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Do UK retail investors buy at the top and sell at the bottom?

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Introduction

A great deal of research has been conducted into the investment acumen of active fund managers. Countless studies have focussed upon their ability to produce alpha. The majority of these studies have come to the conclusion that most fund managers find it very difficult to produce alpha, and those that do may have just been lucky! Many other researchers have sought to establish whether performance tends to persist[2]. In general these studies find that some performance does persist – unfortunately it is poor performance that tends to persist while positive performance tends not to. As such an investor that chooses to invest in a fund that has performed relatively well in the past is unlikely to find that this attention grabbing performance will be repeated in the future, whereas choosing a poorly performing fund is a good method of guaranteeing poor future performance, if that is what one wishes to achieve. Other studies have performed tests to identify whether fund managers can 'time the market', in other words, whether they consistently increase their fund's exposure to the market (beta) before the market rises and reduces this exposure ahead of a fall (for evidence and references see Clare, Cuthbertson and Nitzsche(2009)). Once again there is little evidence that managers can do this consistently over time.

Relatively little attention has been paid to the investment skill of retail investors. The majority of evidence that does exist has been gathered with respect to investors in US mutual funds. Early studies of retail investor behaviour used market level, or aggregate data. Using aggregate US data Nesbitt (1995) found that the investment decisions of US mutual fund investors between 1984 and 1994, generally led them to underperform a simple buy and hold strategy by as much as 1.08%. While Braverman *et al* (2005) found similar results using a more recent sample period. Frazzini and Lamont (2006) produce evidence to suggest that mutual fund investors tend to invest at the wrong time, buying too late into a rally and selling

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[2] For references to work on both fund manager alpha and performance persistence see Cuthbertson and Nitzsche (2009)).

as the market troughs. Using index level data on the US NYSE/AMEX Dichev (2007) finds that investment timing decisions might have cost US equity investors around 1.3% per year over the period 1926 to 2002. Dichev also finds a negative correlation between flows and past returns, but a positive correlation between flows and future returns, which together suggest that investment in US equities tended to increase after good returns and also before a period of poor returns – hence explaining the underperformance vis a vis a buy and hold strategy.

In a more recent study of US mutual fund investor behaviour using fund level data from 1991 to 2004 Friesen and Sapp (2007) propose a methodology that identifies the average return experience of mutual fund investors. They propose and make use of a measure that they refer to as the '*performance gap*' that compares the return available to a simple buy and hold strategy in a fund with the return a typical investor would achieve taking into account the timing of their investments into the fund and also their disinvestments from the fund. Their finding indicate that the typical investor loses 1.56% per year due to the timing of their investment decisions. And since they use disaggregated data they are able to identify, for example, that this performance loss averages 0.13% per month for actively managed funds but only 0.05% per month for passive funds. They also find that that there is a greater degree of poor investment timing associated with better performing funds. When fund alphas are calculated using a three factor model and then grouped into alpha performance deciles, Friesen and Sapp's results show that the performance loss of the average investor in the lowest decile of funds by alpha experienced a loss of 0.068% per month, while the same figure for the same figure for the top decile of funds was an astonishing 0.378% per month. This suggests that investors might be inadvertently giving up the alpha generated by top performing funds through poor investment timing decisions. Finally, Friesen and Sapp found that poor investment timing decisions seemed to be entirely absent from bond and money market mutual funds, and therefore that the phenomenon seemed to be confined almost entirely to equity mutual funds.

Finally, using the same methodology as Friesen and Sapp (2007), Dichev and Yu (2009) investigate the returns achieved by investors in hedge funds taking into account the timing of investment flows, compared with those that would have been achieved on a 'buy and hold' basis. They find that average investor returns are around 4.0% lower than the buy and hold returns reported by the funds. Furthermore, they find that for "star funds" this performance gap can be as much as 9% per annum. These results suggest that the alpha that the average hedge fund investor thought they were accessing may have been almost completely offset by poor investment timing decisions.

