

FUND TURNOVER AND INVESTMENT PERFORMANCE

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ABSTRACT

We examine the level of share dealing activity of UK long-term institutional funds and, for UK pension funds, assess the impact of this dealing activity on investment performance. The analysis is carried out using annual returns and activity from the WM Universe of UK funds. Previous published research has concentrated mainly on US mutual funds and has generally reported no relationship between annual turnover and returns within the same year. As we are studying UK institutional funds with long-term liabilities, our approach is to establish any relationship by straightforward observations over a ten year period. We conclude that dealing activity within the North American and Japanese equity portfolios of UK pension funds is generally detrimental to long-term investment performance.

1. INTRODUCTION

In this paper, we first examine the share dealing activity of UK pension funds and UK life funds and then, for UK pension funds, consider the relationship between dealing activity and investment performance.

UK pension funds have traditionally put much greater emphasis on foreign investment than have US pension plans. We therefore pay particular attention to the impact of UK pension funds' dealing activity within foreign equity portfolios on investment performance. We specifically consider the following questions:

1. How does the level of dealing activity in UK pension funds' equity portfolios compare with that of similar portfolios managed by life offices?
2. Is there more or less dealing activity within UK investing institutions' foreign equity portfolios compared with their UK equity portfolios?
3. Is dealing activity within the North American equity portfolios and Japanese equity portfolios of UK pension funds detrimental to investment performance?
4. Is dealing activity within the UK equity portfolios of UK pension funds detrimental to investment performance?
5. Is there a "home and away" effect? In other words, does UK pension funds' dealing activity in UK equities have less (or more) impact on their investment performance than dealing activity in their foreign equity portfolios?

Blake et al (1997), using data provided by The WM Company on 364 pension funds over the period 1986-1994, find that fund size accounts for an important fraction of the cross-sectional variation in measured performance in equity returns. They observe an apparent size handicap with large funds overrepresented among the relative underperformers. We therefore group the equity portfolios in our study into different categories depending on their size.

We do not attempt to adjust returns for risk as we consider this to be unnecessary. The portfolios in our study are well-diversified with betas not significantly different from unity.

The paper is organised as follows. Section 2 reviews existing literature on the relationship between share dealing activity and investment performance. Section 3 compares the dealing

activity within equity portfolios of UK pension funds and UK life funds, and also compares the dealing activity within different types of pension fund equity portfolios. Section 4 looks at the relationship between dealing activity and investment performance for UK pension funds. Section 5 is the conclusion.

2. LITERATURE REVIEW

2.1 US Mutual Funds

A large body of finance literature has studied the investment performance of US mutual funds, predominantly those invested in US equities. The bulk of this work has concentrated on identifying superior performance of particular fund managers. In recent years, however, a small number of papers have examined the efficiency of the US mutual fund industry as a whole, including the question of whether portfolio turnover is sufficiently profitable to cover the costs involved.

Ippolito (1989) studies 128 US mutual funds invested in US equities over the period 1971-84 using data from *Investment Companies* (Wiesenberger). A pooled cross-section/time series regression methodology is employed, using the following formula:

$$R_{it} - R_{ft} = b\beta_i [R_{mt} - R_{ft}] + cE_{it} + dMF_i + eY_t + error$$

where R_{it} is the total rate of return for fund i in year t

R_{ft} is the one year return on US Treasury bills in year t

β_i is the estimated beta coefficient for fund i

R_{mt} is the rate of return available in year t on a broad market index

E_{it} represent measures of mutual fund expenses including portfolio turnover², management fees and expense ratio.

The variables MF_i and Y_t are vectors of mutual fund and year dummies.

The coefficients on the turnover, management fee and expense ratio variables are not significantly different from zero. Thus, funds with higher turnover, fees and expenses appear to earn risk-adjusted returns that are sufficient to offset the higher charges.

Droms and Walker (1994) study the performance of US mutual funds invested in international equities over the period 1981-90. In particular, they examine the extent to

which investment performance is related to the following key operating characteristics: total assets; expenses as a percentage of NAV; turnover rate; and whether 'load' or 'no-load'³. As in Ippolito (1989), a pooled cross-section/time series regression methodology is adopted, but funds in the sample are not required to have data for all years. Thus, there are only 15 funds in 1981 but as many as 108 funds in 1990. The results show that none of the coefficients is statistically significant using either risk-adjusted or unadjusted returns. In particular, asset size and turnover rates are not related to investment performance. The authors say that these results are contrary to the conventional wisdom that investment performance decreases with increases in asset size and that high turnover detracts from investment returns.

