The Conditional Performance of UK Property Funds

A Paper Presented at the Fifteenth Annual American Real Estate Society Meeting

7-10 April 1999

Tampa, Florida

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Abstract

The evaluation of investment fund performance has been one of the main developments of modern portfolio theory. Most studies employ the technique developed by Jensen (1968) that compares a particular fund's returns to a benchmark portfolio of equal risk. However, the standard measures of fund manager performance are known to suffer from a number of problems in practice. In particular previous studies implicitly assume that the risk level of the portfolio is stationary through the evaluation period. That is unconditional measures of performance do not account for the fact that risk and expected returns may vary with the state of the economy. Therefore many of the problems encountered in previous performance studies reflect the inability of traditional measures to handle the dynamic behaviour of returns. As a consequence Ferson and Schadt (1996) suggest an approach to performance evaluation called *conditional performance evaluation* which is designed to address this problem. This paper utilises such a conditional measure of performance on a sample of 27 UK property funds, over the period 1987-1998. The results of which suggest that once the time varying nature of the funds beta is corrected for, by the addition of the market indicators, the average fund performance show an improvement over that of the traditional methods of analysis.

Introduction

The analysis of investment fund performance has been a source of academic interest over many years. However, the standard measures of fund manager performance are known to suffer from a number of problems in practice. In particular previous studies implicitly assume that the risk level of the portfolio is stationary throughout the evaluation period. That is unconditional measures do not account for the fact that risk and expected returns may vary with the state of the economy. If for example the market exposure of a managed portfolio varies predictably with the property cycle but the manager does not have superior forecasting ability, a traditional approach to performance measurement will confuse the common variation between fund risk and expected market returns with abnormal performance. Therefore many of the problems encountered in previous performance studies reflect the inability of traditional measures to handle the dynamic behaviour of market returns. As a consequence Ferson and Schadt (1996) suggest an approach to performance measurement called *conditional performance evaluation* which is designed to address this problem. The conditional performance evaluation approach takes the view that a managed portfolio strategy that can be replicated using information readily available to the public should not be judged as an indication of superior investment ability. In a conditional approach, a mechanical market-timing rule using for example lagged interest rate data does not add value. Only managers who correctly use more information than is generally publicly available are considered to have potentially superior investment ability.

The advantage of a conditional approach to performance evaluation is that it can accommodate whatever information is held to be appropriate by the choice of the *lagged variables* used to represent the public information. By incorporating a given set of lagged variables, managers who trade mechanically in response to these variables should be unable to "game" the performance benchmark. The conditional performance approach therefore avoids some of the biases that plague traditional measures. Furthermore a conditional performance evaluation approach would seem to raise the hurdle on managers seeking abnormal positive performance, because it gives them no credit for using readily available information. Managers who do therefore out perform such a stringent benchmark can be said to have achieved such performance by superior investment ability.

In this paper effectiveness of the conditional performance evaluation approach of Ferson and Schaldt is illustrated using a sample of UK Property Funds over the period from 1987 to 1998, with the lagged initial yield (cap rate) of the market and short-term interest rate data, as the conditioning information. The results suggest that once the time varying nature of the fund's beta is corrected for by the addition of the market indicators the average fund performance show an improvement over that of the traditional methods of analysis.

Traditional Measures of Performance

Following Jensen (1968) the traditional approach to measuring fund performance is to regress the excess return of the managed fund on the market index:

$$RP_{it} = \alpha_i + \beta_i RM_t + \mu_{it} \qquad (1)$$

where: RP_{it} is the excess return of managed portfolio i at time period t, RM_t is the excess return on the market portfolio at time t, b_i is the index of systematic risk of fund i, a_i, is the *unconditional alpha* coefficient and η_t is a random error term, which has the expected value of zero. It follows therefore that a significant and positive (negative) value for a_i may be interpreted as superior (inferior) return performance attributable to the investment skills of the portfolio manager.

However, performance measures often attempt to distinguish security selection, or stock-picking ability, from market timing the ability to predict the future direction of the market. Unfortunately a_i in Equation (1) reflects both types of ability. Subsequent market-timing models represent an attempt to separate these two aspects of performance.

