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The Norwegian Mutual Fund Market:

An Empirical Analysis of the Relationship Between Fund Flows and Fund Performance

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Table of Contents

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Abstract

In this paper, we study the motivation behind flows of capital from investors going into and out of active Norwegian mutual funds, and investigate whether fund flows could partly explain the widespread evidence of non-persistence in fund performance. The data set contains monthly observations from June 1999 to December 2015. To our knowledge the sample is free of survivorship bias and consists of 97 Norwegian mutual funds. We test the impact of returns on flows by running a piecewise linear regression to study investors' reaction to past performance. Further, we examine if returns are predictable using Flow as an explanatory variable in the short run through a regression with return as the dependent variable. For the long run, we sort funds into quintiles based on accumulated flows over horizons stretching from 3 months to 5 years, and observe the average excess returns in the following period. Our results indicate that there has been a change in investor behavior in light of the Great Recession in 2007-2009, where a strong asymmetric flow-performance relationship observed before the crisis cease to exist in the following years. We are not able to document that fund flows have an effect on performance in the short run. However, we find that it becomes increasingly difficult for managers of large funds with the highest accumulated inflows to generate excess returns as the time horizon increases.

1.0 Introduction

In this paper, we investigate the motivation behind the inflow and outflow of capital in Norwegian active mutual funds, and observe whether these flows have an effect on future performance. The paper has two parts, the first part focuses on active mutual fund investor reactions to past performance, and the second focuses on how performance is affected by fund flows. Our motivation for writing this paper came from findings of several studies providing evidence against actively managed mutual funds' ability to outperform passive strategies. Since Jensen (1968)'s pioneer work on risk adjusted performance of mutual funds, a large literature such as Fama and French (1993), Hendricks, Patel and Zeckhauser (1993) and Carhart (1997), find strong empirical evidence that active mutual fund performance does not persist over time. Sørensen (2009) tested performance and its persistence on Norwegian equity mutual funds, finding no statistically significant evidence of risk-adjusted abnormal returns for an equally weighted portfolio of mutual funds. Regardless of these findings, investors are investing heavily in active mutual funds. From the data received by the Norwegian Fund and Asset Management Association (VFF), we find that in December 2015 more than NOK 70bn were invested in Norwegian registered active mutual funds, while only NOK 16.5bn were invested in passive mutual funds (see Appendix 2: Figure 1). It is easy to make the conclusion that the lack of persistence in mutual fund performance imply that there does not exist any stock picking skills among mutual fund managers. If fund managers do not provide any stock picking skills; it is a puzzle why investors are willing to pay a fee for these funds.

Berk and Green (2004) challenge the idea of lack of superior stock picking skills among fund managers. Rational investors would not reward fund managers that do not provide them any extra gain. Therefore, Berk and Green (2004) came up with the theory for which active managers do not outperform passive strategies because investors competitively supply funds to skilled managers, and fund managers experience decreasing returns to scale in their ability to outperform the benchmark. There are differences in the ability to generate superior returns across managers, and investors learn about managerial ability through past returns. Investors supply funds to past winners to the point where the fund becomes too large and is not

expected to generate abnormal returns in the future. On the contrary, investors withdraw funds from the poor performers to the point where the fund is no longer expected to underperform.

Our paper is partly motivated by the theory of Berk and Green (2004), particularly how investor behavior to past performance have an effect on future fund performance. To examine this relationship, we propose the two following research questions:

1. *Does past fund performance affect flows into Norwegian mutual funds?*
2. *Do flows into Norwegian mutual funds affect future fund performance?*

There is a fairly large literature related to the first research question. Our initial expectations are based upon the findings by Ippolito (1992), Chevalier and Ellison (1997), and Sirri and Tufano (1998), that flows into and out of mutual funds are strongly related to past measures of excess return. Sirri and Tufano (1998) find that investors are flocking to U.S. equity mutual funds with the highest past returns, while they tend to stay in funds that have performed poorly generating a convex flow-performance relationship. These findings are partly in line with Berk and Green (2004)'s theory, where investors supply a significantly larger amount of capital to recent top performers. If fund managers operate under decreasing returns to scale, these heavy inflows will explain why there is no persistence in mutual fund performance. However, the finding that investors do not sell out of the poorest performers at the same rate, contradicts Berk and Green (2004)'s theory.

Our initial expectations with respect to the second research question reconciles with Berk and Green (2004)'s theory that fund flows will have an effect on fund performance. Edelen (1999) finds a negative and statistically significant relationship between investor flows and fund returns for 166 U.S. mutual funds. He argues that fund managers provide a costly liquidity service for their investors. After a flow shock, the fund manager will experience losses when adjusting its portfolio. Therefore, we find it reasonable to believe that fund flows could help explain the non-persistence in mutual fund performance. In contrast to Edelen

(1999), Benson, Faff and Smith (2010) finds that current flows and lagged flows have no effect on returns, similar to our initial findings. Chen, Hong and Kubik (2004) document that fund size erodes performance, leading us to look at longer horizons of flows. The underlying assumption is that large fund inflows over long horizons will lead to an increased fund size. Therefore, we try to capture the size effect by accumulating fund flows.

From our analysis we find that historically, investors in Norwegian mutual funds have behaved similar to U.S. mutual fund investors. Meaning that they have supplied significantly more funds to recent top performers, while not dropping out of recent worst performers. However, after the financial crisis in 2007-2009, investors have become less reluctant to withdraw their money from the worst performers, and more skeptical to continuance of high performance. When we investigate the opposite relationship, we find no effect from fund flows on performance in the short run. However, as flow accumulate over time, our results indicate that it becomes more challenging for fund managers to invest funds successfully, and generate excess return.

To our knowledge, this is our contribution to the literature as there are no other papers looking at the flow-performance relationship for the Norwegian mutual fund market. Our finding that the asymmetric flow-performance relationship has disappeared after the financial crisis is particularly interesting, as it suggests that the financial crisis might have induced changes in investor behavior.

The rest of the paper is organized as follows: Section 2 provides a review of previous research literature on similar studies and related theory. Section 3 describes the data and sample composition. Section 4 describes the methodology used. Section 5 gives the empirical results and interpretation. Section 6 concludes the study.

2.0 Literature Review and Theory

In 1970, Eugene Fama formulated his well-known efficient market hypothesis (EMH) saying that stock prices reflect all available information, making it impossible to find mispriced securities and generate abnormal returns. If this theory holds it should be impossible for active managers to systematically outperform the market. Jensen (1968)'s pioneer work on mutual fund performance gives support to the EMH. With a sample of 115 U.S. mutual funds in the period 1945-1964, he finds that these funds were not able to outperform a "buy-the-benchmark-and-hold" strategy, on average. Since then, several other papers such as Fama and French (1993), Elton, Gruber and Blake (1995), and Carhart (1997) have used different risk adjusted performance measures, finding no evidence of abnormal returns for an equally weighted portfolio. Following Fama and French (1993) and Carhart (1997), Sørensen (2009) tests mutual fund performance for the Norwegian market. As expected, he could not find any evidence of persistence in fund performance for an equally weighted portfolio.

On the theoretical side, Berk and Green (2004) provide a rational expectations model, explaining the non-persistence in mutual fund performance. They argue that there in fact exist skilled active fund managers who are able to outperform the market. However, they are not able to outperform the market in the long-run because rational mutual fund investors are constantly chasing performance. Mutual fund investors view past abnormal returns as indication of skills and will actively supply funds to these skilled managers. As the fund grows it becomes increasingly difficult for the manager to sustain the abnormal return. Fund managers' ability to outperform the market is assumed to exhibit decreasing returns to scale. The fund inflow will continue until the size of the fund reaches a point where the manager is no longer able to outperform in the future, at which point the inflow of funds will cease. For poorly performing funds there will be an outflow of funds until the point at which the underperformance ceases.

There is a large empirical literature supporting the idea of Berk and Green (2004) that mutual fund investors chase performance. Ippolito (1992) is among the first to investigate investor reactions to fund performance. His sample consisted of 143

U.S. open-ended mutual funds from the beginning of 1965 through 1984. Using the Capital Asset Pricing Model (CAPM) for risk-adjusted performance, he detects a clear underlying movement of investment money toward recent good performers and away from recent poor performers. In addition, he detects that the relationship is asymmetric; Investors flock to funds that perform better than the market while failing to flee underperforming funds at the same rate.

Like Ippolito (1992), Sirri and Tufano (1998) find empirical evidence from 690 U.S. mutual funds during the period December 1971 to December 1990 that there is a relationship between past measures of performance and fund flows. They rank all funds based on past year performance, and sort them into five quintiles. By utilizing a piecewise linear regression, they are able to separately calculate the sensitivity of fund growth to performance for each performance quintile. The results indicate that mutual fund inflows are sensitive to historical performance, but the sensitivity is not linear. For top performers, inflows are highly sensitive to past performance and statistically significant. As fund performance diminishes, the sensitivity weakens. For worst performers, there is virtually no relation between inflow and past performance.

Chen et al. (2004) studied a sample of 3,439 distinct, diversified U.S. equity mutual funds in a time span from 1962 to 1999, collected from the Center for Research in Security Prices (CRSP) Open-End Mutual Fund Database. They find strong empirical evidence that fund size erodes performance. They discuss various explanations for the negative relationship between fund size and performance, but conclude that it is due to trading costs associated with liquidity and price impact. The larger the fund, the more difficult it becomes for the fund manager to trade efficiently in stocks without moving the underlying price. To support the “liquidity hypothesis”, they find that fund size erodes performance much more for funds who have to invest in small, often illiquid stocks. They argue that small funds can easily put all their money in their “best ideas”, whereas a lack of liquidity forces larger funds to invest in their “not so good ideas” and take larger positions in a stock than what is optimal, thereby eroding performance. These results are consistent with

Berk and Green (2004)'s theory that fund size plays an important role in fund management.

Edelen (1999) questions the widespread empirical evidence of zero abnormal returns, and consequently, the inability of mutual fund managers to outperform the market. Since mutual fund investors supply and withdraw funds unsystematically, mutual fund managers provide a liquidity service for their investors. He argues that when a fund experiences a cash flow shock, the manager has to perform liquidity-motivated trading to get back to an efficient portfolio. Edelen finds a negative and statistically significant relation between investor flows and fund returns, that he argues arises from the cost of liquidity motivated trading.

Alexander, Cici and Gibson (2007) report that mutual fund managers who are forced to perform liquidity-based trading rather than valuation-based trading after an excessive inflow, tend to result in significant losses. Valuation based trading refers to a situation where the fund manager believes that a stock is significantly undervalued and therefore wants to buy its shares. However, heavy inflows will force the manager to invest excess cash by buying other stocks that are not necessarily undervalued at the time. Similarly, heavy investor outflows will constrain the manager by forcing him or her to control liquidity by selling stocks. These constraints force the manager to perform inefficient trading, potentially leading to significant losses.

Benson et al. (2010), look at the endogenous relationship between mutual fund flows and returns. Using a sample consisting of 7390 funds from the CRSP mutual fund database, they find that current returns together with past returns have a positive impact on flow. This implies that investors are quick to recognize high performing funds and allocate their funds accordingly. Additionally, they find that current flows and lagged flows have no impact on returns, contradicting the results found by Edelen (1999) and Alexander et al. (2007).

Frazzini and Lamont (2008) study how U.S. mutual fund investors allocate their money. They find evidence of individual investors being "dumb money" as they

send money to mutual funds that underperform over the subsequent few years. At the beginning of every calendar month, they rank all funds based on the latest available flow and assign them to one of five quintile portfolios. When examining average portfolio excess returns in period *t*, they find that funds with high inflow underperform low inflow funds when the flow is computed over horizons stretching from six months to five years.

3.0 Background and Data

3.1 Fund Data

Data on fund flows and total assets were provided by The Norwegian Fund and Asset Management Association (VFF), containing monthly data on all Norwegian equity funds with specifications on subscriptions and redemptions during each period. The data goes back to January 1998, however, VFF only reported the totals of each Norwegian fund provider until May 1999. They began reporting monthly data on each Norwegian mutual fund separately in June 1999. Thus, we use monthly data from June 1999 to December 2015.

3.1.1 Survivorship Bias

We have constructed our dataset with the intention to avoid potential survivorship bias. Brown, Goetzmann, Ibbotson and Ross (1992) argue that by excluding short lived funds, there will be a biased inference on funds abnormal returns. This is because funds usually cease to exist due to bad performance. By excluding these funds, the sample would mainly consist of high performing long-lived funds. To have a sample free of survivorship bias we therefore include as many short-lived funds as possible. However, each fund must have sufficient observations for reliable statistical inference. We define all applicable funds as those with at least 1 year track-record, so to have at least 12 observations. All funds with a lifespan less than one year have therefore been dropped from the data set. Ending up with a sample consisting of 97 active Norwegian mutual funds (Appendix 1: Table 1), with 10.3 years of observations per fund on average.

3.1.2 Fund Names

As mentioned earlier, VFF reports monthly data on fund flows. VFF creates excel files on fund data (in the immediate following month after the occasions), but they rarely report that funds have changed names. Thus, we faced a problem regarding name changes on the funds, as we desire to track each fund over time, and some of the longest living funds have changed name up to four times. Therefore, it has been necessary to manipulate the data set, such that each fund has the same name from

start to end. The last reported fund names have been used through the entire sample. The same goes for the fund providers, as many Norwegian mutual funds have changed ownership during their life span.

3.1.3 Retail vs Institutional Investors

Our sample consist of both funds with retail investors and funds with institutional investors. In our robustness tests in the analysis, we find that retail and institutional investors do not behave very differently in the Norwegian mutual fund market, so we find it reasonable to use the full sample for our main results.