In this paper we examine market level data on the net investment into broad categories of UK mutual funds (known as unit trusts) collated by the Investment Management Association (IMA). We use these data to calculate a measure known as the 'performance gap' that is used by both Friesen and Sapp (2007) and by Dichev and Yu (2009). Our data spans the period from 1992 to the end of 2009 and therefore represents a significant sample period over which to study this phenomenon. Our results are broadly in keeping with those of previous research in this area, which has been achieved using US mutual fund data. The UK data that we use here suggest that on average the investment timing decisions of retail investors with regard to equity mutual funds has cost them performance of just under 1.2% per year over the eighteen year period of our study. Although 1.2% may not sound very high, compounded over 18 years it represents a cumulated under performance of 20%, compared with a simple buy and hold strategy. We also distinguish between retail and institutional equity mutual fund flows in this paper and find that the performance gap we measure is largely a retail investor rather than an institutional investor phenomenon. Finally, however, we find evidence to suggest that the performance gap with regard to bond mutual funds is positive, that is, investment timing decisions with regard to bond mutual funds have enhanced the return experience of the median investor.

The rest of this paper is organised as follows: in Section 2 we describe the methodology and our data; in Section 3 we present our results; while Section 4 concludes the paper with some thoughts about possible areas of future research.

1. Methodology and Data

The data that we use in this paper have been kindly provided to us by the Investment Management Association (IMA). The data set comprises total monthly assets under management (AUM) for the IMA's UK equity and fixed income (bond) market sectors along with the net sales for these two sectors. The data spans the period from January 1992 to November 2009. For the equity market related data, as well as providing the total values for these series, the IMA also split the data into retail and institutional sub-categories, thus allowing us to distinguish between the timing ability of retail versus institutional investors. Unfortunately this split is not available for the bond market mutual fund data. From these data it is possible to calculate an implied monthly return using the following expression for each sector as a whole (equity and bond) and for the retail and institutional equity sub-categories:

$$r_t = \frac{AUM_t - NS_t}{AUM_{t-1}} - 1 \qquad\qquad (1)$$

where AUM represents assets under management for the total as a whole, or for the retail or institutional equity sub-categories, and NS represents respective net sales. From expression (1) we can calculate what is known as the time weighted rate of return (twrr) for the sector as a whole and for retail and institutional sectors. This twrr is just a geometric average of the returns calculated from expression (1) and effectively represents the buy and hold return that an investor would have achieved by investing at the start of the sample period until the end of the sample.

$$\bar{r}_{tw} = \prod_{t=1}^{T}(1+r_t)^{1/T} - 1 \qquad (2)$$

Next we can calculate a money weighted rate of return (mwrr) which is simply a measure of the internal rate of return, r_{mw}, that satisfies the following expression:

$$AUM_0 = \frac{AUM_T}{(1+r_{mw})^T} - \sum_{t=1}^{T}\frac{NS_t}{(1+r_{mw})^t} \qquad (3)$$

where AUM_0 and AUM_T represent the total assets under management at the beginning and end of our sample period respectively. Friesen and Sapp (2007) define the difference between the twrr and mwrr as the 'performance gap', that is, the difference between the buy and hold return versus the return achieved by the average investor taking account of cash in and outflows. The performance gap (PG) is shown in expression (4).

$$PG = r_{tw} - r_{mw} \qquad (4)$$

We use this performance gap measure to identify the market timing abilities, or otherwise, of both retail and institutional investors. In the following section we present the results of our analysis.

3. Results

3.1. Equity mutual funds

Before presenting the equity mutual fund performance gap results, table 1 reports some simple analysis of the correlation between equity mutual fund flows and returns. Panel A reports the correlation between fund flows and both past and future returns for the whole sector. The results show that there is a correlation of 18% between returns over the previous 12 months and contemporaneous fund flows. This correlation is found to be statistically significant at the 99% confidence level. Table 1 also shows the correlation between the contemporaneous flow and returns over the following 12 months. This correlation is found to be both small, just 2.0%, and statistically insignificantly different from zero. This result

suggests that flows tend to follow good equity market performance but are unrelated to future performance. Panels B and C of Table 1 present the results of the same analysis for the retail and institutional sub-categories respectively. When we consider only the retail flows, the correlation between the equity markets performance over the previous 12 months and the contemporaneous flow increases to 37% and remains statistically significant at the 99% level of confidence. But in sharp contrast the correlation between institutional flows and past returns we find to be only 3% and statistically insignificant from zero. For retail flows we find that the correlation between flows and future returns is -9% but that this correlation is not statistically significant. For institutional flows there seems to be no correlation between flows and returns over a subsequent one twelve month period. *Our results indicate that institutional flows are largely unaffected by the performance of the market, while retail flows are influenced strongly by past returns*.

