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Can UK Pension Fund Managers Time the Market?

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Can UK pension fund managers time the market ?

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Abstract

The UK's defined benefit pensions industry makes widespread use of pooled investment vehicles which are provided by a large number of fund management groups. In this paper we test whether the managers of these unitised vehicles have market timing ability. Using data on 734 pooled funds, ranging from UK equity to funds specialising in Pacific Basin equities, we found almost no statistically significant evidence that the managers of these funds had any market timing ability over our twenty five year sample period from 1980 to 2004. With increasing numbers of UK fund managers purporting to be able to provide "high alpha" products to the UK's beleaguered pensions industry, our results do not give us great confidence that the solution to the widespread deficits lies in the hands of the UK's active institutional investment managers.

Keywords: UK pooled pension fund performance, Henriksson and Merton, Treynor and Mazuy, non-parametric performance test.

JEL Classification: C15, G11

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1. Introduction

Much of the academic literature on performance measurement has focussed on the persistence of returns or upon the market timing abilities of managers of US mutual funds. This work has its roots in the early work of Jensen (1968) and has been extended by, among many others, by Cahart (1997) and Wemers (2003). On the whole the results of the vast majority of the studies in this area suggest that managers of US mutual funds neither display market timing ability, nor can they perform on a consistent basis over time. Studies by Blake and Timmerman (1998), and by Giles, Wilson and Worboys (2002), among many others, find that positive performance persistence is absent amongst managers of UK mutual funds (known as unit trusts in the UK), though studies do indicate that negative performance persistence is common.

Our focus in this paper is on the performance of managers of UK pension fund assets. Far fewer studies with respect to this aspect of the investment management industry have been conducted. Given the importance of the UK's occupational pension industry, it is perhaps a little surprising that so little work has focussed on the performance of the fund managers charged with managing these assets. According to the last ONS release on the issue, the market value of the long-term assets held by the UK's pension funds is just over £800bn, representing about 80% of the annual GDP of the UK economy. The need to focus on this important industry is perhaps even more crucial at the moment, given that the vast majority of Defined Benefit scheme's are in deficit. Watson Wyatt estimate that the combined deficit of the UK's defined benefit pensions industry is [£130bn], which implies that the average UK scheme is now facing a deficit of around 15%. However, there have been some notable exceptions with respect to research in this area.

Brown, Draper and McKenzie (1997) investigated the performance persistence of UK pension fund managers. Using a sample of 232 funds between 1986 and 1992 and another consisting of 409 funds from 1986 to 1992 that retained the same manager over these samples, Brown *et al* concluded that there was limited evidence that the managers were able to achieve a persistent performance. A result, broadly in

keeping with persistence studies conducted using alternative fund manager universes.

Blake, Lehmann and Timmermann (1999) examined the asset allocation decisions of 364 UK pension funds using data that spanned the period from 1986 to 1994. The criterion they used in identifying the sample was that each fund should have been managed byr the same manager over this period, and that this manager should also have been responsible for the asset allocation of the fund over this uninterrupted period, in other words these were balanced mandates. Using this sample Blake *et al* found "surprisingly" little variation in the performance of these managers, or in the strategic asset allocation decisions that they made over time. In addition they found that the vast majority of time variation in returns was due to the strategic asset allocation decisions, very little of the variation was due to stock selection. They concluded that the empirical regularities that they observed were most likely due to the legal and economic environments under which these managers operated, for example, by the fact that fees were paid on the basis of assets under management rather than on performance. Perhaps their most damning conclusion was that - "*most funds would have been better off with their strategic asset allocation decisions placed in passive index funds*" rather than paying for active fund management.