3.2 Factors for Performance

There are several factors necessary to compute fund performance when using the models explained in the methodology chapter, that is;

1. Fund returns
2. Risk free rate
3. Market return
4. Norwegian factor returns

Fund returns (1) are computed using data provided by VFF and the following rewritten formula given by Sirri and Tufano (1998):

$$R_{i,t} = \frac{(TNA_{i,t} - Flow_{i,t})}{TNA_{i,t-1}} - 1, \quad (1)$$

where $TNA_{i,t}$ is total net assets in period *t* for fund *i*, TNA_{t-1} is total net assets in the previous period for fund *i*, and $Flow_{i,t}$ is the net inflow of capital by investors in period *t* for fund *i*. The reported TNA are total asset under management after fees are deducted. Therefore, when computing returns by formula (1), we obtain the actual returns to investors.

The risk-free rate (2), market return (3) and Norwegian Factor returns (4) are downloaded from Bernt Arne Ødegaard's webpage. The risk-free rate is an estimated, forward looking borrowing interest rate at a monthly frequency. In

Norway, most passive mutual funds are tracking the OBX Total Return Index. Based on the assumption that investors in active mutual funds expect the fund manager to "beat the market", and always consider investing in passive strategies if they perceive it as more profitable, we find the OBX to be the most suited proxy for the benchmark. The OBX consists of the 25 most liquid stocks at the Norwegian equity market, ranged by the previous six months' turnover, revised twice a year.

Furthermore, the Norwegian factor returns (4) are the size factor; SMB, the value factor; HML, and the momentum factor; PR1YR. SMB and HML are premiums required by investors due to differences in companies' cost of capital. The cost of capital of a firm is related to its associated risk, and higher risk cause higher required return. SMB is the difference in return between the smallest and the largest stocks, as smaller companies generally pay more for capital when borrowing or issuing securities. HML is the difference in return between the 30% highest book-to-market ratio stocks and 30% lowest book-to-market ratio stocks. Stocks with high book-to-market ratios are recognized as value stocks, while low ratios recognize growth stocks. The motivation behind the momentum factor, PR1YR, is to adjust for the effect of return trends where high return stocks continue to deliver high returns while low returns stock continue to deliver low returns.

3.3 Descriptive Statistics

Panel A of Table 2 shows a descriptive for fund characteristics. Looking at the time horizons, we observe that approximately 55% of the sample are funds living more than 10 years, while roughly 30% are funds living less than 5 years and the rest is in between. Note that the funds might have lived several years before our sample begins, since Norwegian mutual fund market flourished between 1970 and 1990 according to VFF. Moreover, we construct a dummy variable that takes the value of one when a fund has changed name, and zero otherwise. We observe that funds with more than 10 years of observations have on average changed names approximately 1.5 times. In total, all funds in the sample have on average changed name once during the sample period 1999-2015, making it reasonable to assume that they might have changed fund manager and strategy within the sample period.

Panel B of Table 2 shows a descriptive statistic of the Norwegian one-month risk free rate, four return factors for the Norwegian market, as well as the excess return and the Flow factor (further explained in chapter 4.1.2 “Flow”) for an equally weighted portfolio of all Norwegian active mutual funds between August 1999 and December 2015. The *Excess Return Equal Weighted Portfolio* exhibits an average return of 0.58% (t-stat: 1.29) per month, but is not statistically significant. Similar, the *Market Risk Premium* is neither significant, but exhibits an average return of 0.62% (t-stat: 1.35) per month. The remaining return factors are all statistically significant, where the size factor *SMB*, the value factor *HML* and the momentum factor *PR1YR* exhibit an average monthly return of 0.56% (t-stat: 3.89), -0.10 (t-stat: 4.63) and 1.00 (t-stat: 4.67) respectively. The *Flow Equal Weighted Portfolio* exhibits a statistically significant monthly inflow of 0,53% (t-stat: 2.88). Considering the distributions, the highest skewness (2.83) and kurtosis (17.31) is found in *Flow Equal Weighted Portfolio*, meaning that it shows large and mostly positive realizations.

Panel C of Table 2 displays the correlation-matrix for the factors mentioned above. As expected, the correlation between the Excess Return Equal Weighted Portfolio and the Market Risk Premium is close to a prefect positive correlation (0.96). Further, there is a relatively large negative correlation (-0.54) between the Market Risk Premium and SMB. This is not surprising considering that SMB portfolios go short in big stocks opposed to the market portfolio (OBX) that consist of the largest most liquid stocks. The remaining correlations are relatively small.

Table 2 : Descriptive Statistics

This table provides selected descriptive statistics for the Norwegian 1-month risk free rate, an equal weighted portfolio of the funds in our dataset, as well as all the factors considered and used throughout our analysis. Returns, standard deviation, max and mean values are reported as percentage on a monthly basis. The market risk premium is the OBX total return Index minus the Norwegian 1-month risk free rate. A thorough description of the Flow factor is provided in chapter 4.1.2 "Flow" and description of remaining factors are provided in chapter 3.2 "Factors for Performance".

Panel A: Fund Descriptives	Short (<= 5 yr)	Medium (>5yr, <10 yr)	Long (> 10yr)				
Number of Funds	30	14	53				
Number of Name Changes	8	11	78				
Mean Total Net Assets in NOK (1000)	371 799	432 644	739 167				
Panel B: Factor Descriptives	Risk-free Rate	Excess Return Equal Weighted Portfolio	Market Risk Premium	SMB	HML	PR1YR	Flow Equal Weighted Portfolio
Average Return/Flow	0,30	0,58	0,62	0,56	-0,10	1,00	0,53
Standard Deviation	0,18	6,35	6,42	3,89	4,63	4,67	2,88
t-statistics	23,95	1,29	1,35	2,01	-0,31	2,99	2,59
Max	0,64	15,66	17,05	13,28	9,33	15,43	19,82
Min	0,08	-26,54	-25,99	-11,03	-16,65	-16,09	-6,83
Skewness	0,64	-0,86	-0,91	0,14	-0,52	-0,40	2,83
Kurtosis	1,81	5,08	5,27	4,34	4,01	4,43	17,31
Panel C: Cross-correlations							
Risk-free Rate	1,00						
Excess Return Equal Weighted Portfolio	-0,27	1,00					
Market Risk Premium	-0,25	0,96	1,00				
SMB	0,14	-0,45	-0,54	1,00			
HML	0,08	-0,25	-0,18	0,01	1,00		
PR1YR	-0,06	-0,24	-0,20	0,17	-0,02	1,00	
Flow	0,11	0,14	0,13	-0,06	-0,04	-0,09	1,00

4.0 Methodology

The work by Sørensen (2009), Sirri & Tufano (1998), Benson et al. (2010) and Frazzini & Lamont (2008) serves as a point of departure in this chapter. First, we define our measures of performance and flow. Then, we describe the methodology used to study investor reactions to past performance. Lastly, we describe the methodology used to examine whether returns are predictable using flow as an explanatory variable.

4.1 Measures of Performance and Flow

4.1.1 Factor Models for Performance

The models we consider in our estimation of performance are unconditional factor models which can be specified as follows:

$$R_{i,t}^{e} = \alpha_i + \sum_{j=1}^{K} \beta_{i,j} \times f_{j,t} + \varepsilon_{i,t}, \quad (2)$$

where $R_{i,t}^{e} = (R_{i,t} - r_{f,t})$ is excess return of fund *i* at time *t*, that is the funds' raw return minus the risk-free rate. α_i is the estimated abnormal return, K is the number of factors, $\beta_{i,j}$ is fund *i*'s loading to the risk factor *j*, $f_{j,t}$ is the value of risk factor *j* at time *t* and $\varepsilon_{i,t}$ is the error term of the model.

The simplest form of the unconditional factor models is based on the capital asset pricing model (CAPM) including only one factor, developed by Jensen (1968). In this model, the asset's excess return is a linear function of the market risk premium $(R_{m,t} - r_{f,t})$ and the systematic risk β_i, where the market return, $R_{m,t}$ is the return of the Standard and Poor Composite 500 index. The α_i in CAPM is referred to as Jensen's Alpha, and is commonly used as a measure of performance. The model has been extended in numerous ways by including additional risk factors or allowing for time-varying coefficients. In all cases, the constant term serves as a performance measure.

Even though the CAPM has been popular for decades, Fama and French, among others, find evidence of funds focusing on small firms and value stocks frequently

generated positive abnormal returns relative to the CAPM model, even for funds without managers that possess superior stock picking skills. This led to the design of the Fama and French three-factor model which includes a risk factor for firms with small market capitalization (SMB) and a risk factor for firms with high book-to-market ratio (HML). SMB is related to the assumption that small firms are known to be more volatile than large firms, due to cash-flow uncertainties and other strategic risks, leading to higher cost of capital and therefore a higher required return from investors. The HML factor relates to the increased requirement of return on firms that have had a decreasing market value, driven by unfavorable news, resulting into financial distress.

Carhart (1997) augmented the Fama and French three-factor model with an additional factor to capture Jegadeesh and Titman (1993)'s one year momentum anomaly. The momentum factor, PR1YR (prior one year) is added to capture the market inefficiency of return trends, where stock prices have a tendency to continue rising if going up and continue declining if going down. He showed that the PR1YR factor reduced the error term in risk-adjusted returns obtained by the model. This led to a significant increase in adjusted R^2, which means improved explanatory power of the model relative to previous factor models.

Sørensen (2009) used three models estimating fund performance on Norwegian mutual funds. The models were based on CAPM one-factor model, Fama & French three-factor model and Carhart four-factor model. Several researchers conclude that the latter model describes risk-adjusted returns most accurately as it exhibits the utmost information. For this reason, the Carhart model will be used in this paper as well. Hence, we compute fund performance on each fund through the following regression:

$$R_{i,t}^{e} = \alpha_i + \beta_1 R_{m,t}^{e} + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 PR1YR_t + \varepsilon_{i,t}, \qquad (3)$$

where $R_{i,t}^{e} = (R_{i,t} - r_{f,t})$ is excess fund return, α_i is the estimated abnormal return, and $R_{m,t}^{e} = (R_{m,t} - r_{f,t})$ the market risk premium. The size factor SMB_t, the value factor HML_t and the momentum factor $PR1YR_t$, are all return factors from the Norwegian equity market.

Additionally, we experiment by including a fifth factor to the Carhart four-factor model. The fifth factor is the Flow factor, individual to each fund, that essentially exhibits unsystematic volatility. The motivation behind this inclusion, is to see whether fund flows can explain funds' variation in return beyond the ability of the market models. Intuitively, the Flow factor might give indications on how the funds' return reacts to inflows and outflows of capital supplied by the investors. With the measure of performance relating to the fund managers' ability to pick high-yielding stocks, it is reasonable to ask the question whether these fund managers face the same level of challenge. Berk and Green (2004) argue that there exist skilled fund managers, but investors constantly chase performance, causing decreasing returns to scale for the skilled manager. Therefore, we run the following augmented Carhart regression model on each fund separately:

$$R_{i,t}^{e} = \alpha_i + \beta_1 R_{m,t}^{e} + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 PR1YR_t + \beta_5 Flow_{t-1} + \varepsilon_{i,t}, \quad (4)$$

where we include one-month lagged flow as we assume that fund managers are not able to reallocate new funds into stocks that generate returns instantly. Without knowing the distribution of fund flows through a month, we lag the flow variable to capture the effect of an entire month of flows on returns the following month.
From our analysis, we do not find a strong relation between current returns and one-month lagged flows. Therefore, we look at the direct effect from current flows on current returns to investigate the relationship further. The augmented Carhart regression model is then specified as follows:

$$R_{i,t}^{e} = \alpha_i + \beta_1 R_{m,t}^{e} + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 PR1YR_t + \beta_5 Flow_t + \varepsilon_{i,t}, \quad (5)$$

4.1.2 Flow

To be consistent with previous studies, we measure Flow as Sirri and Tufano (1998) by computing growth as net flow scaled by total assets in *t-1*:

$$Flow_{i,t} = \frac{Total\ assets_{i,t} - Total\ assets_{i,t-1} \times (1+R_{i,t})}{Total\ assets_{i,t-1}} = \frac{Net\ flow_{i,t}}{Total\ assets_{i,t-1}}, \quad (6)$$

where $Net\ flow_{i,t}$ is the net NOK amount of cash invested by investors to the funds in period *t*, defined as the difference between the funds' total assets in *t* and *t-1*, net of returns obtained in period *t*.

The use of (net) percentage flow eliminates the effect of net cash flows being positively related to the funds' size regardless of performance.

4.1.3 The Great Recession in 2007-2009

Our sample stretches through the financial crisis in 2007-2009, probably the worst financial crisis since the Great Depression in the 1930's. According to Gorton (2010) the financial crisis started in December 2007, with a crisis in the subprime mortgage market in the U.S., that quickly escalated into a worldwide financial crisis lasting until June 2009. The crisis had a great impact on the Norwegian equity market, where stock prices where plummeting (see Appendix 2: Figure 2). Investors sold out of the stock market in panic which led to large drops in security prices. We know that these abnormal market conditions could potentially bias our results, and will therefore additionally investigate the relationship between fund flows and fund returns in the periods before, during and after the crisis.

4.2 The Effect of Returns on Flows

Sørensen (2008) has already shown empirically that Norwegian active mutual funds do not beat passive strategies on average. In the U.S., several studies have tried to explain possible explanations for why active funds do not beat passive strategies (see Edelen (1999), Berk and Green (2004), Chen et al. (2004), Alexander et al. (2007)). So far, similar studies on the Norwegian fund market are missing from the literature. When trying to address this question, we are in part inspired by the Berk

and Green (2004) theory. They argue that active managers do not outperform index funds because investors chase performance, competitively supplying funds to skilled managers, and fund managers' ability to outperform the market deteriorates. To begin with, we evaluate how investors allocate their funds and test empirically whether Norwegian fund investors chase performance in their investment decisions, trying to answer the first research question; "*Does past fund performance affect flows into Norwegian mutual funds?"*

We apply the method adopted by Sirri & Tufano (1998), running a piecewise linear regression to see whether past performance influence fund flows, and if the relationship is asymmetric. Each month we rank funds into a fractional rank between 0 and 1 based on past performance, where 1 is the best performing fund. We determine past performance by Carhart's alpha, computed over a rolling window of the past 12-month period.