Table 2 presents the same analysis but instead uses a six month timeframe. In other words it presents the correlation between returns over a past or future six month period with contemporaneous flows. The most interesting result in this table is that the positive correlation between retail fund flows and returns over the previous six months rises to 40%, but more significantly the correlation between retail flows and future returns falls to -17% and is significant at the 99% level of confidence. This indicates that retail inflows are stronger the higher is the return on the market over the previous six months, but also that flows tend to be negatively correlated with future returns, that is, there is a tendency to for there to be a net positive retail inflow prior to a fall in equity markets in the subsequent six month period.

To investigate the periodicity issue Tables 3A and 3B show the correlation results for different past and future market return periods for equity market retail and institutional flows respectively. These tables confirm the positive correlation between past market returns and flows at all horizons considered here for the retail data. Table 3A also shows that the negative correlation between retail flows and future returns that exists is significant around

the six month horizon, but also that it becomes highly significant between the fifteen and twenty four month return horizon too. Finally, Table 3B confirms the fact that institutional flows are largely invariant to market conditions, at least statistically speaking, since the correlations are not statistically significant.

We now turn to the issue of the equity market performance gap. The results of the estimation of expression (4) are presented in table 4. These findings confirm the results of the correlation analysis. The flows data for the whole sector indicate that the performance gap has been -0.82% per year since the start of our sample in 1992. However, this is almost entirely due to the performance gap we calculate for retail investors, that we estimate at -1.17% per year compared with only -0.27% for institutional flows. Although -1.17% may not sound very high, compounded over 18 years it represents a cumulated underperformance of 20%, compared with a simple buy and hold strategy.

In Figure 1 we present the performance gap measure for retail and institutional investors, calculated on a rolling basis in effort to identify where the performance was 'lost'. The chart shows that the return experience of institutional investors is relatively stable. The performance gap is close to zero for most of the period, although it has been consistently positive since the end of 2007. This indicates that through either luck or judgment, institutional investors have benefited from some positive investment timing decisions. By contrast the performance gap for retail investors (which is negative on average) swings from positive to negative. Our analysis suggests that much of the performance gap occurred between 2000 and 2004, and also that it has been persistently negative since late 2007 to the end of our sample.

3.2. Sectoral level results using individual mutual funds

To enhance and shed more light on the aggregate results discussed in Section 3.1 above, we also collected fund level data on mutual fund flows in an effort to investigate whether the

performance loss occurred in particular equity market sectors. Collating these data is very time consuming, they are also not available for the time span of the aggregate IMA data. We used Reuters 3000 Xtra to extract data from the Lipper fund database for all equity focussed funds that are denominated in sterling and registered for sale in the United Kingdom. This data specification yielded an initial sample of 1,362 funds. For each fund we extracted the NAV, the Total Net Assets as well as fund specific information such as the geographical focus. These data were available from April 2003 to November 2009, compared with the longer sample of January 1992 to November 2009. We grouped these funds into their geographic focus namely, Asia, Europe, Emerging, UK, US and Global, a summary of the number of funds and their focus are contained in the first column of table 5.

Using this data, within each geographical focus, for each individual fund we calculated the flows at time t using expression 5:

$$Flow_t = TotalNetAssets_t - \left(TotalNetAssets_{t-1} \times \frac{NAV_t}{NAV_{t-1}} \right)$$

(5)

By calculating this expression and then by using the same methodology used for the aggregated IMA data we were then able to calculate the time weighted return, the money weighted return and the performance gap for each individual category. The results of these calculations are presented in Table 6.

For the entire sample of 1362 funds the performance gap is 4bp per month or 0.46% per annum. This result therefore confirms the results using the IMA data, although the sample period means that the results are not directly comparable. For most sectors there is a negative performance gap. The gap is largest for the Global equity market sector at -2.27%, per annum. While the gap is respectively -0.60% per annum for Asia focussed funds, -0.5% for UK focussed funds and -0.44% for Emerging market equity mutual funds. This provides

some tentative evidence to suggest that performance losses may be greater where markets are more volatile. Although there is no performance gap for US focussed funds, the more interesting result is that the performance gap is positive for European (ex UK) equity mutual funds. The timing gain has been 1.52% since 2003. It is difficult to explain why this gap should be positive while the gap for say, UK funds is negative, but the result does at least suggest that investment timing does vary across different equity market mutual fund sectors.