The first attempt to quantify the timing component of total performance in a rigorous manner was the quadratic regression model proposed by Treynor and Mazuy (1966). In the standard regression equation, a portfolio's return is a linear function of the market return. However, Treynor and Mazuy (1966) argued that if the manager was able to forecast market returns successfully, he would hold a greater proportion of the

market portfolio when the return on the market was high and a smaller proportion when the return on the market was low. Thus, the portfolio return would be a convex function of the market return, captured by the coefficient on the quadratic term b_{2i} in (2), that is:

$$RP_{it} = \alpha_i + \beta_{1i} RM_t + \beta_{2i} RM_t^2 + \mu_{it} \qquad (2)$$

The quadratic regression has been used in evaluating the performance of managed funds by Treynor and Mazuy (1966), Lehmann and Modest (1987), Lee and Rahman (1990), Cumby and Glen (1990), Grinblatt and Titman (1994). The empirical results in most of these studies suggested the presence of perverse timing, that is the estimates of b_{2i} were often found to be negative. However, a negative coefficient may also indicate the misspecification of the market-timing model especially if the fund's beta is varying through time. Such time variation in a managed portfolio beta may arise for three distinct reasons, Ferson and Warther (1996). First, the betas of the underlying assets may change over time such that a passive buy and hold strategy will experience changes in beta. Second, a manager can actively manipulate the portfolio weights, departing from a buy-and-hold strategy, and thereby create changes in the portfolio beta. Finally, a fund may experience net cash inflows or outflows, which the manager does not directly control. Consequently as such investment flows affect the cash holdings of the fund, the funds' beta will fluctuate as the percentage of cash held by the fund fluctuates. Consistent with this conjecture, Smith (1978); Spitz (1970), Gruber (1996), Hendricks et al. (1993), Patel et al. (1994), Sirri and Tutano (1993), Ippolito (1992), Lakonishok et al. (1992), and Brown and Goetzmann (1995) have all found evidence that mutual fund performance impacts a fund's ability to attract new money. Thus net investment typically lags fund performance. In particular the funds' beta will be lower than expected when market returns are high, due to increased net inflows and higher than expected when market returns are low, as a consequence of net outflows. Thus the timing-model of Treynor and Mazuy (1966) would liken such behaviour in portfolio returns to perverse timing on the part of fund managers when none in fact exists!

In addition many studies report a negative correlation between selectivity and timing that is suggestive of reverse skills or activity specialisation (see Kon, 1983;

Henriksson, 1984; Chang and Lewellen, 1984 and Lee, 1997). A number of explanations have been proposed for this negative correlation between selectivity and timing ability. Henriksson (1984), for example suggests that this might be due to misspecification of the market portfolio or from the exclusion of some relevant factors from the return generating process. While Jagannathan and Korajczyk (1986) suggest that if a fund manager chooses a portfolio that shows lower leverage than the market, market timing will be biased downwards and selectivity biased upwards. The reverse will be true if the fund manager chooses a portfolio with higher leverage than the market. Such a model implies that timing is positively correlated with systematic risk since systematic risk increases with leverage. Thus, a negative correlation between measures of market timing and security selection is expected.

However, traditional market-timing models have taken the view that any information correlated with future market returns is superior information. Yet any ability to predict the market that can be matched using the public information should not be considered to truly reflect market-timing ability on the part of fund managers, beyond that of the funds' investors. Any abnormal performance, which can be replicated by public information about the market, should not be taken as proof of superior investment market timing skill. Thus even traditional market-timing models are unconditional models.

Conditional Performance

Ferson and Schadt (1996) show that a conditional performance evaluation can be built on basically the same theoretical assumptions as traditional models. However, unlike the traditional models, the conditional performance evaluation approach explicitly incorporates the time variation in a fund's beta with respect to publicly available information. The conditional beta is modelled by the following linear function, using the approach of Rosenberg and McKibben (1973) and Rosenberg and Marathe (1975):

$$\beta_i = b_0 + b_{1i}(IY) + b_{2i}(TB) + \varepsilon_i \qquad (3)$$

where: (IY) is the lagged value of the initial yield, or cap rate, and (TB) is the lagged value of a yield on 90 day Treasury Bills and e_i is a random error term. The funds'