Furthermore, we construct quintiles based on the fractional ranks as follows;

$Q1_{i,t} = \min\left[rank_{i,t}, 0.2\right]$,

$Q2_{i,t} = \min[rank_{i,t} - Q1, 0.2]$,

$Q3_{i,t} = \min[rank_{i,t} - Q2, 0.2]$,

$Q4_{i,t} = \min[rank_{i,t} - Q3, 0.2]$,

$Q5_{i,t} = \min[rank_{i,t} - Q4, 0.2]$,

where $rank_{i,t}$ is the fractional rank of fund *i* in month *t*. Hence, if a fund is in the 85th percentile compared to other funds in period *t*, then the particular observation will take on the value 0.2 in Q1, Q2, Q3 and Q4, and the value of 0.05 in Q5.
Finally, we run the following piecewise linear regression:

$$Flow_{i,t} = \alpha_i + \beta_1 Q1_{i,t} + \beta_2 Q2_{i,t} + \beta_3 Q3_{i,t} + \beta_4 Q4_{i,t} + \beta_5 Q5_{i,t} + \gamma_1 Flow_{t-1} + \gamma_2 Log(TNA)_{t-1} + \gamma_3 SD + \varepsilon_{i,t}, (7)$$

where the included control variables are lagged flow, lagged log of total net assets ($Log(TNA)_{t-1}$), and the standard deviation of the previous 12-months returns

(SD). Lagged flow is included because flow tends to accumulate over time, as revealed in Table 11 in our analysis. The lagged log of total assets is included to control for size, as an equal NOK amount of fund flows will have a larger percentage impact on small funds than on larger funds. In our analysis, we find that yearly growth is highest for the riskiest funds, and somewhat higher for the funds with lowest risk, creating a u-shaped pattern (see Appendix 2: Figure 5, panel B). Therefore, standard deviation of past returns is included to control for the riskiness associated with the fund. The estimated quintile coefficients represent flows sensitivity to past performance for each quintile and give the shape of the flow-performance relationship.

4.3 The Effect of Flows on Returns

The second question we address in our thesis is "*Do flows into Norwegian mutual funds affect future fund performance?*". To develop a model that recognizes a causal linkage from fund flows on fund returns, we are partly inspired by Benson et al. (2010). Since we want to examine whether flows as a measure of fund growth have an effect on returns, we conduct the test by using a scaled form of the base case model formed by Benson et al. (2010) who applied the model on level values. Thus, we estimate the following regression model:

$$R_{i,t} = \alpha_t + \beta_1 Flow_{i,t} + \beta_2 Flow_{i,t-1} + \beta_3 R_{i,t-1} + \beta_4 MR_t + \beta_5 MR_{t-1} + \varepsilon_t, \quad (8)$$

where $R_{i,t}$ is the return of fund *i* at time *t*, $Flow_{i,t}$ and $Flow_{i,t-1}$ is the net fund flow to fund *i* at time *t* and *t-1*, $R_{i,t-1}$ is the return of fund *i* at time *t-1* and MR_t and MR_{t-1} is the market return, OBX, at time *t* and *t-1*.

Our results from regression 8 indicates little to none return predictability from fund flows in the short run. From Chen et al. (2004), we know that size might influence return. Therefore, we extend the time frame, to be able to obtain information regarding fund size, as funds with heavy inflows over long horizons become large. Inspired by Frazzini & Lamont (2008), we examine monthly excess returns on portfolios formed by sorting funds on previous flows with more extensive time

horizons. Using this method, we observe whether high inflows or outflows over time have an effect on excess returns. Since we have already observed return as a function of one-month flows, we extend the horizons to quarterly, half-year, one-year, three-year and five-year flow. Furthermore, the portfolios are constructed as quintiles, were the bottom quintile represents funds with least inflows while the top quintile represents funds with most inflows. We rebalance the portfolios every month, and are then able to report time series averages of the sorting variable for each portfolio, and the average excess returns in month *t* of portfolios formed by sorting on the last available flow as of month *t-1*.

4.4 Tools

All raw data were received in excel files, sorted, and then merged to create one sheet of all fund flows, returns, total assets etc. Stata/IC 14.0 is used to add market factors to the sample and run the models above.

5.0 Results and Analysis

5.1 Summary Statistics

Table 3 shows developments in the Norwegian mutual fund market in the years 2000, 2007 and 2015. We observe that the total number of active mutual funds has decreased moderately through time, from an average of 61 funds in 2000 to an average of 53 funds in 2015. Further, the yearly average of total assets into active mutual funds have increased steadily, growing by approximately 40% from NOK 33.7bn in 2000 to NOK 47.2bn in 2007 and 52% from 2007 to NOK 71.6bn 2015. However, looking at Figure 3 (Appendix 2) we see that total fund assets under active management has decreased as a percentage of all assets invested in both active and passive funds. This is consistent with the decrease in average number of investors in active funds from 2000 to 2015. An interesting observation is that the yearly average of total flows to active funds each month has been negative in both 2000, 2007 and 2015. This suggest that the total size of active mutual funds should have decreased, holding returns constant. However, looking at the monthly averages, we observe that positive returns have been between four and five times larger than the negative flows in 2000 and 2007, and 12 times larger in 2015. Thus, we find return to be an important contributor to the growth in total fund assets.

Table 3: Developments in the Norwegian Mutual Fund Market

	2000	2007	2015
Yearly Average Number of Funds	61	59	53
Yearly Average Number of Investors	789 664	418 550	295 328
Yearly Average Total Fund Assets (in NOK 1000)	33 654 352	47 186 181	71 557 978
Yearly Average Total Net Flow (in NOK 1000)	-292 420	-257 490	-385 620
Monthly Average Flow in %	-0,08 %	-0,20 %	-0,04 %
Monthly Average Return in %	0,35 %	0,98 %	0,48 %

The estimation results of Equation (3), (4) and (5) are presented in Table 4, 5 & 6 (Appendix 6). We document a significant positive relationship between lagged flows and current excess returns for 7 out of the 97 funds. Additionally, in 2 cases, the relationship is significantly negative. On average the adjusted R^2 decrease when including the lagged Flow variable to the Carhart four-factor model. This indicates that one-month lagged Flow does not enhance the predictability of returns. However, considering the model with Flow in *t*, we observe a small increase in

explanatory power on average, implying that the Flow factor absorbs some of the variation in returns that is not explained by Carhart's four-factor model. Further, we find current flows to be significantly negative related to current excess returns for 3 funds, while significantly positive for 17 funds.

Overall, the regression results for the Carhart four-factor model when including either lagged or current Flow, indicate that only a handful of the funds experience a significant effect of fund flows on returns. For most of these funds, it seems as if Norwegian fund managers are effectively reallocating new funds into high-yield stocks as flows are positively related to returns in most cases.

Furthermore, the funds' alphas as a measure of performance, do not change severely for the top 5 and bottom 5 funds when current or lagged Flow is included (Appendix 3: Table 7, 8 & 9). However, funds with negative relationship to fund flows achieve a higher ranking relative to other funds, both when including the lagged and current flow variable. The opposite is true for funds with positive fund flows. Interpreting these results is difficult, but they might suggest that the size of fund flows affects fund managers' ability to generate high returns. This indicates that for funds where flows impair performance, the fund managers relative to others are not necessarily less skilled. However, we are not able to document this pattern as significant. Therefore, we investigate the relationship between fund flows and performance more thoroughly in the remaining parts of this chapter.

Figure 4 (Appendix 2) gives an indication that larger funds provide a lower and more stable return relative to smaller funds with larger standard deviations. We observe that fund returns converge towards zero when funds become large. These findings suggest that fund size matter, and that large funds either have less risky strategies, or that fund managers face a greater challenge in picking high-yielding stocks when the fund size is large. The latter relates to the belief that large funds experience larger flows in levels, meaning that either large institutional investors or many small investors simultaneously withdraw and supply larger amounts of NOK to these funds, relative to smaller funds. We interpret this graph to be consistent with the findings of Chen et al. (2004) that document decreasing returns to scale for U.S. mutual funds. They suggest that eroding of performance is due to a lack of

liquidity, forcing larger funds to invest in "not so good ideas", and take larger positions in a stock than what is optimal. Alexander et al. (2007), argue that when funds become large, fund managers are forced to perform more liquidity based trading. Therefore, we expect large funds to experience less volatile outcomes because large liquid stocks often contain less risk. Small funds on the other hand, can more often invest in their "best ideas" which generally are based on the assumption that a stock is undervalued. This can ultimately result in either large wins or large losses.

5.2 The Effect of Returns on Flows

Figure 5, panel A (Appendix 2), depicts the relationship between flows and returns. By constructing ten portfolios on rolling one-year return, rebalanced every month, we document the puzzling convex relationship found by researchers such as Ippolitto (1992) and Sirri & Tufano (1998). The figure indicates that investors are buying heavily into the previous period top performers, but are holding their positions in the worst performers. This convexity provides some support to Berk and Green (2004)'s theory that top performing managers receive high inflows. On the other hand, the convexity contradicts the part of the theory saying that poor performers will experience outflows until underperformance ceases. Lynch and Musto (2003) argue that the convexity is due to a strategy change for the worst performing funds. Funds that have performed badly will change their strategy and past performance will no longer be a good predictor for future performance. Therefore, investors will not flee from poor performers as much as past performance would indicate. Alternatively, the convexity could be explained by the disposition effect, a behavioral bias where investors are reluctant to realize losses. Kahneman and Tversky (1979) argue that "losses have more emotional impact than an equivalent amount of gains". Investors hold on to losing stocks for too long, trying to avoid the pain from realizing losses. As the figure shows, flow is close to zero for the worst performing funds, indicating that investors hold on to losing stocks. Whether this is an irrational behavior or not is difficult for us to conclude.

Furthermore, panel B in Figure 5 (Appendix 2) illustrates the relationship between flows and standard deviations of past returns. Here we have constructed ten portfolios on rolling one-year standard deviation, rebalanced every month. In accordance to the results by Sirri & Tufano (1998), we detect that high risk is connected with the highest growing funds, and there exists a weak u-shaped pattern. Since relative riskiness has an effect on fund growth, we have included it as a control variable in Equation (7) to avoid endogeneity.

We estimate Equation (7) to answer the first research question, "Does past fund performance affect flows into Norwegian mutual funds?". The estimation results are reported in Table 10. In the first column we run the piecewise linear regression over the entire sample period from 1999 to 2015. For all portfolios sorted on performance, except from Q5, the reported coefficient estimates surround zero. The Q5 portfolio consists of funds with past year abnormal returns in the 80th percentile, and are therefore called the "top performers". The Q5 funds experience a spike in inflows, where flows from investors increase TNA by 17.6% in the following month. The Q5 coefficient is only significant at a 10% level, however due to the high increase in magnitude we conclude that top performing funds receive significantly higher inflow from investors than all other funds. Our findings indicate that similar to the U.S. (Sirri & Tufano, 1998), the flow-performance relationship for the Norwegian mutual fund market is also asymmetric. Investors are attracted to past top performers and supply a significant amount to these funds. Whereas for the lower performing funds, investors do not care about past performance when making investment decisions.

Table 10: Estimation Results from Equation (7)

This table shows the estimation results from Equation (7), with Flow in period t as the dependent variable. Standard errors corresponding to the coefficients are reported in parantheses below the coefficient estimates. The construction of quintiles is based on Carhart's alpha estimated on the previous 12-month period for each fund in the sample. Flow(t-1) is the one-month lagged Flow variable. Log TNA (t-1) is lagged log of total net assets. SD is the one-year standard deviation of past monthly returns. Column "Total" refers to the entire sample from 1999 to 2015, "Before" refers to the period August 1999 to November 2007, "During" refers to the period December 2007 to June 2009 and "After" refers to the period July 2009 to December 2015.

Table 10

	Total	Before	During	After
Q1(BOTPERF)	0.007	0.065	-0.115	-0.066
	(0.043)	(0.075)	(0.107)	(0.047)
Q2	0.013	-0.043	0.045	0.064**
	(0.021)	(0.033)	(0.124)	(0.027)
Q3	0.011	0.057	0.072	-0.050**
	(0.022)	(0.037)	(0.124)	(0.023)
Q4	-0.004	-0.055	-0.124	0.075**
	(0.034)	(0.038)	(0.185)	(0.033)
Q5(TOPPERF)	0.176*	0.118***	1.007	0.083
	(0.090)	(0.043)	(0.885)	(0.061)
Flow(t-1)	0.024	0.071**	-0.043	0.050*
	(0.021)	(0.034)	(0.033)	(0.027)
Log TNA(t-1)	-0.019***	-0.022***	-0.151*	-0.023***
	(0.005)	(0.007)	(0.082)	(0.006)
SD	0.133**	-0.027	-0.540	-0.017
	(0.055)	(0.101)	(0.571)	(0.064)
Constant	0.224***	0.261***	1.959*	0.304***
	(0.060)	(0.094)	(1.077)	(0.085)
Adj_R-squared	0.024	0.046	0.032	0.034
N	10032	4578	1092	4303

* p<0.10, ** p<0.05, *** p<0.010

Our sample period consists of probably the most harmful financial crisis since the Great Depression in the 1930's. From December 2007 until June 2009 financial markets all over the world experienced a severe downturn. These extraordinary market conditions could potentially bias our results. Therefore, we have split the sample into before, during and after the crisis, as displayed in the last three columns of Table 10.

In column 2 (*Before*) of Table 10 we observe that the convex flow-performance relationship found for the whole sample is present before the crisis. The Q1 till Q4 coefficients remain statistically insignificant, while the Q5 coefficient spikes up. Funds falling into the Q5 quintile experience an inflow that increases TNA by 11.8% in the following month, significant at a 1% level. The convex flow-performance relationship is much more significant before the crisis than for the

entire sample period, indicating that the sample period stretching from the financial crisis and onwards dilutes the initial results.