3.3. Bond mutual funds

The results above indicate, that retail investors at least, experience a performance loss when investing in equity mutual funds. In this section of the paper we use the aggregate IMA data on "bond" mutual funds to see whether investors experience the same degree of timing-related performance loss when investing in fixed income markets. Unfortunately the institutional versus retail investor split in the IMA data for fixed income, or bond, mutual fund flows is not available. Our results in this section therefore relate to all bond mutual fund investors types.

In Table 6 we present the correlation between bond mutual fund flows and returns. The results indicate that future and past bond returns might be correlated, there is almost no correlation between bond mutual fund flows and past and future returns, over these two horizons. However, Table 7 indicates that there may be some correlation between fund bond mutual fund flows and past returns, essentially between the 18 and 24 month horizon. In Table 8 we present the results of the performance gap calculation for bond mutual funds. The results are in sharp contrast to those estimated for equity market mutual funds. We find the performance gap to be positive, that is, investment timing decisions tend to benefit the investor return experience in fixed income bond funds. We estimate the performance gap to be 8bps per month, equivalent to 1.07% per annum. Figure 2 shows the evolution of this gap over time. Our results therefore provide tentative evidence to suggest that investors can time the bond markets, but not the equity markets.

4. Conclusions

In this paper we have examined the impact of investment timing decisions on realised equity investment returns for both UK retail and institutional investors, and for bond market mutual funds. We find that equity-related retail investment flows (as defined by the IMA) tend to follow good performance and to anticipate poorer performance. This investment pattern has effectively cost the median UK retail equity investor a cumulated total return of 20% over the last 18 years. It should also be remembered that this annual performance gap of 1.17% for retail equity investors is a median value, in other words some investors would have experienced a much worse investment performance over this period. We also find that equity mutual fund institutional flows (again, as defined by the IMA) tend not to suffer from the same detrimental investment timing issues. This is probably because the flow of institutional money, into regular savings products for example, tends to be more stable over time and is influenced less by investment judgment. Our results, with regard to retail investment patterns, and its influence on the investment return experience are consistent with evidence obtained in the past using comparable data on US mutual funds. Finally, we find tentative evidence that suggests that timing decisions with regard to bond mutual funds have enhanced the returns of the median investor since the performance gap is positive, at just over one percentage point per annum.

5. References

Clare, A, K. Cuthbertson and D. Nitzsche (2009), 'An Empirical Investigation into the Performance of UK Pension Fund Managers', *Journal of Pension Economics and Finance.*

Cuthbertson, Nitzsche and Niall O'Sullivan (2006) Mutual Fund Performance (2006), CAMR Working Paper, London.

Dichev, Ilia D., 2007. What are Stock Investors Actual Historical Returns? Evidence from Dollar-weighted Returns, *American Economic Review* 97, (1) March: 386-401.

Dichev, D. and G. Yu, Higher risk, lower returns: What hedge fund investors really earn, (2009), Goizueta Business School at Emory University, Working Paper.

Frazzini, Andrea, and Owen A. Lamont, 2008. Dumb Money: Mutual Fund Flows and the Cross-section of Stock Returns, *Journal of Financial Economics* (88): 299-322.

Friesen, Geoffrey C., and Travis R. A. Sapp, 2007. Mutual Fund Flows and Investor Returns: An Empirical Examination of Fund Investor Timing Ability, *Journal of Banking & Finance* 31, (9): 2796-816.

Table 1: The correlation between flows and returns
over twelve months for equity mutual funds

Panel A ALL FLOWS	Flows	Past Return	Future Return
Scaled Flows	1.00 (0.00)		
Past Return	0.18** (0.01)	1.00 (0.00)	
Future Return	0.02 (0.76)	0.07 (0.32)	1.00 (0.00)
Panel B RETAIL FLOWS	Scaled Flows	Past Return	Future Return
Scaled Flows	1.00** (0.00)		
Past Return	0.37** (0.00)	1.00** (0.00)	
Future Return	-0.09 (0.23)	0.07 (0.32)	1.00** (0.00)
INSTITUTIONAL FLOWS	Scaled Flows	Past Return	Future Return
Scaled Flows	1.00** (0.00)	0.03 (0.72)	0.08 (0.27)
Past Return	0.03 (0.72)	1.00** (0.00)	0.07 (0.32)
Future Return	0.08 (0.27)	0.07 (0.32)	1.00** (0.00)

Notes: The p-values are from Pearson's correlation using a student's t distribution for a transformation of the correlation. This is exact when X and Y are normal when the procedure computes p-values for Kendall's tau and Spearman's rho using either the exact permutation distributions (for small sample sizes), or large-sample approximations.

