49	10.1	9.4
1997	19.25	12.66	17.65	14.04	16.9	15.5
1998	16.26	10.85	14.16	12.18	11.7	12.2
1999	17.26	13.01	15.86	14.08	14.7	14.2
2000	15.50	10.56	14.32	11.50	10.5	10.5
2001	7.98	1.97	4.73	5.57	6.7	7.1
Mean	13.18	6.45	10.26	8.90	9.24	9.36
SD	5.32	6.63	6.05	6.68	7.32	6.24

Table 2 shows that if an investor had perfect foresight and invested in those funds that were winning funds, compared with the median fund, in a particular year and were subsequently winning funds in the next year he would have achieved average returns almost three times that from holding a portfolio of losing funds, and an average return 40% greater than the two benchmarks of performance. A series of t tests shows that this difference in performance is significant in all case (p=0.01, 0.08, and 0.07 respectively). In contrast, the loser portfolio under-performed the two benchmarks, although not insignificantly at the usual levels of significance (p=0.18 and 0.15, respectively).

However, just because a fund is classified as a winner (loser) in a previous period does not ensure it will have a higher (lower) returns or rank above the average in a future period. In other words, a winner (loser) in one period may not be a winner

(loser) in the next period. Indeed, DeBondt and Thaler (1985,1987) suggest that investing in losing funds may prove an attractive investment strategy when the fund's performance improves. Nonetheless, as shown in Table 2 investing in those funds that were winners in one period still offers greater returns than investing in losing funds or the two benchmarks of performance. However, a series of t tests computed to test the hypothesis that the "winner strategy" offers significantly greater returns compared with the three alternatives is rejected at the usual levels of significance (p=0.31, 0.36, and 0.37 respectively). In contrast, the "loser strategy" under-performed the two benchmarks, although not significantly at the usual levels (p=0.45 and 0.43, respectively).

Overall the results in Tables 2 enhance the findings summarised in Table 1. Real estate funds with higher returns than the average in over a year maintain a return advantage over losing funds in the subsequent year. Although this advantage cannot be maintained for very long without switching holdings as funds in general cannot keep their superior position for very long.

5. Individual Fund Performance

The results above show there is only weak evidence of persistence in performance for UK real estate funds as a whole, except for the annual data. However, individually, some funds may exhibit characteristics of superior or inferior persistence. We next present and analyse the contingency tables of performance persistence of individual funds. We report results for only quarterly, semi-annually and annual periods of measurement because of the statistical difficulties of providing reliable results with limited data over longer evaluation periods. Also, in presenting the results only the repeat winner and the Chi-square tests are shown, as the CPR test is inappropriate for testing the persistence of individual funds. In addition, the results for only those real estate funds with more than 40 quarterly data are shown. This limits the sample to 19 funds.

Table 3: Performance Persistence for Individual Funds: Quarterly Returns

					RW	Repeat Winner		Chi-square	
Fund	WW	WL	LW	LL	%	Z-Test	p-value	Yates	p-value
1	4	18	17	8	0.18	-2.98	0.00	17.19	0.00
2	3	20	20	4	0.13	-3.54	0.00	67.34	0.00
3	6	20	20	1	0.23	-2.75	0.01	80.38	0.00
4	6	13	13	15	0.32	-1.61	0.11	0.46	0.50
5	6	16	17	8	0.27	-2.13	0.03	10.22	0.00
6	10	15	14	8	0.40	-1.00	0.32	2.34	0.13
7	9	11	11	16	0.45	-0.45	0.65	0.00	1.00
8	9	14	13	11	0.39	-1.04	0.30	0.60	0.44
9	13	15	14	5	0.46	-0.38	0.71	3.62	0.06
10	4	9	10	24	0.31	-1.39	0.17	0.04	0.85
11	3	7	8	29	0.30	-1.26	0.21	0.01	0.94
12	8	11	10	18	0.42	-0.69	0.49	0.01	0.91
13	13	6	7	21	0.68	1.61	0.11	4.14	0.04
14	11	11	12	13	0.50	0.00	1.00	0.02	0.88
15	11	15	16	5	0.42	-0.78	0.43	7.02	0.01
16	16	7	7	17	0.70	1.88	0.06	4.28	0.04
17	16	8	9	10	0.67	1.63	0.10	0.89	0.35
18	11	10	11	11	0.52	0.22	0.83	0.02	0.88
19	16	7	8	12	0.70	1.88	0.06	2.30	0.13

Inspection of Table 3 shows 68% (13) of the funds show some evidence of repeat losing persistence, on a quarterly basis, i.e. with repeat winner ratios less than 50%.