During the financial crisis the Q5 coefficient is very high, predicting that the top performing funds experience an increase in TNA by 100.7% in the following month. However, with a standard deviation of 0.885 the coefficient is statistically not different from zero. During the crisis there seems to be no relationship between past performance and flow as all quintile portfolio coefficients are statistically insignificant, and the convex flow-performance relationship observed before the crisis is permanently absent. This implies that fund allocations from investors were driven by other external factors rather than performance during the turbulent time period.

After the crisis, the flow-performance relationship does not reappear as convex, as the Q5 coefficient is not statistically different from zero. Now the second best and second worst performing funds seem to receive more inflows, while there is a significant outflow from the mid performer, Q3. Our results seem to suggest a possible change in investor psychology after the financial crisis. Investors are more skeptical about whether past performance will persist and do no longer chase past winners at the same rate. The International Money Fund (IMF) report in their Global Financial Stability Report from September 2011 that "The crisis appears to have had an enduring effect on investor behavior", and that they find structural breaks in investor behavior after the 2007-2009 financial crisis. From Figure 3 (Appendix 2), we observe a clear drop in the ratio of total assets to active funds during the crisis. The ratio continues to decrease in the years after, suggesting perhaps that investor preferences have changed after suffering through the crisis. This further supports the argument that investors have become more skeptical to active mutual funds. We believe that these results are very interesting, since they suggest a severe change in investor behavior after the financial crisis, and contradict previous studies performed on pre-crisis samples.

5.3 The Effect of Flows on Returns

So far, we have found for our full sample length that there is a significant inflow to recent winners, supporting the Berk and Green (2004) assumption that recent

winners receive large inflows. We will now proceed with our second research question, "*Do flows into Norwegian mutual funds affect future fund performance?"*. The estimation results of Equation (8) is presented in Table 11. The first column (*Total)* shows the estimated coefficients on the full sample of mutual funds from 1999 to 2015. We find that there is no effect from neither current flows nor one-month lagged flows on current returns. These results indicate that fund managers' ability to generate returns is not influenced by fund flows from investors. We based our initial predictions that large inflows erode performance, which is documented by Edelen (1999) on the U.S. mutual fund market. He finds that returns can be severely impacted by the flow of money into or out of the fund, arguing that it would be difficult for a manager to immediately place a major inflow of newly contributed cash into profitable investments. Holding of such cash will result in the temporary freezing of the money, thereby leading to a depressed percentage return for the fund. Conversely, a large outflow of cash may accelerate the need for managers to liquidate assets to meet investor demand. Our results clearly contradict Edelen (1999). However, they are in line with Benson et al. (2010) who find no effect from flows on returns, also for U.S. mutual funds.

Table 11: Estimation Results from Equation (8)

This table shows the estimation results from Equation (8), with return in period t as the dependent variable. Standard errors corresponding to the coefficients are reported in parantheses below the coefficient estimates. Flow and Flow (t-1) are the current and lagged Flow variable respectively. Return(t-1) is the lagged fund returns net of fees. Market return and Market return(t-1) are current and one-month lagged returns of the OBX total return Index.

Table 11

	Total	Before	During	After
Flow	0.013	0.000	0.037***	-0.002
	(0.010)	(0.008)	(0.006)	(0.007)
Flow(t-1)	0.000	-0.003	0.002	0.006
	(0.002)	(0.004)	(0.002)	(0.004)
Return(t-1)	0.013	0.022	-0.035	-0.019
	(0.017)	(0.026)	(0.035)	(0.025)
Market return	0.950***	1.010***	0.905***	0.886***
	(0.005)	(0.008)	(0.008)	(0.011)
Market return(t-1)	0.008	-0.018	0.064*	0.054**
	(0.016)	(0.025)	(0.033)	(0.023)
Constant	-0.000	0.001**	-0.002**	-0.001***
	(0.000)	(0.000)	(0.001)	(0.000)
Adj_R-squared	0.793	0.774	0.942	0.666
N	11918	6193	1128	4537

* p<0.10, ** p<0.05, *** p<0.010

Recall that from Table 10 we find that investor behavior changed dramatically during the financial crisis, thus we suspect that the crisis might have had an influence on our results from Equation (8) as well. By constructing sub samples for the time periods before, during and after the financial crisis in 2007-2009, we observe how returns are influenced by fund flows during both "good" and "bad" states of the world. During the crisis we find that an inflow of 1% of TNA in *t-1* significantly increase returns by 0.037% in the current month. A plausible explanation for the significant relation during the crisis is that mutual funds experienced huge drops in their returns during this period, and at the same time investors withdrew large amounts of cash to limit losses, creating this positive relationship. This result indicates that the effect of flows on returns might be state dependent, as we document a higher sensitivity from current flows on returns during a time period in a "bad" state.

Before and after the crisis we are not able to document that flows have an effect on returns, and the current market return coefficient is highly significant and close to unity, indicating that CAPM holds. These results are similar to the findings from the full sample length (*Total)*. The non-significant current flow coefficient after the

crisis implies that the negative impact of current flows on returns as identified in Edelen (1999), is not necessarily applicable to all funds. Overall, we conclude that in the short run, fund managers' ability to achieve returns are not affected by new funds from investors, contradicting our initial expectations.

As shown in Table 3, monthly fund flows were on average -0.08% in 2000, -0.20% in 2007 and -0.04% in 2015. We believe that the low values of flows could be too small to measure a causal effect on returns. However, accumulating flows over longer horizons enable us to see how large flows increase fund size and thereby might erode performance, as argued by Chen et al. (2004). To test how returns are affected by accumulated flows over time, we create portfolios formed by sorting funds on Flow, and then report the time series average excess returns for each portfolio. Table 11 report the time series averages for the sorting variable Flow. The portfolios are sorted on time horizons stretching from 3 months up to 5 years. The Q5minQ1 column shows the difference between the funds with highest flow (Q5) and those with lowest flow (Q1). The pattern shows an increasing difference between Q1 and Q5 as the time horizon increases. This is mainly because flows into funds with already high inflow accumulate over time. For the bottom quintile, outflows accumulate, but at a more moderate pace.

Table 12: Flow on Flow

This table reports the average flows where funds are assigned to one of five quintiles based on the last available flow over the time horizons 3-months, 6-months, 1-years, 3-years and 5-years. The rightmost column «Q5minQ1» is the difference between Q5 and Q1.

Flow	Q1	Q2	Q3	Q4	Q5	Q5minQ1
3-month flow	-0.146	-0.037	-0.011	0.023	0.248	0.394
6-month flow	-0.228	-0.071	-0.023	0.048	0.452	0.680
1-year flow	-0.336	-0.132	-0.046	0.092	0.861	1.197
3-year flow	-0.539	-0.299	-0.120	0.219	3.027	3.566
5-year flow	-0.629	-0.410	-0.214	0.290	6.142	6.771

Table 13 report the average excess returns in month *t*, sorted into quintiles on cumulated flow as of month *t-1*. The L/S column shows the returns of a zero-cost portfolio, going long the top 20% high flow funds and short the bottom 20% low

flow funds. As suggested by Chen et al. (2004), increased fund size erodes performance. Therefore, we would expect that those funds who have experienced most heavy inflow (Q5) would struggle to generate excess returns because their fund size has become large. Looking at the results, we see that high flow funds generate larger excess returns than do low flow funds. Over a 6-month period, the excess return in the forthcoming month is on average 0.62% into funds that have had high inflows, while 0.47% for funds that have had low inflows. This contradicts our expectations. Sorted on three-month flow, Q5 funds outperform Q1 funds by 16.2 basis points, almost 2% per year. The same applies to the 6-months and 1-year flow. However, as the time horizon increases, the difference shrinks, and when sorted on three-year flow we observe a shift where high inflow funds achieve 1.05% excess return on average in the forthcoming month, while low inflow funds achieve 1.08%. With the L/S strategy, Q1 funds outperform Q5 funds by 0,4% per year. These results indicate that a high three-month inflow does not increase the fund size enough to erode performance. However, as the time horizon increases, it seems as if it becomes increasingly difficult for the fund manager to effectively reallocate new funds and sustain performance. For the 5-year flow, we observe that the pattern reverse, where Q5 funds outperform Q1 funds by 8 basis point per month, or almost 1% per year. This shift is difficult to interpret, but could be due to a change in management or strategy, as a response to the large increase in fund size. Note that the L/S strategy is not statistically significant at a 95% confidence level for any of the horizons, but we believe that the decreasing pattern is evident.

Table 13 Flow on return

This table report the average excess returns in monthly percent, where funds are assigned to one of five quintiles based on the last available flow over the time horizons 3-months, 6-months, 1-years, 3-years and 5-years.. L/S is a zero-cost portfolio that holds the top 20% funds and sells short the bottom 20% funds. T-statistics corresponding to the means are reported in parantheses below the coefficient estimates.

	Q1 (Low)	Q2	Q3	Q4	Q5 (High)	L/S
3-Month Flow	**0,471**	**0,480**	**0,449**	**0,685**	**0,624**	0,162
	(3,07)	(3,32)	(3,17)	(4,64)	(4,07)	(1,61)
6-Month Flow	**0,424**	**0,448**	**0,437**	**0,532**	**0,657**	0,221
	(2,68)	(3,03)	(3,01)	(3,58)	(4,23)	(1,91)
1-Year Flow	**0,512**	**0,579**	**0,533**	**0,588**	**0,633**	0,097
	(3,23)	(3,91)	(3,53)	(3,88)	(4,04)	(0,86)
3-Year Flow	**1,076**	**0,829**	**1,013**	**1,058**	**1,046**	-0,033
	(6,62)	(5)	(6,5)	(6,62)	(6,31)	(-0,36)
5-year Flow	**0,643**	**0,545**	**0,663**	**0,563**	**0,687**	0,080
	(3,56)	(3,02)	(3,65)	(3,09)	(3,8)	(0,8)

To strengthen the argument that fund size erodes performance, we have constructed a subsample for the 30% largest funds, where size is determined by TNA. If our hypothesis holds, large funds experiencing heavy inflows will provide lower returns than large funds with low inflows. Chen et al. (2004) suggest that the larger the fund, the more difficult it becomes for the fund manager to trade efficiently in stocks without moving the underlying price. This is because the percentage inflow to a large fund is a much greater amount of capital than the equivalent percentage inflow to a smaller fund, possibly limiting the fund managers' ability to trade in small and illiquid stocks. Moreover, Alexander et al. (2007) report that fund managers who receive an excessive inflow or outflow might be forced to perform liquidity-based trading rather than valuation-based trading which tend to result in significant losses. Hence, for high inflow funds, price movement costs and other trading costs will become so large that it will dampen performance. Table 14 (Appendix 4) reports the average excess return in monthly percent for the 30% largest funds. Here the L/S portfolio is negative for the six-month, one-year and three-year flow, supporting our hypothesis that fund inflow is more harmful on performance for large funds. The results display that if you sell out of large funds

with the lowest 6-month flow and buy into funds with the highest flow, you will suffer a loss of 3.6 basis point per month, or approximately 4% per year. With the equivalent strategy on 1-year and 3-year flow, you lose 5.4% and 1.2% per year respectively.

Overall, we find some support to Chen et al. (2004) and Alexander et al. (2007)'s theories, that size erodes performance. It is difficult to measure exactly how large the fund must become, but the pattern is evident. Large funds with high accumulated flows over time achieve lower excess returns than large funds with low accumulated flows.

5.4 Robustness Tests

In addition to constructing subsamples separated by time periods before, during and after the financial crisis and on size, we have conducted robustness tests regarding the funds' types of investors. The different types we consider are retail and institutional investor. We assume that funds with less than 100 investors during the entire sample period are funds intended for institutional investors only, or more wealthy individuals. The idea to test robustness through the specified two types of investors stem from two motives; (1) institutional investors have more resources available and are assumed to be more informed, leading to the belief that retail and institutional investors might interpret past performance differently. Therefore, retail and institutional investors perhaps react differently or at different pace when deciding whether to supply, withdraw or hold funds with respect to past performance. (2) the expectation that institutional investors supply and withdraw larger amounts of money than retail investors, meaning that the effect of fund flows on returns could depend on the size of the fund flows, relative to the size of the funds. In the robustness checking sample, we therefore drop all observations for institutional investor funds, and are left with 63 Norwegian mutual funds defined as retail funds.

Firstly, the results from estimating the effect of return on flow with retail investors are displayed in Table 15 (Appendix 5). For the entire estimation period 1999 to

2015, there exists slightly different coefficient estimates compared to the full sample results. The best performers do not receive significantly higher flows from retail investors than others, however, the spike in flow into top performers indicates that the convex relationship still exists. This suggests that the convex relationship is stronger for institutional funds than for retail funds, and that institutional investors supply more funds to top performers than do retail investors.

Observing the sub samples before, during and after the financial crisis, we find no differences in signs of the coefficients, meaning that the interpretation of the results remains equal for retail investors as for all investors. Additionally, after the financial crisis retail investors care less about past performance in their trading decision, as they only supply significantly more funds to the second-best performers.

Overall, we conclude that retail investors and institutional investors do not behave very differently in response to performance in the Norwegian mutual fund market. Hence, we can confirm that the full sample, including both retail investor funds and institutional investor funds, is representative for both categories when examining the effect of returns on flows for Norwegian mutual funds.

Secondly, we check the robustness of the results in Table 11. The estimation results from Equation (8) for funds with retail investors is presented in Table 16 (Appendix 5). We find that current flows have a positive significant effect on current returns, while lagged flows has a negative significant effect on current returns.