Table 2: The correlation between flows and returns over six months for equity mutual funds

Panel A ALL FLOWS	Flows	Past Return	Future Return
Flows	1.00** (0.00)		
Past Return	0.25** (0.00)	1.00** (0.00)	
Future Return	0.00 (0.99)	0.07 (0.32)	1.00** (0.00)
Panel B RETAIL FLOWS	Flows	Past Return	Future Return
Flows	1.00** (0.00)		
Past Return	0.40** (0.00)	1.00** (0.00)	
Future Return	-0.17** (0.02)	0.07 (0.32)	1.00** (0.00)
INSTITUTIONAL FLOWS	Flows	Past Return	Future Return
Flows	1.00** (0.00)		
Past Return	0.08 (0.26)	1.00** (0.00)	
Future Return	0.10 (0.17)	0.07 (0.32)	1.00** (0.00)

Notes: The p-values are from Pearson's correlation using a student's t distribution for a transformation of the correlation. This is exact when X and Y are normal when the procedure computes p-values for Kendall's tau and Spearman's rho using either the exact permutation distributions (for small sample sizes), or large-sample approximations.

Table 3A: Retail flows and returns for equity mutual funds

Months	Flows v Past Return	P-Value		Flows v Future Return	P-Value	
1	21.29%	0.18%	**	4.72%	49.30%	
2	22.65%	0.09%	**	-1.68%	80.89%	
3	24.93%	0.03%	**	-4.87%	48.41%	
4	30.63%	0.00%	**	-7.96%	25.39%	
5	36.93%	0.00%	**	-12.77%	6.80%	*
6	39.95%	0.00%	**	-16.82%	1.65%	**
7	38.35%	0.00%	**	-15.28%	3.03%	**
8	37.07%	0.00%	**	-12.28%	8.39%	*
9	38.13%	0.00%	**	-10.36%	14.72%	
10	37.26%	0.00%	**	-9.59%	18.21%	
11	36.31%	0.00%	**	-9.23%	20.15%	
12	36.73%	0.00%	**	-8.69%	23.17%	
13	38.32%	0.00%	**	-9.27%	20.48%	
14	36.91%	0.00%	**	-10.27%	16.18%	
15	35.65%	0.00%	**	-12.62%	8.71%	*
16	35.71%	0.00%	**	-16.45%	2.60%	**
17	35.81%	0.00%	**	-19.54%	0.84%	**
18	35.04%	0.00%	**	-21.96%	0.31%	**
19	34.05%	0.00%	**	-21.46%	0.41%	**
20	31.33%	0.00%	**	-20.71%	0.60%	**
21	30.36%	0.00%	**	-21.43%	0.46%	**
22	28.09%	0.02%	**	-22.09%	0.37%	**
23	26.60%	0.05%	**	-22.88%	0.28%	**
24	25.99%	0.07%	**	-24.08%	0.17%	**

Notes: This table presents the correlations between mutual fund flows and both past and future returns, using aggregate IMA fund flow data on equity market mutual funds. The p-values are from Pearson's correlation using a student's t distribution for a transformation of the correlation. This is exact when X and Y are normal when the procedure computes p-values for Kendall's tau and Spearman's rho using either the exact permutation distributions (for small sample sizes), or large-sample approximations.