beta therefore varies linearly with a number of market indicators, in this case interest rates and yields. The use of short-term interest rates and market yields is suggested by the work of a number of researches in the equity market, see Fama (1991) for a review. While Newell and Higgins (1996) and Coleman, Hudson-Wilson and Webb (1994) among others present evidence for linkages between interest rates, yields and returns in the real estate market. As a consequence the b_i in equation (3) are coefficients of proportionality by which an individual fund's beta is adjusted in response to movements in the indicators. The conditional performance model, therefore, uses the following regression for the evaluation of managed portfolio returns:

$$RP_{it} = \alpha_i + b_0 RM_t + b_{1i}[RM_t x(IY)_{t-1}] + b_{2i}[RM_t x(TB)_{t-1}] + \mu_{it} \qquad (4)$$

Here the conditional model includes two predictors in additional to the regression variable traditionally used to estimate the Jensen alpha. Where the variables, $[RM_t x(IY)_{t-1}]$ and $[RM_t x(TB)_{t-1}]$, are interaction terms picking up the movements through time of the conditional betas in response to the changes in the market indicators. The coefficients b_1 and b_2 measure the response of the conditional betas to the lagged market indicators. The term b_0, however, no longer represents the systematic risk of fund with respect to the market, nor should one assume that it takes the same value, because of the multiplicative nature in the way the market indicators enter the model. In other words it can only be viewed as the separate influence of the market after accounting for the influence of the market indicators. Consequently the intercept (a_i) is the *conditional alpha* measuring the abnormal performance of the fund above and beyond the time varying benchmark of equal risk. In other words the conditional a_i is the difference between a funds' excess return and the excess return to the particular combination of the market index and the market indicators, which replicate the fund's time-varying risk exposure.

In addition Ferson and Schadt (1996) proposed the following conditional version of the Treynor and Mazuy market-timing regression:

$$RP_{it} = \alpha_i + b_0 RM_t + b_{1i}[RM_t x(IY)_{t-1}] + b_{2i}[RM_t x(TB)_{t-1}] + \gamma_i RM_t^2 + \mu_{it} \qquad (5)$$

where: the coefficients b_1 and b_2 as before capture the response of the fund's beta to the public information. The coefficient g_i therefore measures the sensitivity of the fund's beta to any private market-timing ability above and beyond the information about the future shape of the market return that is contained in the initial yield and short term interest rate. Thus the conditional market-timing model tries to distinguish between market timing based on public information from market-timing information that is truly superior to the public information.

Data

The analysis of performance was undertaken on a sample of 27 UK property funds, with complete quarterly return data over the 47 quarter period from March 1987 through September 1998 inclusive. The data was obtained from the Combined Actuarial Performance Service (CAPS). The return on 90 day Treasury Bills and the return on the Investment Property Databank Monthly Index (IPDMI) were used as proxies for the risk free rate and the market return respectively. Both these data series are taken from Datastream. To measure the state of the UK property market the lagged yield on 90-day Treasury-Bills and the lagged initial yield of the IPDMI were employed.

Of the 39 property funds covered by CAPS at the end of 1998, one fund (Abbotstone Agricultural Fund) was excluded from the analysis, as the IPDMI does not include the returns from agricultural investment. A further 9 funds were excluded as they all started later than the sample period and, thus, did not have an adequate time series to be included in the study. Finally two funds were dissolved during the sample period. The sample therefore has survivorship bias because it contains only surviving funds. In particular if survivorship bias is important, the estimates of the performance of the managed funds are too optimistic. But, the aim of the analysis is to compare the

appropriateness of the models of performance and since the same sample is used in both cases the results should be unaffected by survivorship bias.

In addition if it can be shown that a particular performance measure shows that a passive investment strategies displays significant abnormal selectivity or timing ability, it would call into question the quality of that performance measure. Consequently to test the effectiveness of the unconditional and conditional performance measures three further portfolios were evaluated. First a naive buy-and-hold portfolio was constructed starting in 1987 with an arbitrary initial set of weights of 80 percent in the IPDMI and 20 percent in T-Bills. Second a naïve buy-and-hold portfolio starting in 1987 with 40 percent in the IPDMI Retail index, 36 percent in Offices, 14 percent in Industrials and 10 percent in T-Bills, the average property holdings of UK short-term property funds at that time, after adjusting for cash holdings (IPD, 1996). The weights of the buy-and-hold strategies changing over time as the relative values of the asset classes evolve. Finally the performance of another benchmark of property performance in the UK was evaluated, the Jones Lang Wootton (JLW) Property Index. This was because Zimmerman and Zogg-Wetter (1992) show that even a market index can display significant timing and selective ability, compared with another benchmark of performance, when clearly there should be none in a passive market index.