Interpreting these results is difficult as it does not make economically sense that funds are inefficient in reallocating new funds received in previous month, but efficient in reallocating new funds received in the present month. This inconsistency seems to relate to the period before the financial crisis in 2007- 2009 but might be further related to the IT-crisis in 2001. As we have already found a state dependency regarding the financial crisis, it might be reasonable to assume existence of the same nature of state dependency associated with the IT-bubble. This difference in results could otherwise suggest that the model is inconsistent, e.g. due to endogeneity as there might be other variables explaining variation in fund returns. Examples of such variables are the Fama French and Carhart risk adjustment factors.

Moreover, the results during and after the financial crisis are fairly similar for retail investors as for the entire sample, confirming the full sample as reliable.

Table 17 (Appendix 5) present the average flow into quintiles of funds sorted on flow, for retail investor funds. Focusing on Q1 and Q5, we observe that by dropping funds with institutional investors, both the largest outflows and the largest inflows are reduced. This is consistent with the assumption that inflows and outflows from institutional investors are larger than from retail investors. However, we find the differences to be relatively small, and the pattern that flow accumulates over time remains equal.

Lastly, we look at the predictability from flows on returns over the time horizons from 3-months to 5-years for retail investor funds, presented in Table 18 (Appendix 5). The results indicate that the size effect is weaker for funds with retail investors, where high inflow funds keep outperforming low inflow funds after 3-years of accumulated flows. However, the pattern of decreasing difference in excess returns remains as flows accumulate.

Overall, we can confirm that Norwegian retail and institutional investors do not behave very differently, and that fund returns are similarly affected by flows from both types of investors. Therefore, we conclude that the results from our full sample including both types of investors, are generally valid for the Norwegian mutual fund market.

6.0 Conclusion

This paper studies the relationship between fund flows and fund returns in the Norwegian mutual fund market. Our initial results document that there exists an asymmetric relationship between returns and flows in the Norwegian mutual fund market. Similar to the findings by Siri and Tufano (1998), we find that investors supply significantly higher funds to top performers while they do not pull out of the worst performers at the same rate. However, after the Great Recession in 2007-2009 we no longer find evidence of a convex flow-performance relationship, indicating that investor behavior might have changed. From our findings, we think it is reasonable to believe that investors have generally become more averse to active fund management.

When we look at the opposite relationship with return as the dependent variable, we find that in the short run, current and one-month lagged fund flows have virtually no effect on performance. For the long run we find that when fund flows accumulate, high inflows predict high returns in the future. However, as the time horizon increases, it seems as if it becomes increasingly difficult for the manager of funds with the highest inflows to effectively reallocate new funds, and sustain performance. This argument is further supported when we look closer at the size effect. We find that managers in large funds with heavy inflows provide lower excess returns than managers of similar funds with less inflows.

Knowing that fund returns have had an important role in the growth of mutual funds and that the total size of Norwegian mutual funds have increased from NOK 34bn in 2000 to NOK 72bn in 2015, we find it reasonable to believe that there exist some stock-picking skills among Norwegian mutual fund managers. However, previous studies find that neither Norwegian nor U.S. mutual funds achieve persistent returns. Further, when observing a convex flow-performance relationship and decreasing returns to scale, we find it plausible to conclude that investors chasing performance before 2008 can help explain Sørensen (2009)’s finding that Norwegian mutual funds do not persist their performance.

Since we find relatively large differences on how investors react to past performance before and after the financial crisis, we believe it could be interesting to perform future research on persistence in Norwegian mutual fund performance, solely looking at post-crisis samples.

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Appendix

Appendix 1: Norwegian Mutual Funds Sample

Table 1: List of Norwegian Mutual Funds in the Sample

List of the 97 Norwegian active mutual funds included in the sample with their assigned ID number.

id	Fund	id	Fund
1	ABIF Norge ++	51	K-IPA Aksjefond
2	Alfred Berg Aktiv	52	KLP AksjeNorge
3	Alfred Berg Aktiv II	53	KLP Aksjeinvest
4	Alfred Berg Gambak	54	Landkreditt Norge
5	Alfred Berg Humanfond	55	Landkreditt Utbytte
6	Alfred Berg Norge (old)	56	NB Aksjefond
7	Alfred Berg Norge Classic	57	Nordea Avkastning
8	Alfred Berg Norge Etisk	58	Nordea Barnespar
9	Alfred Berg Norge Inst	59	Nordea Kapital
10	Alfred Berg Vekst	60	Nordea Kapital 2
11	Atlas Norge	61	Nordea Kapital 3
12	Banco Norge +	62	Nordea Norge Pluss
13	Carnegie Aksje Norge	63	Nordea Norge Verdi
14	Carnegie Aksje Norge 2	64	Nordea PBPM Norske fond Aksje Portefølje
15	Carnegie Aksje Norge III	65	Nordea SMB
16	Carnegie Aksje Norge IV	66	Nordea SMB 2
17	Carnegie Aksje Norge V	67	Nordea Vekst
18	DNB Norge	68	ODIN Norge C
19	DNB Norge (Avanse I)	69	ODIN Norge II
20	DNB Norge (Avanse II)	70	Omega Investment Fund
21	DNB Norge (III)	71	Orkla Finans 30
22	DNB Norge (IV)	72	Pareto Aksje Norge A
23	DNB Norge Pensjon	73	Pareto Aksje Norge B
24	DNB Norge Selektiv	74	Pareto Aksje Norge I
25	DNB Norge Selektiv (II)	75	Pluss Aksje
26	DNB Norge Selektiv (III)	76	Pluss Markedsverdi
27	DNB SMB	77	Postbanken Aksjevekst
28	Danske Invest Norge I	78	RF Aksjefond
29	Danske Invest Norge II	79	Romsdal Fellesbank Plussfond
30	Danske Invest Norge Vekst	80	Skandia Horisont
31	Danske Invest Norske Aksjer Institusjon I	81	Skandia Norge
32	Danske Invest Norske Aksjer Institusjon II	82	Skandia SMB Norge
33	Delphi Norge	83	Storebrand Aksje Innland
34	Delphi Vekst	84	Storebrand Aksjespar
35	Diversifiserte Norske Aksjer	85	Storebrand Norge
36	DnB Aksje Pensjon	86	Storebrand Norge A
37	ESG Norske Aksjer	87	Storebrand Norge H
38	Eika Norge	88	Storebrand Norge I
39	Eika SMB	89	Storebrand Norge Institusjon
40	Fondsfinans Aktiv II	90	Storebrand Optima Norge A
41	Fondsfinans Norge	91	Storebrand Vekst
42	Forte Norge	92	Storebrand Verdi
43	Forte Trønder	93	Swedbank Generator
44	GJENSIDIGE Invest	94	Terra Norge
45	Gambak Oppkjøp	95	Terra Vekst
46	Globus Aktiv	96	VÅR Aksjefond
47	Globus Norge	97	WarrenWicklund Alpha
48	Globus Norge II		
49	Handelsbanken Norge		
50	Holberg Norge		

Appendix 2: Figures

Figure 1: Total Net Assets in Norwegian Mutual Funds as of December 2015

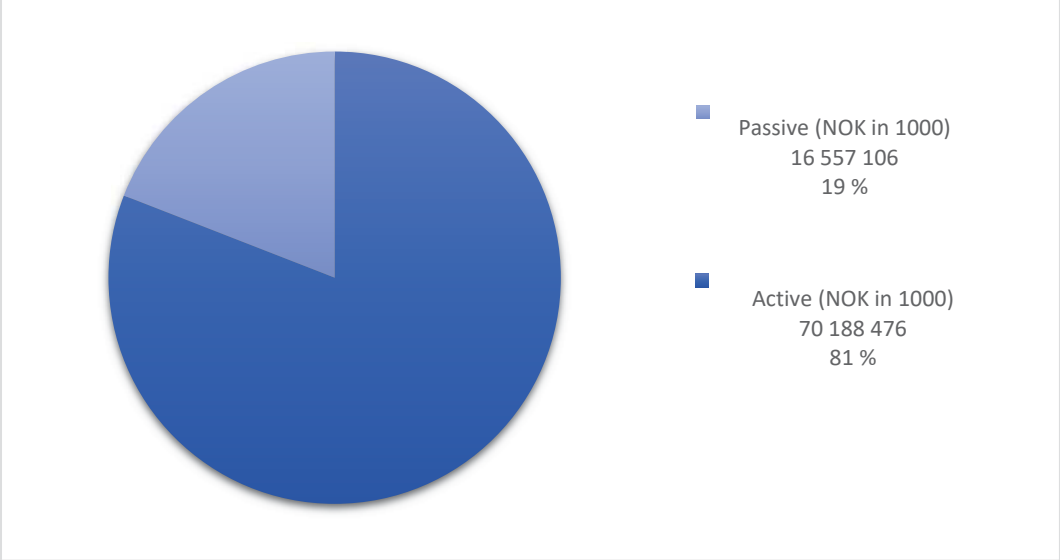


Figure 2: OBX Daily Closing Prices (in NOK)

This figure shows the daily closing prices of the OBX total return index in NOK from June 1999 to December 2015. The financial crisis between December 2007 and June 2009 is marked with the red vertical lines.

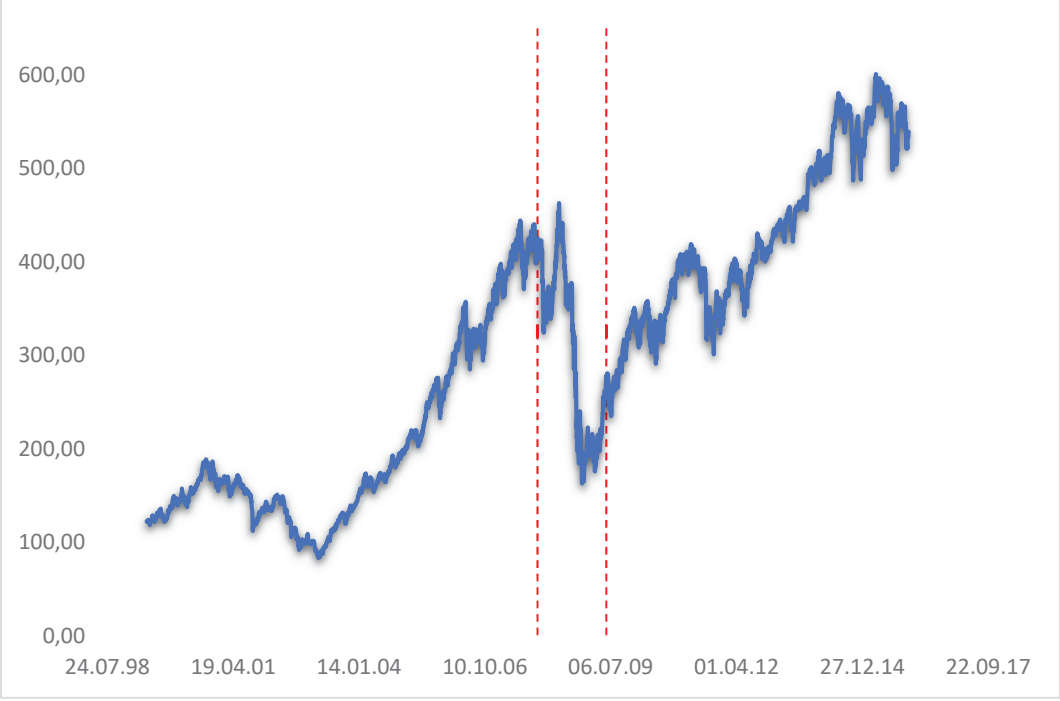


Figure 3: Total fund assets : Active vs. Passive Funds

This figure shows the total fund assets under active management as a percentage of all assets invested in both active and passive funds at the Norwegian mutual fund market.

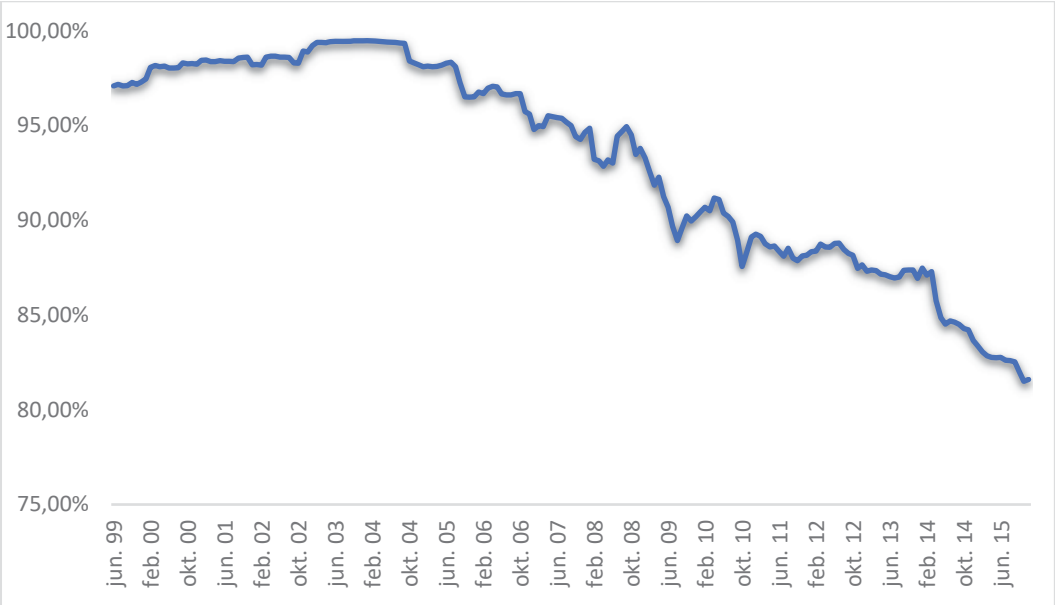


Figure 4: Size and Returns

This figure shows the relationship between fund size (TNA) and fund returns from June 1999 to December 2015.