Table 3B: Institutional flows and returns for equity mutual funds

Months	Flows v Past Return	P-Value		Flows v Future Return	P-Value	
1	2.71%	69.44%		11.98%	8.10%	*
2	0.61%	93.02%		6.66%	33.59%	
3	3.85%	57.97%		10.27%	13.91%	
4	5.81%	40.58%		7.75%	26.72%	
5	6.56%	34.99%		9.00%	19.91%	
6	7.98%	25.75%		9.62%	17.21%	
7	6.52%	35.81%		10.81%	12.67%	
8	5.38%	45.02%		10.93%	12.43%	
9	0.22%	97.54%		11.16%	11.86%	
10	3.77%	60.06%		9.92%	16.77%	
11	1.32%	85.49%		6.46%	37.18%	
12	2.59%	72.25%		7.96%	27.37%	
13	-0.38%	95.82%		5.95%	41.57%	
14	-2.55%	72.92%		5.61%	44.55%	
15	-2.38%	74.82%		5.46%	46.06%	
16	-3.55%	63.32%		4.30%	56.32%	
17	-4.95%	50.80%		1.52%	83.86%	
18	-3.47%	64.49%		2.92%	69.78%	
19	-4.34%	56.66%		5.72%	44.94%	
20	-5.27%	48.82%		5.76%	44.87%	
21	-5.26%	49.19%		4.14%	58.88%	
22	-5.67%	46.14%		4.36%	57.08%	
23	-9.24%	23.24%		4.85%	53.11%	
24	-12.08%	12.00%		3.12%	68.86%	

Notes: This table presents the correlations between mutual fund flows and both past and future returns, using aggregate IMA fund flow data on equity market mutual funds. The p-values are from Pearson's correlation using a student's t distribution for a transformation of the correlation. This is exact when X and Y are normal when the procedure computes p-values for Kendall's tau and Spearman's rho using either the exact permutation distributions (for small sample sizes), or large-sample approximations.

Table 4: The performance gap for equity mutual funds

	Monthly	Annual
Implied Time Weighted Return	0.53%	6.51%
Money Weighted		
Total	0.46%	5.70%
Retail	0.44%	5.35%
Institutional	0.51%	6.24%
Performance Gap		
Total	-0.06%	-0.82%
Retail	-0.09%	-1.17%
Institutional	-0.02%	-0.27%

Notes: This table presents both the money-weighted and time-weighted returns from investing in equity market mutual funds, derived from aggregate IMA data. The difference between these two return measures represents the performance gap.

Table 5: Fund level performance gaps by equity market sector

	# of funds	Time Weighted	Money Weighted	Performance Gap	Per annum
Asia	146	1.10%	1.05%	-0.05%	-0.60%
Europe	157	0.63%	0.76%	0.13%	1.52%
Emerging	58	1.89%	1.86%	-0.04%	-0.44%
UK	548	0.35%	0.31%	-0.04%	-0.50%
US	101	0.13%	0.13%	0.00%	0.04%
Global	352	0.42%	0.23%	-0.19%	-2.27%

Notes: This table presents both the money-weighted and time-weighted returns from investing in equity market mutual funds, using fund level data from the Lipper fund database extracted using Reuters 3000 Xtra. The includes all equity focussed funds that are denominated in sterling and registered for sale in the United Kingdom. The difference between these two return measures represents the performance gap for each equity market sector.

Table 6: The correlation between mutual fund bond flows and returns

Panel A: Over twelve months

Correlation Matrix (p values in parenthesis)			
ALL FLOWS	Scaled Flows	Past Return	Future Return
Scaled Flows	1.00** (0.00)		
Past Return	0.03 (0.68)	1.00** (0.00)	
Future Return	0.02 (0.79)	-0.27** (0.00)	1.00** (0.00)

Panel B: Over six months

Correlation Matrix (p values in parenthesis)			
ALL FLOWS	Scaled Flows	Past Return	Future Return
Scaled Flows	1.00** (0.00)		
Past Return	0.04 (0.55)	1.00** (0.00)	
Future Return	0.02 (0.80)	-0.11 (0.10)	1.00** (0.00)

Notes: The p-values are from Pearson's correlation using a student's t distribution for a transformation of the correlation. This is exact when X and Y are normal when the procedure computes p-values for Kendall's tau and Spearman's rho using either the exact permutation distributions (for small sample sizes), or large-sample approximations.