Results

1. Unconditional Performance

Table 1 shows the results of estimating the traditional unconditional models of performance using the sample of 27 property funds and the three passive portfolios. There are several results in Table 1 that are of interest. First only 10 funds showed positive performance, with only three funds significantly outperforming the market at the 10% significance level. The majority of funds, 17, displaying negative performance, three significantly. Consequently the results for an equal-weighted portfolio of all the funds shows that on average the funds marginally under-performed the market, line with previous work using traditional methods from the real estate market (see for example Myer and Webb, 1993 and Lee, 1997). Taken at face value, the unconditional results suggest that too many of these property funds do not match the performance of the IPDMI on a risk-adjusted basis.

The results of the unconditional market-timing model are equally damning. Seventy percent of the individual funds displaying perverse timing, three funds significantly at the 10% level. With only two funds displaying significant positive timing ability. The introduction of timing variable now shows two funds still displaying significantly negative performance, but with only two funds displaying significantly positive selection skill. Also in line with previous work the selectivity and timing coefficients of the individual fund data are negatively related (-0.25) although the correlation coefficient is only significant at the 20% level. With one fund (13) displaying significantly positive timing ability coupled with a significantly negative selection skill. This is suggestive of a reverse skill, or activity specialisation, on the part of managers. In other words fund managers are only good at one actively, either selection or timing, when both are needed to achieve superior performance, Key, Fordsham, Ali and Durkin (1996). Thus the results suggest that not only does the typical UK property fund mangers display poor investment skills, under-performing the market, but also are perverse market timers. A suggestion confirmed by the results from the equal-weight portfolio that shows a significant negative timing ability coupled with a negative, but insignificant, selection ability. These findings are again similar to those of previous studies using unconditional models (see Henriksson, 1984; Chang and Lewellen, 1984; Lehmann and Modest, 1987; Grinblatt and Titman, 1988; Cumby and Glen, 1990 and Lee, 1997).

However, this lack of evidence for successful market timing may be simply because fund manager did not engage in timing activities. Those funds that adopted a passive investment strategy would be categorised as perverse market timers by Equation (2) as a result of changes in the returns of the market index. This is shown most graphically from the results of the passive portfolios. The timing coefficients of both the naïve buy-and-hold strategies and that for the JLW Index are all negative when obviously a passive portfolio, or an alternative market index, should not display market-timing information. A performance evaluation approach, which explicitly incorporates publicly available indicators of future market returns to model the changes in market returns, is therefore required. The Ferson and Schadt (1996) approach is designed to do this.

2. Conditional Performance

Table 2 summarises the results of estimating the conditional performance evaluation models. As can be readily appreciated the results using the conditional model Equation (4) are quite different from those in Table 1, for the unconditional model Equation (1), without a market-timing variable. Less than half the funds now display negative selectivity, as measured by the conditional alphas. With only two funds still displaying significantly negative performance and two funds showing significantly positive performance. The performance of the equal-weighted portfolio presents a zero but positive alpha, indicating that the conditional models do not suggest that the funds routinely under-perform the benchmark of performance on a risk-adjusted basis. In other words property fund performance is essentially neutral.