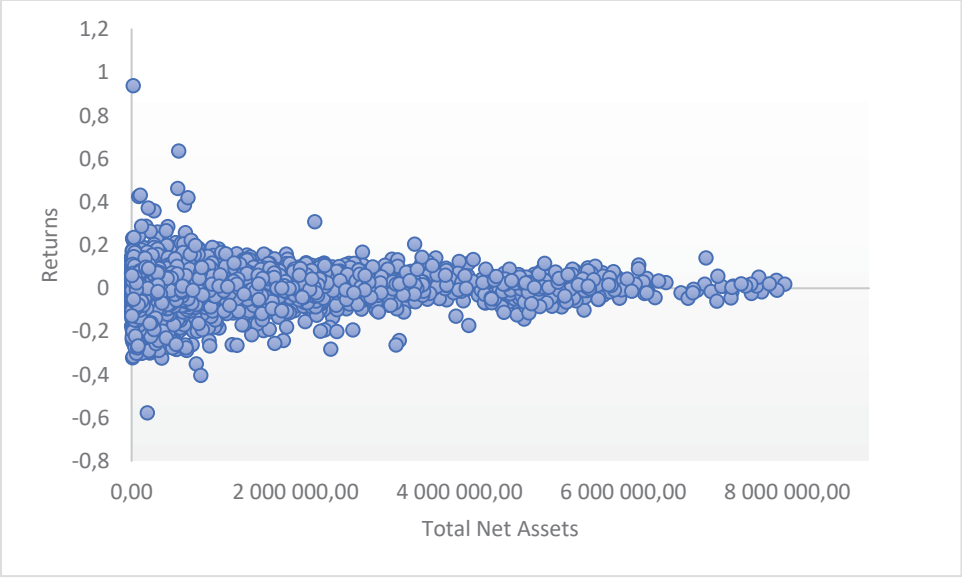
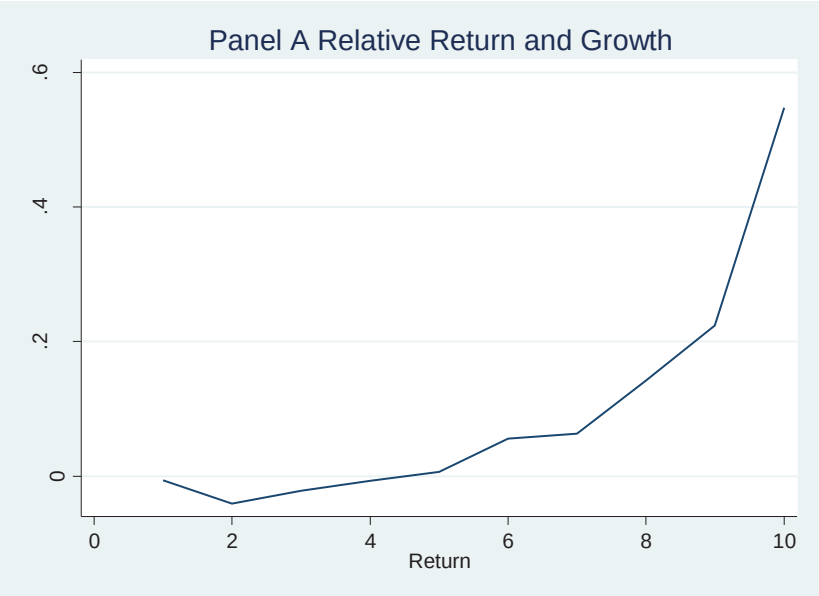
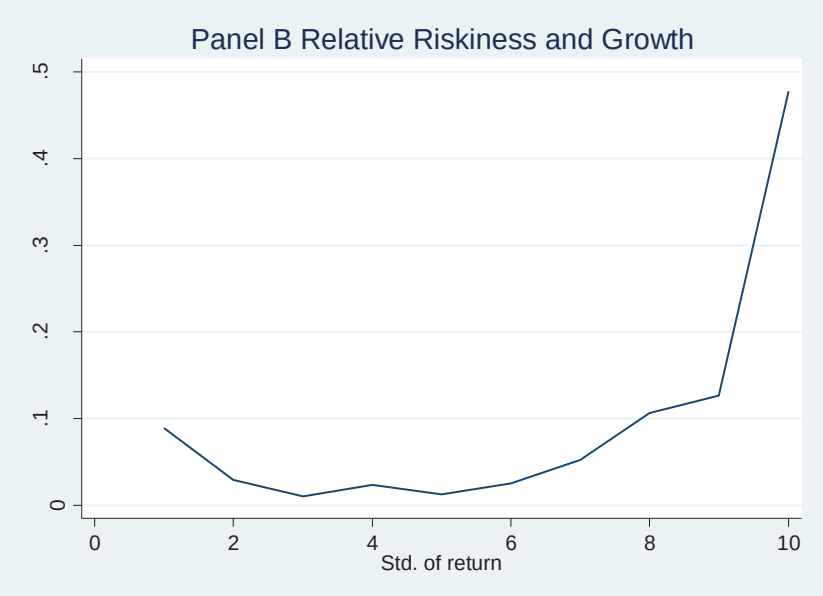


Figure 5: Returns, Standard Deviations and Growth

Panel A shows the relationship between funds' yearly growth and relative returns. The funds are sorted into portfolios based on past returns from 1 (worst) to 10 (best). The yearly growth for each fund are then averaged within each portfolio. Panel B shows the relationship between funds' yearly growth and standard deviation of past returns. The funds are sorted into portfolios based on past standard deviation of returns from 1(least risky) to 10 (most risky). The yearly growth for each fund are the averaged within each portfolio.





Appendix 3: The 5 Best and 5 Worst Performing Funds

Table 7: The 5 Best and 5 Worst Performing Funds

This table shows the 5 best and 5 worst performing funds according to Carhart's alpha, estimated from Equation (1).

Rank	Fund	id	MRP	SMB	HML	PR1YR	Alpha
1	Swedbank Generator	93	.2963138	-.2316561	.1338969	-.3320614	.0156545
2	Forte Trønder	43	.4354984	-.1606863	-.1818543	-.2376095	.0123678
3	Nordea PBPM Norske fond Aksje Portefølje	64	.4166272	-.1630888	.0519538	-.3492126	.0106477
4	Forte Norge	42	.3021396	-.3353974	-.048606	-.199314	.0085206
5	Eika Norge	38	.9937053	.0629621	.2582309	-.0564681	.0060403
93	Storebrand Aksjespar	84	.8627744	-.0831676	-.17061	-.0670661	-.0080387
94	Gambak Oppkjøp	45	.4798114	-.1886437	-.4246633	.1474778	-.0083615
95	Nordea SMB 2	66	.8979007	.3181781	-.197853	-.0354605	-.0152459
96	Terra Vekst	95	.9139577	.518372	-.5780115	.0281732	-.0165627
97	Skandia SMB Norge	82	.9456292	.3234485	-.258451	-.3467422	-.017508

Table 8: The 5 Best and 5 Worst Performing Funds when including Flow(t-1)

This table shows the 5 best and 5 worst performing funds according to Carhart's alpha when including flow in *t-1*, estimated from Equation (4).

Rank	Fund	id	MRP	SMB	HML	PR1YR	FlowL	Alpha
1	Swedbank Generator	93	.2383041	-.223854	.1390713	-.3358104	-.1132861	.0205948
2	Nordea PBPM Norske fond Aksje Portefølje	64	.350998	-.1628491	-.0155996	-.386038	-.1388027	.0185524
3	GJENSIDIGE Invest	44	.7886443	-.0336003	-.0990015	-.10225	.6957611	.0137611
4	Forte Trønder	43	.4601792	-.1483833	-.1770749	-.2475146	.0613304	.0112308
5	Forte Norge	42	.3117008	-.3425886	-.0430813	-.1929377	.0795334	.0070897
93	Alfred Berg Vekst	10	.9159989	-.0947425	-.2219564	.070115	-.3360822	-.0120217
94	Nordea SMB 2	66	.8866506	.3445792	-.1903678	-.050334	.0299566	-.0147738
95	K-IPA Aksjefond	51	1.114967	-.0654296	.0334716	.0976191	.5119061	-.0171644
96	Skandia SMB Norge	82	.9462728	.3231646	-.258249	-.3464401	.0080416	-.017378
97	Terra Vekst	95	.9089881	.4786704	-.5704977	.0195215	.1211843	-.0184468

Table 9: The 5 Best and 5 Worst Performing Funds when including Flow(t)

This table shows the 5 best and 5 worst performing funds according to Carhart's alpha when including flow in *t*, estimated from Equation (5).

Rank	Fund	id	MRP	SMB	HML	PR1YR	Flow	Alpha
1	Forte Trønder	43	.434853	-.1601763	-.1861881	-.2424318	-.0185218	.0128752
2	GJENSIDIGE Invest	44	.8171615	-.0461084	-.0660458	.0115794	.6190102	.0126846
3	Forte Norge	42	.3288986	-.3874307	-.1278384	-.2169795	-.1888067	.0116049
4	Swedbank Generator	93	.2969407	-.3005372	.0569031	-.3393453	.1154077	.0107502
5	Nordea PBPM Norske fond Aksje Portefølje	64	.4499972	-.2142691	.0486904	-.3328779	.0366338	.0078178
93	Gambak Oppkjøp	45	.4638377	-.1886022	-.4243434	.1791162	-.0193409	-.0098344
94	VÅR Aksjefond	96	.9863559	.2568438	.0525418	-.2218517	.1479963	-.0101894
95	Nordea SMB 2	66	.8839789	.3011755	-.1974661	-.0296473	.0400357	-.0140266
96	Terra Vekst	95	.9353346	.5194138	-.597242	.0427522	-.1056677	-.0144956
97	Skandia SMB Norge	82	.9310282	.2946035	-.2599711	-.3630742	-.1365844	-.0191623

Appendix 4: Sample of Large Funds

Table 14: Fund Flows on Returns for Large Funds

This table report the average excess returns in monthly percent for the 30% largest funds, where funds are assigned to one of five quintiles based on the last available flow over the time horizons 3-months, 6-months, 1-years, 3-years and 5-years.. L/S is a zero-cost portfolio that holds the top 20% funds and sells short the bottom 20% funds. *T*-statistics corresponding to the means are reported in parantheses below the coefficient estimates.

	Q1 (Low)	Q2	Q3	Q4	Q5 (High)	L/S
3-Month Flow	**0,543**	**0,676**	0,299	0,884	0,562	0,017
	(2,01)	(2,63)	(1,13)	(3,38)	(2)	(0,11)
6-Month Flow	**0,557**	**0,731**	0,194	**0,863**	0,476	-0,036
	(2,07)	(2,79)	(0,7)	(3,25)	(1,68)	(-0,25)
1-Year Flow	**0,637**	**0,719**	0,423	**0,757**	**0,621**	-0,045
	(2,34)	(2,71)	(1,49)	(2,82)	(2,1)	(-0,28)
3-Year Flow	**1,096**	**1,080**	**0,969**	**1,144**	**1,047**	-0,001
	(3,88)	(3,79)	(3,43)	(3,96)	(3,62)	(-0,01)
5-year Flow	**0,653**	**0,668**	0,415	**0,753**	**0,702**	0,061
	(2,01)	(2,14)	(1,23)	(2,34)	(2,1)	(0,44)

Appendix 5: Sample of Retail Investor Funds

Table 15: Returns on Flows for Funds with Retail Investors

This table shows the results of running Equation (7) with Flow in period t as the dependent variable. Standard errors corresponding to the coefficients are reported in parentheses below the coefficient estimates. The construction of quintiles is based on Carhart's alpha estimated on the previous 12-month period for each fund in the sample. Flow(t-1) is the one-month lagged Flow variable. Log TNA (t-1) is lagged log of total net assets. SD is the one-year standard deviation of past monthly returns. Column "Total" refers to the entire sample from 1999 to 2015, "Before" refers to the period August 1999 to November 2007, "During" refers to the period December 2007 to June 2009 and "After" refers to the period July 2009 to December 2015. The regression model is run on the sub sample of retail investor funds for robustness checking of the results in Table 10.

Table 15

	Total	Before	During	After
Q1(BOTPERF)	0.023	0.048	0.048	-0.020
	(0.026)	(0.039)	(0.122)	(0.033)
Q2	0.017	-0.002	-0.291	0.050
	(0.020)	(0.026)	(0.242)	(0.030)
Q3	0.014	0.013	0.298	-0.036
	(0.022)	(0.028)	(0.193)	(0.028)
Q4	-0.026	-0.019	-0.386	0.064*
	(0.038)	(0.026)	(0.250)	(0.036)
Q5(TOPPERF)	0.184	0.084*	1.592	0.010
	(0.115)	(0.043)	(1.234)	(0.049)
Flow(t-1)	0.041	0.174***	-0.042	0.088***
	(0.037)	(0.058)	(0.043)	(0.033)
Log TNA(t-1)	-0.019***	-0.013**	-0.156	-0.013***
	(0.006)	(0.006)	(0.106)	(0.004)
SD	0.107*	-0.026	-0.551	0.048
	(0.055)	(0.093)	(0.763)	(0.068)
Constant	0.221***	0.146*	2.024	0.165***
	(0.084)	(0.080)	(1.402)	(0.055)
Adj_R-squared	0.026	0.095	0.047	0.035
N	7020	3430	758	2792

* p<0.10, ** p<0.05, *** p<0.010

Table 16: Short-Term Flows on Returns for Funds with Retail Investors

This table shows the estimation results from Equation (8), with return in period t as the dependent variable. Standard errors corresponding to the coefficients are reported in parentheses below the coefficient estimates. Flow and Flow (t-1) are the current and lagged Flow variable respectively. Return(t-1) is the lagged fund returns net of fees. Market return and Market return(t-1) are current and one-month lagged returns of the OBX total return Index. The regression model is run on the sub sample of retail investor funds for robustness checking of the results in Table 11.