Thus less than one third of the funds show repeat winner performance. Nonetheless, of these 6 funds four funds (13, 16, 17 and 19) were significant repeat winners over this period (p=0.11, 0.06, 0.10 and 0.06, respectively). In contrast, five funds 1, 2, 3, 4 and 5 show strong evidence of being persistent losing funds (p=0.00, 0.00, 0.01, 0.11, and 0.03, respectively). Results only partially confirmed by the Chi-square test after correcting for any small sample bias. For instance, only four of the five funds show significant repeat losing performance also have significant Chi-squared values. While, only two of the four funds show significant positive performance persistence (funds 13 and 16), under the repeat winner test, are also shown to have significant persistence under the Chi-squared test. However, the significant positive persistence shown for fund 17 by the repeat winner test (repeat winner ratio 67% and p-value of 0.10) is not confirmed by the Chi-squared test with a value of 0.89 and a p-value of 0.35). While fund 9 which shows an insignificant repeat losing ratio of –38% (p=0.71), shows significant performance persistence on the Chi-squared test, Yates value 3.62 (p=0.06).

Table 4 shows that in a number of cases the half-yearly evaluation period presents conflicting results from those for the quarterly data. First, now only 10 funds (53%) are classified as repeat losing funds, i.e. with repeat winner ratios less than 50%. Secondly, in terms of the repeat winner approach funds 1, 2, and 3 are now no longer classified as significant repeat losers. Funds 7 and 12 are now shown to be significant repeat losers (p=0.00 and 0.02, respectively). Only funds 16 and 17 are still classified as a repeat winner (p=0.13 and 0.08, respectively). In contrast, the Chi-square results generally indicate that there is little evidence of persistence with only one fund (7) showing evidence of performance persistence at the 5% level and only four funds (6, 7 12 and 16) showing significant persistence at the 15% level.

Table 4: Performance Persistence for Individual Funds: Half-yearly Returns

					RW	Repeat Winner		Chi-square	
Fund	WW	WL	LW	LL	%	Z-Test	p-value	Yates	p-value
1	3	7	6	7	0.30	-1.26	0.21	0.11	0.74
2	5	6	6	6	0.45	-0.30	0.76	0.04	0.84
3	4	5	6	8	0.44	-0.33	0.74	0.11	0.75
4	4	5	5	9	0.44	-0.33	0.74	0.00	0.99
5	7	6	7	3	0.54	0.28	0.78	0.18	0.67
6	6	8	7	2	0.43	-0.53	0.59	2.41	0.12
7	0	8	8	7	0.00	-2.83	0.00	5.03	0.02
8	6	6	6	5	0.50	0.00	1.00	0.04	0.83
9	6	6	5	6	0.50	0.00	1.00	0.04	0.85
10	2	5	5	11	0.29	-1.13	0.26	0.07	0.79
11	1	2	3	17	0.33	-0.58	0.56	0.00	0.99
12	1	8	7	7	0.11	-2.33	0.02	2.14	0.14
13	7	4	5	7	0.64	0.90	0.37	0.35	0.56
14	3	5	6	9	0.38	-0.71	0.48	0.08	0.77
15	7	6	6	4	0.54	0.28	0.78	0.02	0.89
16	8	3	3	9	0.73	1.51	0.13	2.27	0.13
17	9	3	4	5	0.75	1.73	0.08	0.88	0.35
18	8	4	5	4	0.67	1.15	0.25	0.00	0.95
19	6	5	6	4	0.55	0.30	0.76	0.04	0.84

Finally, Table 5 presents the individual results for the annual data. Table 5 shows that in line with the results in Table 1 funds with positive performance persistence now dominate the sample, with 63% (12 funds) showing repeat winner ratios greater than 50%. Nonetheless, only two funds (16 and 17) are classified as significant repeat winners (p=0.10 and 0.10, respectively) while fund 14 shows significant repeat losing persistence (p=0.08). However, the results of the Yates corrected Chi-squared test

show no fund with significant performance persistence at the usual levels of significance.