Using the quarterly returns on a much larger sample (2,175) of segregated UK pension funds spanning the period from 1983 to 1997 Thomas and Tonks (2001) investigate the performance of UK equity portfolios managed by investment managers, in contrast to the performance of the balanced portfolios investigated by Blake *et al*. Thomas and Tonks' conclusions were consistent with those of Blake *et al*. The variety of techniques used to assess the quality of fund performance all suggested a very narrow cross-sectional dispersion in returns, which suggested that the managers were all "closet trackers". They also conclude that on the whole there were negative returns to both selectivity and to market timing.

Finally, Tonks (2004) suggests that the results of Brown *et a*l and of Blake *et al*, might suffer from survivorship bias, since both studies impose the restriction that the pension fund examined should have the same manager over the sample period. Instead, Tonks looks at the performance of pension funds irrespective of whether the

fund manager changed over the 1983 to 1997 sample period used. Examining the performance of 2,175 UK equity funds over this sample, Tonks found evidence to suggest that there was indeed performance persistence at least at the one year horizon.

In this paper we investigate the market timing ability of the UK's pension fund managers, but from a different perspective than previous studies. Rather than looking at the performance of individual pension funds over time, we instead focus on the performance of the pooled investment funds offered by the UK's investment managers. The alternative focus of the paper reflects a change in the style of pension fund management over the last twenty years or so. Over this period pension funds have made increasing use of the pooled funds offered by investment managers. Because of this, the performance of these funds is now of much more relevance to pension fund trustees than would have been the case during the sample periods studied by previous authors. In investigating this aspect of the industry it also means that we do not have to be concerned about changes in the fund management houses since, by definition, they do not change over time. In addition, our results encompass the turbulent equity market periods following the collapse of the high tech bubble in 2000, whereas data used in previous studies end prior to this period.

The rest of this paper is organised as follows: in Section 2 we describe the methodology that we employ to investigate the market timing ability of UK pension fund managers; in Section 3 we describe the data used in the study; our results are presented in Section4; and finally, we conclude the paper in Section 5.

2. Methodology: Parametric and Non Parametric Tests

Standard statistical tests for market timing have been proposed by Henriksson and Merton (1981) (HM) and by Treynor and Mazuy (1966) (TM). The tests are based on regression analysis and are extensions of the CAPM. They assume that the manager's timing ability is dependent upon the relevance of their information about the market. HM estimated the following model:

$$(1) \qquad r_{i,t+1} = \alpha_i + \beta_i r_{m,t+1} + \gamma_i D_{t+1} r_{m,t+1} + \varepsilon_{i,t+1}$$

whereas TM used the following regression model:

(2) $r_{i,t+1} = \alpha_i + \beta_i r_{m,t+1} + \gamma_i (r_{m,t+1})^2 + \varepsilon_{i,t+1}$

where r_i is the excess return of fund i, r_m is the excess return on the market and D is a dummy variable which takes the value 1 if the excess return on the market is greater than zero, and 0 otherwise. The intuition behind these regression-based tests is that fund managers who do time the market, generally increase their exposure to the market prior to the market going up, and reduce exposure prior to a decline. This market timing ability is captured by the second term in equations (1) and (2).

Abrevaya and Jiang (2001) and Jiang (2003) have suggested an alternative, non-parametric, test for market timing. Based on the CAPM, a fund manager with market timing ability would maintain a higher beta between period 2 and 3 compared to period 1 and 2, if $r_{m,1} < r_{m,2} < r_{m,3}$ for any triplet $\{r_{m,1}, r_{m,2}, r_{m,3}\}$. The beta for only two observations is calculated as $(r_{i,t2} - r_{i,t1})/ (r_{m,t2} - r_{m,t1})$. This implies that when the triplets are ordered from the smallest excess market return to the largest value and the fund manager has market timing ability, one would expect that:

$$\frac{r_{i,t3} - r_{i,t2}}{r_{m,t3} - r_{m,t2}} > \frac{r_{i,t2} - r_{i,t1}}{r_{m,t2} - r_{m,t1}}$$

Using probabilities, a summary statistic of market timing ability can be expressed as follows (see Jiang, 2003):