Table 16

	Total	Before	During	After
Flow	0.034***	0.022*	0.044***	-0.002
	(0.003)	(0.013)	(0.001)	(0.012)
Flow(t-1)	-0.004*	-0.014***	0.001	0.008
	(0.003)	(0.004)	(0.003)	(0.008)
Return(t-1)	0.037***	0.045	0.004	0.002
	(0.011)	(0.030)	(0.044)	(0.029)
Market return	0.948***	1.009***	0.897***	0.886***
	(0.006)	(0.010)	(0.010)	(0.014)
Market return(t-1)	-0.008	-0.031	0.033	0.049*
	(0.012)	(0.030)	(0.042)	(0.026)
Constant	0.000	0.001*	-0.002	-0.002***
	(0.000)	(0.001)	(0.001)	(0.001)
Adj_R-squared	0.776	0.750	0.941	0.650
N	8208	4486	760	2922

* p<0.10, ** p<0.05, *** p<0.010

Table 17: Flow on Flow for Funds with Retail Investors

This table reports the average flows where funds are assigned to one of five quintiles based on the last available flow over the time horizons 3-months, 6-months, 1-years, 3-years and 5-years. The rightmost column «Q5minQ1» is the difference between Q5 and Q1. The sample consist of only funds with retail investors.

Flow	Q1	Q2	Q3	Q4	Q5	Q5minQ1
3-month flow	-0.119	-0.039	-0.016	0.014	0.202	0.321
6-month flow	-0.190	-0.073	-0.032	0.027	0.392	0.582
1-year flow	-0.288	-0.133	-0.062	0.049	0.808	1.096
3-year flow	-0.514	-0.301	-0.163	0.114	2.704	3.218
5-year flow	-0.625	-0.417	-0.258	0.163	5.290	5.915

Table 18: Long-Term Flows on Returns for Funds with Retail Investors

This table report the average excess returns in monthly percent for the sub sample of retail invest funds, where funds are assigned to one of five quintiles based on the last available flow over the time horizons 3-months, 6-months, 1-years, 3-years and 5-years.. L/S is a zero-cost portfolio that holds the top 20% funds and sells short the bottom 20% funds. *T*-statistics corresponding to the means are reported in parantheses below the coefficient estimates.

	Q1 (Low)	Q2	Q3	Q4	Q5 (High)	L/S
3-Month Flow	**0,479**	**0,434**	**0,442**	**0,543**	**0,570**	0,122
	(2,55)	(2,47)	(2,57)	(3,08)	(2,99)	(1,05)
6-Month Flow	**0,425**	**0,385**	**0,416**	0,343	**0,663**	**0,268**
	(2,21)	(2,13)	(2,34)	(1,92)	(3,47)	(2,14)
1-Year Flow	**0,492**	**0,532**	**0,463**	**0,466**	**0,630**	0,139
	(2,59)	(2,96)	(2,5)	(2,53)	(3,28)	(1,17)
3-Year Flow	**1,107**	**0,981**	**1,060**	**1,129**	**1,156**	0,068
	(5,75)	(4,97)	(5,56)	(6,06)	(5,79)	(0,81)
5-year Flow	**0,637**	**0,666**	**0,663**	**0,693**	**0,658**	0,030
	(2,98)	(3,17)	(3,04)	(3,23)	(3,03)	(0,24)

Appendix 6: Regression Results on Each Fund Separately

Table 4: Carhart Regression Results on Separate Funds

This table shows the results from running Carhart's four factor model (Equation (3)), on all 97 funds in the sample separately. Standard errors corresponding to the coefficients are reported in parantheses below the coefficient estimates. A thorough description of the model specification is found in chapter 4.1.1. *"Factor Models for Performance"*.

	MRP	SMB	HML	PR1YR	Constant	Adjusted R-squared
Fund 1	0.966***	0.0373	-0.0521	-0.0491	0.00178	0,961
	(0.0374)	(0.0586)	(0.0349)	(0.0378)	(0.00188)	
Fund 2	1.041***	0.431*	-0.158*	-0.157	-0.00296	0,623
	(0.0482)	(0.189)	(0.0625)	(0.175)	(0.00298)	
Fund 3	1.055***	0.318***	-0.156**	-0.0116	-0.00188	0,866
	(0.0430)	(0.0696)	(0.0521)	(0.0609)	(0.00225)	
Fund 4	1.132***	0.491***	-0.350***	0.0630	-0.000815	0,820
	(0.0543)	(0.0837)	(0.0755)	(0.0640)	(0.00222)	
Fund 5	0.958***	0.0949	-0.109***	-0.0593	-0.00120	0,921
	(0.0425)	(0.0499)	(0.0325)	(0.0331)	(0.00133)	
Fund 6	0.837***	-0.0854	-0.109*	-0.0407	-0.00495	0,935
	(0.0430)	(0.0996)	(0.0456)	(0.0675)	(0.00299)	
Fund 7	0.993***	0.183	-0.234	-0.232	0.00504	0,716
	(0.0394)	(0.102)	(0.146)	(0.185)	(0.00388)	
Fund 8	1.096***	0.234***	-0.0858*	-0.0559	-0.00313	0,920
	(0.0340)	(0.0533)	(0.0380)	(0.0301)	(0.00194)	
Fund 9	1.002***	0.136*	-0.120**	0.0373	-0.00130	0,758
	(0.0424)	(0.0636)	(0.0466)	(0.0545)	(0.00305)	
Fund 10	0.888***	-0.0584	-0.263***	0.0502	-0.00356	0,875
	(0.0800)	(0.162)	(0.0696)	(0.107)	(0.00451)	
Fund 11	1.093***	0.279**	-0.353**	0.0438	-0.00130	0,804
	(0.0655)	(0.0999)	(0.133)	(0.0685)	(0.00310)	

Fund 12	1.052***	0.300***	-0.179**	-0.101	0.00220	0,960
	(0.0492)	(0.0876)	(0.0585)	(0.0530)	(0.00237)	
Fund 13	0.959***	0.0177	-0.154***	0.000141	0.00100	0,916
	(0.0402)	(0.0480)	(0.0431)	(0.0347)	(0.00132)	
Fund 14	0.941***	0.00761	-0.0763*	-0.0286	0.000564	0,894
	(0.0435)	(0.0589)	(0.0350)	(0.0376)	(0.00166)	
Fund 15	0.972***	0.0372	-0.0803*	-0.0112	0.00174	0,935
	(0.0401)	(0.0487)	(0.0329)	(0.0316)	(0.00116)	
Fund 16	1.014***	0.156	-0.145*	-0.0440	0.000315	0,783
	(0.0584)	(0.110)	(0.0709)	(0.0576)	(0.00258)	
Fund 17	0.933***	-0.0275	-0.0519	-0.0273	-0.000323	0,925
	(0.0689)	(0.0783)	(0.0560)	(0.0462)	(0.00138)	
Fund 18	0.940***	0.0146	-0.0575	-0.0504	0.00112	0,826
	(0.0309)	(0.0385)	(0.0316)	(0.0296)	(0.00189)	
Fund 19	0.983***	0.0322	-0.0292	-0.0915**	-0.000719	0,941
	(0.0251)	(0.0422)	(0.0241)	(0.0290)	(0.00134)	
Fund 20	0.948***	0.0160	-0.0580*	-0.0922**	-0.00131	0,920
	(0.0349)	(0.0464)	(0.0269)	(0.0323)	(0.00136)	
Fund 21	0.958***	0.0391	-0.0754	-0.131	0.00221	0,865
	(0.0299)	(0.0340)	(0.0513)	(0.0790)	(0.00223)	
Fund 22	0.929***	0.0152	-0.0871	-0.0581	-0.000330	0,848
	(0.0520)	(0.0478)	(0.0832)	(0.0405)	(0.00166)	
Fund 23	0.953***	0.00397	-0.0505	-0.102**	0.00161	0,921
	(0.0325)	(0.0467)	(0.0307)	(0.0315)	(0.00135)	
Fund 24	0.991***	0.0706	-0.0623*	-0.113***	0.000853	0,914
	(0.0355)	(0.0419)	(0.0284)	(0.0322)	(0.00146)	
Fund 25	0.899***	-0.0392	-0.0231	-0.0540	-0.000136	0,890
	(0.0417)	(0.0539)	(0.0421)	(0.0367)	(0.00157)	
Fund 26	0.940***	0.0108	-0.0643*	-0.0498	-0.000335	0,879
	(0.0397)	(0.0468)	(0.0285)	(0.0313)	(0.00143)	
Fund 27	1.170***	0.633***	-0.132*	-0.198**	0.00211	0,770
	(0.0641)	(0.0892)	(0.0673)	(0.0653)	(0.00283)	

Fund 28	0.908***	0.0394	-0.00864	-0.0910*	0.00160	0,911
	(0.0326)	(0.0479)	(0.0306)	(0.0360)	(0.00127)	
Fund 29	0.913***	0.0127	-0.00414	-0.0858*	0.00218	0,909
	(0.0340)	(0.0493)	(0.0326)	(0.0356)	(0.00131)	
Fund 30	0.991***	0.395***	-0.283*	-0.0278	-0.000950	0,756
	(0.0508)	(0.0829)	(0.117)	(0.0582)	(0.00230)	
Fund 31	0.933***	0.0281	-0.0134	-0.0769*	0.00264*	0,922
	(0.0351)	(0.0461)	(0.0325)	(0.0375)	(0.00127)	
Fund 32	0.938***	0.0476	-0.000669	-0.0371	0.00197	0,884
	(0.0892)	(0.0989)	(0.0691)	(0.0726)	(0.00229)	
Fund 33	1.120***	0.399***	-0.233***	-0.112*	0.000466	0,857
	(0.0532)	(0.0653)	(0.0568)	(0.0518)	(0.00210)	
Fund 34	1.115***	0.517***	-0.289**	-0.0578	-0.00269	0,666
	(0.0622)	(0.0890)	(0.0944)	(0.0749)	(0.00403)	
Fund 35	0.890***	0.158	0.0157	-0.139**	-0.00159	0,845
	(0.0781)	(0.0855)	(0.0779)	(0.0518)	(0.00221)	
Fund 36	0.770***	-0.259	-0.100	-0.102	-0.000128	0,677
	(0.148)	(0.224)	(0.0896)	(0.120)	(0.00886)	
Fund 37	1.137***	0.246*	0.296	-0.0788	-0.00368	0,771
	(0.174)	(0.108)	(0.250)	(0.0789)	(0.00423)	
Fund 38	0.994***	0.0630	0.258	-0.0565	0.00604	0,323
	(0.171)	(0.169)	(0.222)	(0.198)	(0.00402)	
Fund 39	0.950***	0.282***	-0.0184	-0.183***	-0.00114	0,841
	(0.0342)	(0.0598)	(0.0461)	(0.0514)	(0.00219)	
Fund 40	0.838***	-0.0399	-0.00914	-0.130	-0.00104	0,884
	(0.0604)	(0.119)	(0.0889)	(0.0738)	(0.00346)	
Fund 41	0.968***	0.174**	-0.0682	-0.164**	0.00395*	0,868
	(0.0498)	(0.0650)	(0.0485)	(0.0499)	(0.00185)	
Fund 42	0.302	-0.335*	-0.0486	-0.199	0.00852	0,379
	(0.170)	(0.159)	(0.112)	(0.144)	(0.00640)	
Fund 43	0.435***	-0.161	-0.182	-0.238**	0.0124**	0,588

	(0.0880)	(0.167)	(0.0989)	(0.0741)	(0.00446)	
Fund 44	0.794***	-0.0422	-0.147***	-0.0962	0.000955	0,880
	(0.0625)	(0.0581)	(0.0302)	(0.0726)	(0.00497)	
Fund 45	0.480***	-0.189	-0.425***	0.147	-0.00836	0,815
	(0.135)	(0.196)	(0.0751)	(0.171)	(0.00538)	
Fund 46	1.143***	0.252*	-0.244***	-0.350***	-0.00424	0,824
	(0.0811)	(0.117)	(0.0732)	(0.0927)	(0.00470)	
Fund 47	1.115***	0.313**	-0.206**	-0.364***	-0.00594	0,836
	(0.0705)	(0.0978)	(0.0653)	(0.0802)	(0.00399)	
Fund 48	1.152***	0.321*	-0.237**	-0.384***	-0.00773	0,829
	(0.0836)	(0.125)	(0.0738)	(0.0897)	(0.00416)	
Fund 49	0.997***	0.0660	-0.0690	-0.0221	0.000129	0,906
	(0.0363)	(0.0505)	(0.0375)	(0.0426)	(0.00141)	
Fund 50	0.960***	0.359***	-0.0864	-0.116*	-0.000194	0,808
	(0.0485)	(0.0739)	(0.0577)	(0.0505)	(0.00223)	
Fund 51	1.142***	-0.00583	-0.00781	0.122	-0.00776	0,898
	(0.124)	(0.125)	(0.0708)	(0.102)	(0.00732)	
Fund 52	0.964***	0.0650	-0.0310	-0.0684*	0.00147	0,922
	(0.0369)	(0.0377)	(0.0269)	(0.0343)	(0.00127)	
Fund 53	0.909***	-0.0112	-0.0649	-0.0912	0.000795	0,929
	(0.0713)	(0.0551)	(0.0440)	(0.0590)	(0.00263)	
Fund 54	0.862***	0.0534	0.00824	-0.225*	0.00419	0,612
	(0.0903)	(0.160)	(0.0728)	(0.0936)	(0.00517)	
Fund 55	0.490*	0.0696	0.126	-0.00991	0.00336	0,282
	(0.249)	(0.225)	(0.103)	(0.105)	(0.00709)	
Fund 56	0.964***	0.138**	-0.00580	-0.129**	-0.00173	0,913
	(0.0317)	(0.0470)	(0.0365)	(0.0444)	(0.00162)	
Fund 57	0.964***	0.0450	-0.0504*	-0.0946**	-0.000320	0,942
	(0.0317)	(0.0369)	(0.0245)	(0.0305)	(0.00105)	
Fund 58	0.890***	-0.0390	-0.106*	-0.0238	-0.00453	0,918
	(0.0620)	(0.0828)	(0.0461)	(0.0648)	(0.00319)	
Fund 59	0.963***	0.0592	-0.105**	-0.0831*	0.000588	0,925