Table 2 also shows the results of the conditional market-timing model, Equation (5). Once again in comparison with the results are different from those of the unconditional market-timing model Equation (2) in Table 1. The conditional market-timing model produces much more reasonable results. First, in contrast to the results of the unconditional model which suggested that the passive buy-and-hold portfolios and the JLW Index somehow engaged in perverse timing, the coefficients of the conditional timing model of are now all insignificantly positive. This is good news for the conditional model because it shows that the approach avoids the obvious problems made by the unconditional model in attributing perverse market timing when fund managers are following a passive investment strategy. On an individual basis only one third of the funds now display perverse timing ability, with only one (Fund 3) still showing significantly perverse timing. Thus there is little evidence of negative, or perverse, timing in this sample of property funds, indeed the reverse seems to be the case. This is confirmed by the timing coefficient of the equal-weighted portfolio, which is significantly positive. In addition only one fund (14) now shows negative selectivity but two funds (12 and 23) still displaying positive selection skill. In addition Fund 13 no longer displays significantly reverse investment ability. This suggests that UK fund managers are essentially following a passive investment strategy when investing in property, and concentrating on selection in their attempt to outperform the market. Consequently the incorporation of a measure of timing ability in isolating management investment skills is of some importance, even in conditional performance evaluation models.

Conclusions

In studies of managed fund performance the traditional measures of risk-adjusted performance (Jensen's alpha) are negative more often than positive. This has been interpreted as evidence of inferior performance. However, there is evidence that the funds' market risk exposure (beta) changes in response to a number of market indicators. The incorporation of lagged market-indicator variables into the analysis of investment performance, an approach called *conditional performance evaluation*, by Ferson and Schadt (1996) corrects for this omission.

Using quarterly data for a sample of 27 property funds the results presented in Table 1, using the traditional unconditional models, show negative performance on average and perverse market timing for a majority of funds. In contrast the results for the conditional models, shown in Table 2, presents a different picture of performance. First the conditional alphas are centered near zero and second the conditional market-timing models removes the evidence of perverse market timing for the typical fund.

The strikingly different results of Table 1 and 2 testifies to the ability of the Ferson and Schadt (1996) approach to control for the variation through time in the funds' betas and the expected market return. Consequently the relatively poor results in previous studies using the traditional measures can be attributed to common time variation in the conditional betas and the expected market return. When the common variation is controlled for, using a number of lagged market indicators, the conditional model results show that essentially UK property funds, over period 1987 and 1998, presented the essentially neutral risk-adjusted performance of passive investment mangers. This result suggests that incorporating public information variables into the analysis of investment performance is important and should improve upon current practice.

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Table 1: Unconditional Performance Evaluation With and Without Timing

	No Timing		With Timing Adjustment			
Individual Results	**Alpha**	**T stat**	**Alpha**	**T stat**	**Beta**	**T Stat**
Fund 1	-0.003	1.01	-0.002	0.36	-1.93	0.87
Fund 2	0.004	1.44	-0.001	0.34	-3.13	1.84*
Fund 3	0.006	1.45	0.001	0.30	-8.76	3.57*
Fund 4	0.002	0.67	-0.002	0.79	0.00	0.00
Fund 5	0.006	2.05*	0.007	1.29	-0.99	0.39
Fund 6	-0.004	1.76*	-0.004	0.92	-0.50	0.29
Fund 7	0.000	0.01	0.004	1.09	-4.28	1.52
Fund 8	0.004	1.24	0.003	0.82	1.92	0.64
Fund 9	0.001	0.14	0.001	0.52	-0.62	0.27
Fund 10	-0.005	0.68	-0.002	0.26	-3.10	0.74
Fund 11	-0.008	2.07*	-0.004	0.82	-5.23	1.66
Fund 12	0.007	2.35*	0.008	1.61	-1.22	0.46
Fund 13	0.008	1.38	-0.011	2.36*	3.64	1.74*
Fund 14	-0.007	2.23*	-0.007	1.78*	0.50	0.24
Fund 15	0.000	0.20	0.000	0.07	-0.29	0.23
Fund 16	0.007	1.67	0.000	0.09	-8.08	2.47*
Fund 17	0.002	0.71	-0.001	0.31	-1.66	0.72
Fund 18	0.001	0.41	0.001	0.67	-0.61	0.71
Fund 19	0.000	0.06	0.000	0.07	-0.47	0.20
Fund 20	0.003	0.82	-0.001	0.34	5.08	1.89*
Fund 21	-0.002	0.80	-0.002	0.48	-0.22	0.05
Fund 22	0.000	0.08	-0.002	0.56	1.89	1.37
Fund 23	0.008	3.82*	0.007	2.58*	1.55	0.95
Fund 24	-0.001	0.52	-0.002	0.90	1.30	0.54
Fund 25	0.001	0.11	0.006	0.85	-6.04	1.03
Fund 26	0.003	1.16	0.004	1.89*	-1.20	0.69
Fund 27	-0.002	0.65	-0.002	0.79	0.96	0.53
EW	**-0.001**	**-1.17**	**-0.000**	**0.08**	**-1.17**	**1.71***
Number	**Alpha**	**Percent**	**Alpha**	**Percent**	**Beta**	**Percent**
Negative	17	63	16	59	19	70
Positive	10	37	11	41	8	30
Passive Results	**Alpha**	**T stat**	**Alpha**	**T stat**	**Beta**	**T Stat**
Buy and Hold 1	-0.003	1.03	-0.001	0.33	-1.78	0.97
Buy and Hold 2	0.000	0.49	0.000	0.75	-0.07	0.41
JLW	0.000	0.05	0.000	0.16	-0.26	0.17