Table 5: Performance Persistence for Individual Funds: Annual Returns

					RW	Repeat Winner		Chi-square	
Fund	WW	WL	LW	LL	%	Z-Test	p-value	Yates	p-value
1	3	2	2	4	0.60	0.45	0.65	0.05	0.82
2	2	2	2	5	0.50	0.00	1.00	0.00	0.96
3	1	1	2	7	0.50	0.00	1.00	0.00	0.96
4	1	3	3	4	0.25	-1.00	0.32	0.00	0.96
5	3	3	4	1	0.50	0.00	1.00	0.28	0.60
6	5	3	2	1	0.63	0.71	0.48	0.39	0.53
7	1	3	2	5	0.25	-1.00	0.32	0.17	0.68
8	5	2	3	1	0.71	1.13	0.26	0.44	0.51
9	3	4	3	1	0.43	-0.38	0.71	0.24	0.62
10	0	2	1	8	0.00	-1.41	0.16	0.09	0.76
11	0	2	2	7	0.00	-1.41	0.16	0.02	0.88
12	1	4	3	3	0.20	-1.34	0.18	0.16	0.69
13	3	2	3	3	0.60	0.45	0.65	0.08	0.78
14	0	3	4	4	0.00	-1.73	0.08	0.69	0.41
15	6	2	2	1	0.75	1.41	0.16	0.27	0.61
16	5	1	1	4	0.83	1.63	0.10	1.49	0.22
17	5	1	2	2	0.83	1.63	0.10	0.18	0.67
18	2	1	2	5	0.67	0.58	0.56	0.10	0.75
19	4	1	2	3	0.80	1.34	0.18	0.36	0.55

6. Conclusion

The performance of managed funds has been the subject of intense study in both the academic and practitioner communities for many years. In particular, the identification of persistence in performance has received considerable recent attention. Using non-parametric contingency tables, which are robust under non-normality of the fund return distribution, this study tests the performance persistence of tax-exempt real estate funds in the UK over various evaluation periods. Several criteria are used to test for persistence; the repeat winner methodology of Malkiel (1995), the CPR test of Goetzmann and Ibbotson (1994) and the Chi-square statistic as used by Kahn and Rudd (1995).

The overall conclusion is that the real estate funds in the UK show little evidence of persistence in the short-term (quarterly and semi-annual data) or for data over a considerable length of time (bi-annual to six yearly intervals). In contrast, the results are better for annual data with evidence of significant performance persistence. Thus at this stage, it seems that an annual evaluation period, provides the best discrimination of the winner and loser phenomenon in the real estate market. This result is different from equity and bond studies, where it seems that the repeat winner phenomenon is stronger over shorter periods of evaluation. Nonetheless, it seems that persistence in performance of real estate funds in the UK does exist and it appears to be a guide to beating the pack in the long run. Furthermore, although the evidence of persistence in performance for the overall sample of funds is limited, we have found evidence that two funds (16 and 17) were consistent winners over this period, whereas no one fund could be said to be a consistent loser. These results require careful interpretation, however, as the results are sensitive to the length of the evaluation period and specific test used.

Finally, as with all performance evaluation studies, a few concerns about the results or the methods used to obtain the results can be raised. We have tried to address some of these concerns, but some remain challenges for future research. Limitations of this research are the following: the small sample size; the question as to whether risk-adjustment materially affect the results and the influence of fund characteristics such as size, management tenure and investment style have on persistence. Investigations of these issues will, therefore, provide future areas of research.

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