(3) $$\theta = 2\Pr\left(\frac{r_{i,t3} - r_{i,t2}}{r_{m,t3} - r_{m,t2}} > \frac{r_{i,t2} - r_{i,t1}}{r_{m,t2} - r_{m,t1}}\right) - 1$$

θ measures the probability that the fund return forms a convex relationship with the market return. For a sample the analogue of θ is a U-statistic, with Kernel of order 3

$$(4) \qquad \hat{\theta}_n = \binom{n}{3}^{-1} \sum_{r_{m,t_1} < r_{m,t_2} < r_{m,t_3}} sign\left(\frac{r_{i,t_3} - r_{i,t_2}}{r_{m,t_3} - r_{m,t_2}} > \frac{r_{i,t_2} - r_{i,t_1}}{r_{m,t_2} - r_{m,t_1}} \right)$$

where n is the number of observations and sign(.) is the sign function taking the values -1, 0 or 1, if the argument is negative, zero or positive respectively. Abrevaya and Jiang (2001) derive a consistent estimator of the standard error of $\hat{\theta}$ as:

$$(5) \qquad \hat{\sigma}^2_{\hat{\theta}_n} = \frac{9}{n} \sum_{t_1=1}^{n} \left(\binom{n}{2}^{-1} \sum_{t_2 < t_3, t_1 \neq t_2, t_1 \neq t_3} h(z_{t_1}, z_{t_2}, z_{t_3}) - \hat{\theta}_n \right)^2$$

$$\text{with } h(z_{t_1}, z_{t_2}, z_{t_3}) = sign\left(\frac{r_{i,t_3} - r_{i,t_2}}{r_{m,t_3} - r_{m,t_2}} > \frac{r_{i,t_2} - r_{i,t_1}}{r_{m,t_2} - r_{m,t_1}} \mid r_{m,t_1} < r_{m,t_2} < r_{m,t_3} \right)$$

Jiang (2003) also shows that this unconditional test can be used for a conditional model where $r_{i,t} = f_i(x)$ and $r_{m,t} = f_m(x)$ and x are some macroeconomic variables which have some forecasting ability, such as the dividend yield, interest rates or the yield curve. Instead of using r_i and r_m in equations (4) and (5) we have to use the unexplained excess returns.

3. Data

Because pension funds are exempt from taxation in the UK the funds studied in this paper have been designed to match the specific legal and tax requirements of pension funds. They are not made available to retail investors, although they are made available to certain other institutional investors, such as charities. However, in essence these funds are analogous to the mutual funds made available to retail and other investors, although they are managed separately and are ring-fenced from all other assets that a fund manager might manage, either on their own behalf or for any third parties.

The Russell Mellon CAPs survey is the industry-standard source for performance information for the UK's pooled pension fund sector, and the source of the data for this study. For a fund to be included in the database, it must be available to UK institutional investors. The survey monitors and provides quarterly performance information on the following equity funds: UK, North American, European (ex UK),

Japanese, Pacific and Global/Overseas equities. The purpose of the Russell Mellon CAPs survey is to display the up-to-date performance of each of the various pooled fund by investment category. The returns in the survey are based upon time-weighted rates of return calculated on both a net and gross basis. Returns are calculated both net of fees from the fund offer prices and, where appropriate, income distributions as quoted by the participating fund management companies. Returns are also calculated gross of fees by adding the charges made against the fund back into the net performance record. However, since pension funds are interested in the returns net of fees, we use net rather than gross returns below. Finally, all the returns are denominated in sterling.

The data consist of the quarterly returns on an initial sample of 734 pooled equity funds between March 1980 to December 2004. Of the 734 equity funds 459 were still available for investment at the end of our sample in December 2004, whereas 275 were classified as dead funds at this date. Only those funds with at least 12 consecutive observations (three years of data) were included in the study of market timing. 593 of the 724 funds met this criteria. The average number of observations of funds with more than 12 observations was 40.54 quarters, just over 10 years. Summary information about the sample is shown in Table 1.