Table 7: Retail flows and returns for bond mutual funds

Months	Flows v Past Return	P-Value		Flows v Future Return	P-Value
1	-1.48%	82.99%		-0.95%	89.07%
2	-3.61%	60.24%		3.44%	61.94%
3	-1.22%	86.10%		3.02%	66.40%
4	1.37%	84.48%		1.50%	82.99%
5	3.31%	63.77%		0.46%	94.73%
6	4.18%	55.42%		1.77%	80.24%
7	6.90%	33.02%		6.67%	34.69%
8	5.11%	47.35%		8.93%	20.99%
9	4.50%	53.02%		9.56%	18.15%
10	3.32%	64.46%		11.11%	12.20%
11	4.04%	57.71%		5.80%	42.30%
12	3.04%	67.63%		1.95%	78.89%
13	0.59%	93.55%		-0.25%	97.27%
14	-4.10%	57.76%		-0.71%	92.27%
15	-8.36%	25.79%		0.13%	98.64%
16	-10.56%	15.50%		-0.14%	98.46%
17	-14.34%	5.41%	*	0.62%	93.44%
18	-16.16%	3.06%	**	1.09%	88.45%
19	-16.62%	2.71%	**	3.13%	67.96%
20	-19.64%	0.92%	**	4.43%	56.03%
21	-21.16%	0.52%	**	6.07%	42.75%
22	-22.97%	0.25%	**	4.70%	54.12%
23	-24.27%	0.15%	**	3.64%	63.85%
24	-25.04%	0.11%	**	1.54%	84.32%

Notes: This table presents the correlations between mutual fund flows and both past and future returns, using aggregate IMA fund flow data on bond market mutual funds. The p-values are from Pearson's correlation using a student's t distribution for a transformation of the correlation. This is exact when X and Y are normal when the procedure computes p-values for Kendall's tau and Spearman's rho using either the exact permutation distributions (for small sample sizes), or large-sample approximations.

Table 8: The performance gap for bond mutual funds

	Monthly	Annual
Implied Time Weighted Return	0.45%	5.59%
Money Weighted		
Total	*0.54%*	*6.66%*
Performance Gap		
Total	*0.08%*	*1.07%*

Notes: This table presents both the money-weighted and time-weighted returns from investing in bond market mutual funds, derived from aggregate IMA data. The difference between these two return measures represents the performance gap.

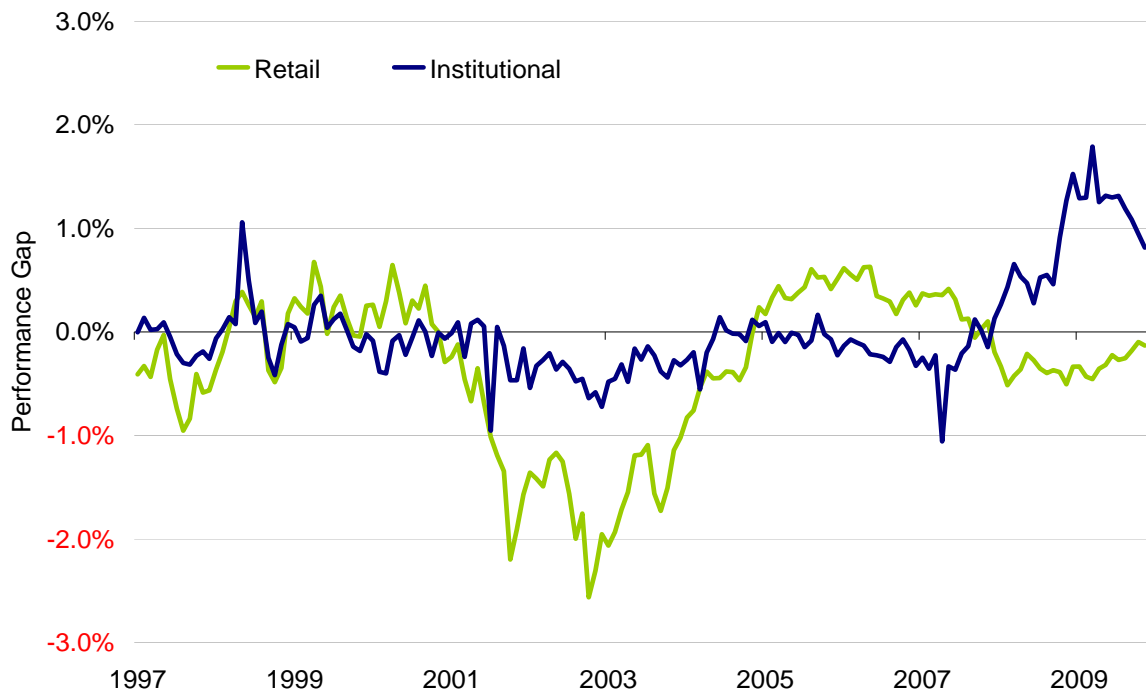**Figure 1: The time varying performance gap for equity mutual funds**

Figure 2: The time varying performance gap for bond mutual funds