Notes: 1 All results are based upon heteroskacticity adjusted t statistics using the Newey-West procedure. 2 * Indicates significance at the 10% level

Table 2: Conditional Performance Evaluation With and Without Timing

	No Timing		With Timing Adjustment			
Individual Results	**Alpha**	**T stat**	**Alpha**	**T stat**	**Beta**	**T Stat**
Fund 1	-0.001	0.24	-0.001	0.37	8.20	1.49
Fund 2	-0.003	0.69	-0.002	0.66	-4.64	1.23
Fund 3	0.003	0.52	0.003	0.67	-10.16	2.23*
Fund 4	-0.003	1.15	-0.003	1.14	3.24	0.93
Fund 5	0.005	0.99	0.005	1.04	-7.16	1.04
Fund 6	-0.004	0.79	-0.003	0.76	-3.67	0.76
Fund 7	0.002	0.71	0.002	0.65	1.69	0.48
Fund 8	0.002	0.68	0.002	0.49	7.43	1.49
Fund 9	0.001	0.63	0.002	0.66	-3.00	0.58
Fund 10	-0.004	0.49	-0.004	0.46	-3.11	0.38
Fund 11	0.002	0.46	0.002	0.41	4.58	1.05
Fund 12	0.010	1.82*	0.010	1.77*	2.51	0.47
Fund 13	-0.008	1.42	-0.008	1.48	6.73	0.95
Fund 14	-0.007	1.71*	-0.007	1.72*	2.81	0.61
Fund 15	-0.004	1.92*	-0.003	1.52	-6.62	1.33
Fund 16	0.003	0.47	0.003	0.42	2.78	0.22
Fund 17	0.001	0.49	0.001	0.36	5.14	1.16
Fund 18	0.001	0.72	0.001	0.69	1.42	0.63
Fund 19	0.002	0.53	0.001	0.40	5.82	1.08
Fund 20	0.000	0.02	0.000	0.05	2.58	0.55
Fund 21	-0.001	0.17	-0.001	0.23	5.13	0.92
Fund 22	-0.003	1.05	-0.003	1.03	0.74	0.22
Fund 23	0.006	2.07*	0.006	2.07*	2.15	0.80
Fund 24	-0.002	0.81	-0.002	0.90	3.48	0.65
Fund 25	0.010	0.75	0.008	0.63	27.14	0.95
Fund 26	0.003	1.52	0.003	1.54	-2.50	0.75
Fund 27	-0.003	0.84	-0.003	0.85	-0.02	0.01
EW	**0.000**	**0.30**	**0.000**	**0.18**	**1.95**	**1.73***
Number	**Alpha**	**Percent**	**Alpha**	**Percent**	**Beta**	**Percent**
Negative	13	48	13	48	9	33
Positive	14	52	14	52	18	67
Passive Results	**Alpha**	**T stat**	**Alpha**	**T stat**	**Beta**	**T Stat**
Buy and Hold 1	-0.001	0.22	-0.001	0.35	6.75	1.50
Buy and Hold 2	-0.000	0.02	0.000	0.11	0.21	1.24
JLW	0.002	1.31	0.002	1.29	1.78	0.73

Notes: 1 All results are based upon heteroskacticity adjusted t statistics using the Newey-West procedure. 2 * Indicates significance at the 10% level