4. Results

Table 1 presents some summary statistics of the pooled equity investment funds. The statistics represent the averages of individual excess fund returns. The quarterly mean excess return of all funds is 0.3889% per quarter or 1.556% p.a. It varies considerably between different investment categories, ranging from -2.7756% p.a. for Japan and 5.242% p.a. for UK Smaller Companies. The variation of the individual fund returns is quite large averaging 10.78 for all funds. Overall our data also suggest that the fund returns are not normally distributed and have an average value for the normality test for 6.53 and being as high as 12.10 for the Overseas equity category.

[Table 1 here]

Table 2 and 3 present the regression results from the Henriksson and Merton and Treynor and Mazuy parametric market timing models. All statistics are averages of all the regression results. Market timing is measured by the gamma coefficient, the coefficient on the squared excess return of the market (TM) or the positive excess market return variable (HM). The average explanatory power of either one of those two market timing models is very high with over 87% of the variation explained by the excess market return and the market timing variable. However for individual funds the explanatory power can be as low as 25%. Comparing the R^2 of the market timing models with the CAPM we see only a slight improvement of the predictive power, less than 5%. The other statistics reported in tables 2 and 3, are very similar which indicates that there is not much to choose between these two different tests of market timing. The last two columns report the percentage of funds whose market timing coefficient is statistically significant at the 95% confidence level. Considering all equity funds the statistics are 4.89% and 3.54% for the Henriksson and Merton model for negative and positive significant gammas respectively. For the Treynor and Mazuy model the statistics are 7.59% (negative) and 4.05% (positive). Overall, we can conclude that there is not much evidence of successful market timing as these results are only slightly higher than what one would expect due to pure chance (2.5% using the normal distribution).

[Table 2 here]

[Table 3 here]

The results from the non-parametric market timing test as suggested by Jiang (2003) are reported in table 4. The results for the unconditional model (i.e. excess returns) and the results from the conditional model, where the conditioning variable is the dividend yield are very similar. Using excess returns on 335 out of 593 funds reveals a significant market timing test statistic for only 8 funds at 95% confidence level. 258 funds had negative test statistics with 11 being statistically significant. This means that less than 5% are significant which indicate that the managers of these funds are not able to time the market. The results from the conditional model using the dividend yield as the conditioning variable are very similar to the results

from the unconditional model[2]. 321 funds have a positive test statistic and 272 a negative. The number of statistical significant funds are 17 (positive) and 6 (negative). This is almost the other way around than when returns have been used, but still within 95% confidence.

[Table 4 here]

Looking at the individual funds we find that only six funds have a positive θ value, using both the unconditional and conditional non-parametric market timing test. Three of those funds have a statistical significant gamma from both of the regression based tests. Another fund has a θ test statistic of 1.81 using the non parametric test and statistical significant statistics using the other 3 tests. All funds that reveal positive market timing using all 4 tests are UK equity funds. Four funds, with negative market timing ability, have statistical significant negative values using both versions of the non-parametric market timing test. Three of these funds also show statistical significant negative γ's using the parametric test. None of those funds belong to the UK equity classification. Overall, our results for UK pension funds are very similar to the findings Jiang (2003), who similarly found virtually no evidence of significant market timing. Whatever it is that these fund managers are doing, they do not seem to be able to add value to the funds by timing the market.

5. Conclusion

Using the non-parametric test for market timing ability suggested by Jiang (2003) we find virtually no evidence that that the managers of a range of pooled equity pension funds can time the market. Our results were not materially affected by the use of a conditional version of the test. These results were confirmed by the more traditional, regression-based tests of market timing ability suggested by both Treynor and Mazuy (1966) and Henriksson and Merton (1981). Our results suggest that pension fund trustees looking to enhance the value of scheme assets by choosing actively managed pooled investment vehicles rather than say passively managed equivalents, may ultimately be disappointed with the outcome. The ability to "time

[2] Alternative conditioning variables have also been used, such as short term interest rates and the yield spread. The results are qualitatively similar and therefore not reported here. They are available from the authors on request.

the market” is a crucial element of adding value to any investment portfolio; we find no evidence here that these pooled vehicles embody this element of return enhancement.