Droms and Walker (1996) use annual data for 151 US domestic equity mutual funds in continuous operation from 1971 to 1990. A pooled cross-section/time series regression methodology is employed as with their 1994 study of international funds but in this case they have a complete data base for all funds in the sample. They conclude that asset size and turnover rates are not related to investment performance using both risk-adjusted and unadjusted returns. Particular attention is given to the question of survivor bias, that is the problem of poor performing funds being eliminated from a data set and consequently biasing the results.

In summary, there have been three studies of the relationship between fund turnover and investment performance of US mutual funds, two looking at US equity portfolios and one looking at international equity portfolios. They all suggest that there is no relationship between turnover and investment performance, net of expenses.

2.2 Other investing institutions

The investment performance of other types of investing institution has received little attention. There have been a few studies of the performance of US pension funds but only one of these papers (Ippolito and Turner, 1987) considered the relationship between stock turnover and portfolio performance. Research on the investment performance of investing institutions outside the US has been virtually non-existent in the academic literature.

² Turnover is defined as the lower of purchases or sales in the fund during the year divided by average assets.

³ A 'load' fund has an initial charge, designed to cover marketing, commissions and other initial expenses. A 'no-load' fund has no initial charge.

However, The WM Company have studied the impact of dealing activity on investment performance for UK pension funds (1994) and Dutch pension funds (1995).

Ippolito and Turner (1987) examine the relationship between turnover/fees and investment performance of 1500 US private pension plans filed with the Internal Revenue Service over the period 1977-83. A pooled cross-section/time series regression methodology is adopted, using a CAPM-type approach. Excess return for a given year, net of expenses, is the dependent variable. Stock turnover as a percentage of total portfolio value is one of the explanatory variables. The results suggest that trading in the stock portion of portfolios had a significant negative impact on net performance. For the average plan, stock trading practices observed in 1983 lowered rates of return by 60 basis points relative to a plan that engaged in no stock trading.

The WM Company (1994) paper studies all the UK equity portfolios with consistent data over the 5 years to end 1992 from their UK Pension Fund Universe. Funds are ranked by 5-year average activity⁴ and divided into deciles. The average activity and the average return are then calculated for each decile. A negative relationship between activity and return is observed. The average annual return for the highest activity decile is 14.24% while for the lowest activity decile it is 14.76%.

The WM Company (1995) paper includes a study of the Dutch equity portfolios and the US equity portfolios with consistent data over the 5 years to end 1994, from within the WM Universe of Dutch Pension Funds. These are quite small samples with only 15 Dutch equity portfolios and 16 US equity portfolios. Negative correlation between activity and return is observed in both cases. The extent of the apparent effect is illustrated by dividing the samples into two halves by performance.

⁴ Activity is defined as sales plus purchases less net cash flow, all divided by mean fund. It is therefore double the 'turnover' figure used in US studies.

Dutch Equities

	Bottom 7 Performing Funds	Top 7 Performing Funds
Return	9.0% p.a.	13.2% p.a.
Activity	59.2% p.a.	49.3% p.a.

US Equities

	Bottom 7 Performing Funds	Top 7 Performing Funds
Return	3.7% p.a.	7.7% p.a.
Activity	62.2% p.a.	31.3% p.a.

The results suggest a possible ‘home and away’ effect. The top performing US equity portfolios are, on average, much less active than the bottom performers. But for the Dutch equity portfolios of the Dutch pension funds, that is portfolios held in the ‘home’ market, the disparity between the dealing activity of top performers and that of bottom performers is much less marked.

3. ACTIVITY RATES

In this section, we compare the crude dealing activity rates within the equity portfolios of UK pension funds and UK life funds using WM Company data. For pension funds, activity data is available over a ten year period from 1986 to 1995 inclusive, but the corresponding data for life funds is only available from 1989.