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Table 1: Summary Statistics

Fund Group	Number of Funds	Averages (Excess Return, quarterly data)				
		Mean Return	SD	Skewness	Kurtosis	Normality Test
UK Equity	130	0.7967	8.7460	-0.37	3.40	5.24
UK Smaller Companies	39	1.3105	11.9038	-0.11	3.85	9.40
North America	68	0.2877	10.6914	-0.28	3.31	3.67
Europe (excl. UK)	67	0.6652	11.2836	-0.32	3.84	7.24
Europe (including UK)	12	0.8673	11.7233	-0.33	3.31	2.88
Japan	64	-0.6939	13.0919	0.21	2.60	1.58
Pacific (excl. Japan)	57	0.7691	13.8968	0.14	3.27	3.11
Pacific (including Japan)	8	-0.2024	13.0456	-0.07	3.26	2.92
Overseas Equity	68	0.2982	9.9836	-0.51	4.06	12.10
Global Equity	80	-0.2356	9.4742	-0.32	3.27	11.79
ALL	593	0.3889	10.7886	-0.23	3.42	6.53

Note : Only funds with a minimum of 12 observations have been included in the analysis. The maximum number of observations available for each fund has been used. The whole sample period is from June 1980 to December 2004 (99 observations). All statistics are means values of the corresponding statistics for each fund. The number of funds used to calculate the mean are given in column 2. The normality test, reported in the last column is χ^2 distributed with 2 degrees of freedom. The critical value at 95% confidence is 5.99.

Table 2 : Parametric Market Timing Test (Henriksson and Merton Models)

Fund Group	Number of funds	Average Statistics									
		Number of obs. (quarters)	α	t_α	β	t_β	γ	t_γ	R^2	Neg. sig. γ (%)	Pos. sig. γ (%)
UK Equity	130	45.57	-0.0035	-0.1120	0.9598	17.25	0.0444	0.2597	91.62	3.85	5.38
UK Smaller Companies	39	43.56	0.4227	0.4572	0.9665	10.56	0.0396	0.1098	86.08	0.00	2.56
North America	68	41.37	-0.3664	-0.4701	1.0190	13.74	-0.0045	-0.2695	90.64	8.83	1.47
Europe (excl. UK)	67	41.09	0.1543	0.0498	1.0782	12.18	-0.0212	-0.1605	89.81	1.49	0.00
Europe (including UK)	12	25.67	1.0717	0.3686	1.0527	10.31	-0.1372	-0.3691	88.30	8.30	0.00
Japan	64	38.02	0.5766	0.2693	0.9310	5.37	0.0792	0.1471	72.74	0.00	3.13
Pacific (excl. Japan)	57	38.28	0.8545	0.6311	0.9253	9.25	-0.0930	-0.5772	87.80	10.53	1.75
Pacific (including Japan)	8	41.00	0.8912	-0.0485	0.8980	7.85	-0.0485	-0.3441	79.69	0.00	0.00
Overseas Equity	68	46.79	0.0524	0.0446	1.0063	11.79	-0.0661	-0.3762	87.73	10.29	4.41
Global Equity	80	30.21	0.0658	-0.0491	0.8934	10.96	0.0616	0.3791	89.42	3.75	7.50
All	593	40.54	0.1954	0.0616	0.9714	12.04	0.0064	-0.0286	87.56	4.89	3.54

Note : Only funds with a minimum of 12 observations have been included in the analysis.

Table 3 : Parametric Market Timing Test (Treynor and Mazuy Models)

Fund Group	Number of funds	Average Statistics									
		Number of obs. (quarters)	α	t_α	β	t_β	γ	t_γ	R^2	Neg. sig. γ (%)	Pos. sig. γ (%)
UK Equity	130	45.57	0.0309	-0.0957	0.9846	29.01	0.0016	0.3609	91.65	3.85	8.46
UK Smaller Companies	39	43.56	0.5013	0.6492	0.9880	17.76	0.0007	0.0560	86.07	0.00	2.56
North America	68	41.37	-0.3864	-0.6758	1.0195	21.79	0.0002	-0.2971	90.66	8.82	0.00
Europe (excl. UK)	67	41.09	0.0603	-0.0555	1.0680	19.47	<0.0001	-0.0616	89.87	4.48	0.00
Europe (including UK)	12	25.67	0.7545	0.2164	0.9815	15.68	-0.0022	-0.1797	88.45	8.33	8.33
Japan	64	38.02	0.7913	0.4767	0.9692	8.88	0.0008	0.1081	72.59	0.00	3.13
Pacific (excl. Japan)	57	38.28	0.7666	0.7416	0.8875	17.50	-0.0019	-0.8972	88.20	3.33	1.75
Pacific (including Japan)	8	41.00	0.7416	0.6410	0.8659	12.93	-0.0005	-0.2942	79.86	12.50	0.00
Overseas Equity	68	46.79	-0.0148	-0.0863	0.9696	17.26	-0.0018	-0.3963	87.82	10.29	4.41
Global Equity	80	30.21	0.2139	0.2090	0.9258	14.87	0.0008	0.1543	89.53	3.75	6.25
All	593	40.53	0.2138	0.0920	0.9759	19.34	0.0002	-0.0650	87.63	7.59	4.05

Note : Only funds with a minimum of 12 observations have been included in the analysis.

Table 4 : Non Parametric Market Timing Test

Fund Group	Number of Funds	Mean $\hat{\theta}$	# $\hat{\theta}$ > 0	# sig. (5%)	# $\hat{\theta}$ < 0	# sig. (5%)
RETURNS						
UK Equity	130	0.0192	86	3	44	1
UK Smaller Companies	39	-0.0135	17	0	22	1
North America	68	-0.0003	32	1	36	2
Europe (excl. UK)	67	0.0018	36	0	31	1
Europe (including UK)	12	0.0255	7	0	5	0
Japan	64	0.0517	48	2	16	0
Pacific (excl. Japan)	57	-0.0139	21	0	36	0
Pacific (including Japan)	8	-0.0012	4	0	4	0
Overseas Equity	68	-0.0371	24	0	44	6
Global Equity	80	0.0460	60	2	20	0
ALL	593	0.0102	335	8	258	11
RESIDUALS : DY						
UK Equity	130	0.0401	94	10	36	1
UK Smaller Companies	39	-0.0092	19	0	20	1
North America	68	0.0048	33	1	35	1
Europe (excl. UK)	67	0.0245	43	2	24	0
Europe (including UK)	12	0.0267	9	0	3	0
Japan	64	0.0471	48	3	16	0
Pacific (excl. Japan)	57	-0.0115	19	1	38	0
Pacific (including Japan)	8	0.0069	3	0	5	0
Overseas Equity	68	-0.0276	22	0	46	3
Global Equity	80	-0.0190	31	0	49	0
ALL	593	0.0104	321	17	272	6

Table 5 : Non Parametric Market Timing Test (Local Currency)

Fund Group	Currency	Number of Funds	Mean $\hat{\theta}$	# $\hat{\theta}$ > 0	# sig. (5%)	# $\hat{\theta}$ < 0	# sig. (5%)
North America	US Dollar	68	0.0077	38	1	30	1
Europe (excl. UK)	Euro	67	-0.0478	25	2	42	4
Europe (including UK)	Euro	12	-0.0965	0	0	12	1
Japan	Yen	64	-0.0133	31	0	33	0