Activity is defined as:

$$Activity = [Purchases + Sales - |N|] / M$$

where

$|N|$ is the modulus of the net investment

M is the initial market value of the fund + time-weighted net investment

For example, if the initial market value of the fund is 100, net investment is 20, purchases and sales are 50 and 30 respectively, then:

$$\begin{aligned} Activity &= (50 + 30 - 20) / (100 + .5 * 20) \\ &= 60 / 110 = 0.55 \text{ or } \mathbf{55\%} \end{aligned}$$

Equity portfolios are grouped by size as follows:

	Portfolio size (£m)			
	Size 1	Size 2	Size 3	Size Other
UK	1000+	100-1000	1-100	< 1
Japan	100+	10-100	0.1-10	< 0.1
North America	100+	10-100	0.1-10	< 0.1

In comparing the dealing activity of pension funds with that of life funds, we confine our attention to Size 1 equity portfolios as most life funds in the WM Universe are relatively large. Figures 1, 2 and 3 illustrate the crude activity figures over the 7 year period from 1989 to 1995 for UK equities, Japanese equities and North American equities respectively. They show that pension funds deal more actively in their large overseas equity portfolios than do

life offices. They also suggest that both pension funds and life funds deal more actively within their large North American and large Japanese equity portfolios than within their large UK equity portfolios.

Figure 4 shows that pension funds deal more actively within their Size 2 North American and Size 2 Japanese equity portfolios than within their UK equity portfolios of comparable size (£10 - £100).

Finally, Figure 5 shows that there is a tendency for pension funds' dealing activity within UK equity portfolios to increase with decreasing size. This simply reflects the practical difficulties of actively managing large equity portfolios.

4. ACTIVITY AND INVESTMENT PERFORMANCE

We now turn to the important question of whether dealing activity tends to increase or reduce the investment performance of UK pension funds' equity portfolios. We analyse separately the equity portfolios in different national markets and therefore exclude the assessment of asset allocation decisions from the study.

We feel that the pooled cross-section/time series methodology employed in the US studies discussed in Section 2 is inappropriate for funds with long-term liabilities. The benefits of active dealing may take time to come through, so examining the relationship between dealing activity and returns within the same year may fail to capture the full effect. Instead, we examine the relationship between average dealing activity over a ten year period and returns over the same period.

Figures 6,7 and 8 give a plot of average activity rate against time-weighted rate of return over the years 1986 to 1995 for UK pension funds' Size 2 Japanese equity portfolios, Size 2 North American equity portfolios and Size 3 UK equity portfolios. There are 27 funds, 66 funds and 196 funds respectively. These size bands are chosen as they contain by far the most data points.⁵ Correlation coefficients and Z-scores (i.e. Fisher-z transformations) are summarised in the following table:

Table 1 - Activity v return, 1986-1995

	Corr coeff	Z-score
Japanese equities	-0.36	-1.85
North American equities	-0.37	-3.08*
UK equities	-0.03	-0.42

* significant at the 5% level (two tail test)

⁵ By analysing within size bands we are obviating any possible size effect.

If the ten year period is split into two 5-year periods we obtain the following results:

Table 2 - Activity v return

	1986-90		1991-95	
	Corr coeff	Z-score	Corr coeff	Z-score
Japanese equities	-0.23	-1.15	-0.47	-2.50*
North American equities	-0.11	-0.88	-0.28	-2.22*
UK equities	-0.12	-1.68	0.11	1.53

* significant at the 5% level (two tail test)

The above results suggest that dealing activity within North American and Japanese equity portfolios is generally detrimental to investment performance, although this does not rule out the possibility that some managers are able consistently to generate superior investment performance through active dealing within these overseas portfolios. We do not think that these results are influenced by survivor bias because fund management mandates will have survived the ten year period if their UK equity performance has been satisfactory. The cancelling of mandates is not normally a consequence of poor overseas equity portfolio performance.

For UK equity portfolios, there is a correlation coefficient of approximately zero for the sample studied over the 10 year period. This is consistent with market efficiency in that the costs of dealing are just covered by an improvement in investment performance. There is a possibility, however, that survivor bias is affecting the correlation coefficient. The relevant question to ask here is whether survivor bias has more influence on high dealing activity funds than on low dealing activity funds. If not, then survivor bias has no influence on the correlation coefficient. This is an area for further research.

5. CONCLUSION

Analysis of crude activity rates for equity portfolios held by pension funds and life offices reveals that:

- (i) pension funds generally deal more actively within their large North American and large Japanese equity portfolios than do life funds;
- (ii) pension funds generally deal more actively within their North American and Japanese equity portfolios than within their UK equity portfolios.

Analysis of the relationship between activity and returns for UK pension funds suggests that dealing activity within North American and Japanese equity portfolios is generally detrimental to investment performance. For UK equity portfolios, however, there is a correlation coefficient between activity and returns over the ten year period studied of approximately zero. This suggests that there is a possible 'home and away' effect but the question of survivor bias and its possible affect on the correlation coefficient for UK equity portfolios needs to be examined further.

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