	(0.0307)	(0.0550)	(0.0347)	(0.0324)	(0.00125)	
Fund 60	1.003***	-0.187	-0.00799	-0.0782	-0.000045	0,879
	(0.0414)	(0.161)	(0.0638)	(0.0514)	(0.00218)	
Fund 61	1.007***	0.0684	-0.0876*	-0.0566	-0.000076	0,944
	(0.0364)	(0.0631)	(0.0413)	(0.0429)	(0.00232)	
Fund 62	0.849***	-0.0117	-0.149*	-0.122	0.000945	0,773
	(0.185)	(0.180)	(0.0752)	(0.0870)	(0.00265)	
Fund 63	0.905***	0.150**	-0.0249	-0.151***	0.000788	0,878
	(0.0371)	(0.0526)	(0.0351)	(0.0381)	(0.00163)	
Fund 64	0.417	-0.163	0.0520	-0.349***	0.0106*	0,665
	(0.236)	(0.261)	(0.112)	(0.0977)	(0.00446)	
Fund 65	1.009***	0.507***	-0.0768	-0.140	-0.00564*	0,762
	(0.0501)	(0.0829)	(0.0668)	(0.0735)	(0.00256)	
Fund 66	0.898***	0.318	-0.198	-0.0355	-0.0152*	0,705
	(0.112)	(0.225)	(0.117)	(0.163)	(0.00733)	
Fund 67	0.973***	0.0700	-0.0739*	-0.0847*	-0.00179	0,923
	(0.0361)	(0.0461)	(0.0320)	(0.0415)	(0.00140)	
Fund 68	0.958***	0.342***	0.0537	-0.0550	-0.000573	0,743
	(0.0494)	(0.0714)	(0.0647)	(0.0644)	(0.00219)	
Fund 69	0.907***	0.335***	-0.0198	-0.0370	-0.00405	0,730
	(0.0680)	(0.0897)	(0.0749)	(0.0688)	(0.00271)	
Fund 70	1.008***	0.121	-0.0261	-0.161*	0.00309	0,729
	(0.0286)	(0.0648)	(0.0522)	(0.0719)	(0.00345)	
Fund 71	0.906***	0.0575	-0.113*	-0.0535	0.00326	0,897
	(0.0326)	(0.0625)	(0.0445)	(0.0472)	(0.00233)	
Fund 72	0.732***	0.142	-0.118	-0.212*	-0.00355	0,607
	(0.175)	(0.175)	(0.0982)	(0.0984)	(0.00356)	
Fund 73	0.906***	0.261**	-0.0744	-0.199**	-0.000067	0,718
	(0.0949)	(0.0994)	(0.0861)	(0.0700)	(0.00270)	
Fund 74	0.888***	0.280***	0.0285	-0.0477	0.00148	0,761
	(0.0572)	(0.0772)	(0.0606)	(0.0522)	(0.00221)	
Fund 75	0.881***	-0.00593	-0.0428	-0.0782*	0.00108	0,923

	(0.0322)	(0.0366)	(0.0282)	(0.0334)	(0.00121)	
Fund 76	0.884***	-0.0519	-0.0248	-0.0714*	0.00220*	0,937
	(0.0300)	(0.0375)	(0.0263)	(0.0296)	(0.00106)	
Fund 77	1.022***	0.0337	-0.190***	-0.0653	-0.00190	0,936
	(0.0324)	(0.0753)	(0.0475)	(0.0496)	(0.00243)	
Fund 78	0.898***	0.0297	-0.0640*	-0.0912*	0.00119	0,928
	(0.0319)	(0.0438)	(0.0326)	(0.0391)	(0.00178)	
Fund 79	1.066***	0.187	-0.211**	-0.103	-0.000291	0,899
	(0.0498)	(0.108)	(0.0750)	(0.0611)	(0.00361)	
Fund 80	0.980***	0.152	-0.169	-0.0561	-0.00127	0,869
	(0.0734)	(0.117)	(0.0925)	(0.0803)	(0.00468)	
Fund 81	0.941***	-0.203*	-0.103	-0.118	0.00127	0,953
	(0.0592)	(0.0915)	(0.0621)	(0.0718)	(0.00300)	
Fund 82	0.946***	0.323*	-0.258**	-0.347**	-0.0175**	0,848
	(0.112)	(0.153)	(0.0800)	(0.122)	(0.00560)	
Fund 83	0.953***	0.000575	-0.0205	-0.0149	-0.00126	0,942
	(0.0336)	(0.0392)	(0.0263)	(0.0289)	(0.000982)	
Fund 84	0.863***	-0.0832	-0.171***	-0.0671	-0.00804*	0,934
	(0.0648)	(0.0762)	(0.0365)	(0.0817)	(0.00334)	
Fund 85	0.993***	0.0421	-0.0876*	-0.0511	-0.000659	0,808
	(0.0335)	(0.0609)	(0.0374)	(0.0360)	(0.00230)	
Fund 86	0.974***	-0.163	0.0396	-0.134*	0.00278	0,942
	(0.0542)	(0.101)	(0.0511)	(0.0535)	(0.00220)	
Fund 87	1.049***	0.155**	0.0382	-0.0822	-0.00205	0,948
	(0.0517)	(0.0496)	(0.0550)	(0.0547)	(0.00180)	
Fund 88	1.027***	0.0726	0.0162	-0.0685	-0.00206	0,818
	(0.0558)	(0.0681)	(0.0525)	(0.0428)	(0.00264)	
Fund 89	1.019***	0.107	-0.0290	-0.0948	-0.00131	0,946
	(0.0619)	(0.0586)	(0.0497)	(0.0490)	(0.00186)	
Fund 90	1.006***	0.00341	-0.0152	-0.0612	-0.000210	0,708
	(0.0622)	(0.113)	(0.0535)	(0.0600)	(0.00324)	
Fund 91	1.003***	0.313**	-0.526***	-0.115	0.00171	0,706

	(0.0592)	(0.105)	(0.0979)	(0.0702)	(0.00325)	
Fund 92	0.948***	0.00242	0.142**	0.00641	-0.000924	0,745
	(0.0410)	(0.0644)	(0.0500)	(0.0412)	(0.00255)	
Fund 93	0.296	-0.232	0.134	-0.332	0.0157	0,237
	(0.379)	(0.428)	(0.268)	(0.178)	(0.00840)	
Fund 94	1.042***	0.240***	-0.172***	-0.0542	-0.00187	0,910
	(0.0407)	(0.0643)	(0.0477)	(0.0534)	(0.00179)	
Fund 95	0.914***	0.518**	-0.578***	0.0282	-0.0166**	0,855
	(0.111)	(0.159)	(0.0837)	(0.0994)	(0.00610)	
Fund 96	1.049***	0.255	0.0386	-0.242	-0.00640	0,708
	(0.138)	(0.219)	(0.0848)	(0.219)	(0.00809)	
Fund 97	1.118***	0.274*	-0.308**	-0.354***	0.00366	0,859
	(0.0681)	(0.133)	(0.0986)	(0.0604)	(0.00389)	

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 5: Carhart + Flow(t-1) Regression on Separate Funds

This table shows the results from running Carhart's four factor model + flow in period *t-1* (Equation (4)), on all 97 funds in the sample separately. Standard errors corresponding to the coefficients are reported in parantheses below the coefficient estimates. Thorough descriptions of the model specifications are found in chapter 4.1.1. *"Factor Models for Performance"* and 4.1.2 *"Flow"*.

	MRP	SMB	HML	PR1YR	FlowL	Constant	Adjusted R-squared
Fund 1	0.972***	-0.00348	-0.0600	-0.0418	-0.0136	0.00252	0,961
	(0.0374)	(0.0688)	(0.0356)	(0.0382)	(0.00917)	(0.00199)	
Fund 2	1.040***	0.430*	-0.158*	-0.157	0.00995	-0.00287	0,621
	(0.0483)	(0.188)	(0.0620)	(0.176)	(0.0324)	(0.00285)	
Fund 3	1.053***	0.315***	-0.152**	-0.0131	-0.0141	-0.00195	0,865
	(0.0438)	(0.0707)	(0.0537)	(0.0607)	(0.0262)	(0.00227)	
Fund 4	1.145***	0.508***	-0.357***	0.0673	0.0798	-0.00119	0,823
	(0.0535)	(0.0808)	(0.0738)	(0.0641)	(0.0425)	(0.00225)	
Fund 5	0.959***	0.0984	-0.110***	-0.0598	-0.0375	-0.000990	0,922
	(0.0430)	(0.0508)	(0.0325)	(0.0332)	(0.0459)	(0.00132)	
Fund 6	0.847***	-0.0523	-0.108*	-0.0229	0.0991	-0.00299	0,937
	(0.0433)	(0.101)	(0.0458)	(0.0629)	(0.0812)	(0.00359)	
Fund 7	0.994***	0.181	-0.236	-0.232	0.0160	0.00514	0,715
	(0.0397)	(0.102)	(0.146)	(0.186)	(0.0181)	(0.00392)	
Fund 8	1.092***	0.235***	-0.0992*	-0.0419	0.00383*	-0.00366	0,833
	(0.0335)	(0.0537)	(0.0409)	(0.0311)	(0.00192)	(0.00206)	
Fund 9	1.001***	0.132*	-0.122*	0.0373	0.0119	-0.00128	0,757
	(0.0425)	(0.0633)	(0.0477)	(0.0545)	(0.0160)	(0.00304)	
Fund 10	0.916***	-0.0947	-0.222**	0.0701	-0.336	-0.0120	0,886
	(0.0672)	(0.119)	(0.0675)	(0.104)	(0.258)	(0.00707)	
Fund 11	1.092***	0.279**	-0.351**	0.0443	0.0124	-0.00117	0,802

	(0.0649)	(0.100)	(0.128)	(0.0692)	(0.0408)	(0.00324)	
Fund 12	1.052***	0.294***	-0.182**	-0.101*	-0.0128	0.00293	0,959
	(0.0490)	(0.0850)	(0.0575)	(0.0515)	(0.0162)	(0.00264)	
Fund 13	0.959***	0.0178	-0.154***	0.000337	0.00547	0.00104	0,916
	(0.0402)	(0.0479)	(0.0432)	(0.0347)	(0.0274)	(0.00133)	
Fund 14	0.940***	0.00699	-0.0760*	-0.0280	0.00416	0.000570	0,833
	(0.0439)	(0.0600)	(0.0355)	(0.0382)	(0.0337)	(0.00166)	
Fund 15	0.972***	0.0386	-0.0812*	-0.0118	0.00658	0.00175	0,833
	(0.0402)	(0.0491)	(0.0332)	(0.0316)	(0.00921)	(0.00116)	
Fund 16	1.016***	0.138	-0.134	-0.0141	0.0728	0.000490	0,833
	(0.0520)	(0.117)	(0.0739)	(0.0620)	(0.0780)	(0.00261)	
Fund 17	0.934***	-0.0296	-0.0531	-0.0220	0.0112	-0.000357	0,926
	(0.0695)	(0.0781)	(0.0560)	(0.0470)	(0.00913)	(0.00137)	
Fund 18	0.940***	0.0138	-0.0569	-0.0511	-0.00425	0.00115	0,833
	(0.0310)	(0.0385)	(0.0316)	(0.0297)	(0.00350)	(0.00191)	
Fund 19	0.979***	0.0245	-0.0291	-0.099***	-0.236	-0.00244	0,941
	(0.0248)	(0.0427)	(0.0245)	(0.0285)	(0.194)	(0.00202)	
Fund 20	0.948***	0.0160	-0.0580*	-0.0921**	0.00442	-0.00124	0,920
	(0.0350)	(0.0465)	(0.0270)	(0.0323)	(0.0278)	(0.00142)	
Fund 21	0.962***	0.0428	-0.0680	-0.132	0.0317**	0.00251	0,867
	(0.0287)	(0.0340)	(0.0503)	(0.0792)	(0.0121)	(0.00225)	
Fund 22	0.929***	0.0168	-0.0901	-0.0561	0.00367	-0.000499	0,847
	(0.0518)	(0.0477)	(0.0864)	(0.0404)	(0.00453)	(0.00181)	
Fund 23	0.949***	-0.00105	-0.0493	-0.0998**	-0.00904	0.00164	0,921
	(0.0333)	(0.0474)	(0.0308)	(0.0316)	(0.00651)	(0.00135)	
Fund 24	0.989***	0.0734	-0.0625*	-0.114***	-0.0202	0.000819	0,914
	(0.0358)	(0.0423)	(0.0287)	(0.0322)	(0.0201)	(0.00146)	
Fund 25	0.894***	-0.0574	-0.0177	-0.0563	-0.0300	0.000239	0,894
	(0.0431)	(0.0579)	(0.0409)	(0.0379)	(0.0168)	(0.00153)	

Fund 26	0.940***	0.00992	-0.0653*	-0.0502	-0.00597	-0.000331	0,878
	(0.0396)	(0.0466)	(0.0281)	(0.0314)	(0.0193)	(0.00143)	
Fund 27	1.165***	0.639***	-0.143*	-0.203**	0.0293	0.00144	0,770
	(0.0643)	(0.0888)	(0.0679)	(0.0656)	(0.0209)	(0.00287)	
Fund 28	0.908***	0.0394	-0.00867	-0.0910*	-0.00349	0.00159	0,833
	(0.0326)	(0.0481)	(0.0306)	(0.0359)	(0.0799)	(0.00132)	
Fund 29	0.912***	0.0159	-0.00271	-0.0859*	-0.0186	0.00222	0,909
	(0.0341)	(0.0494)	(0.0325)	(0.0364)	(0.0179)	(0.00132)	
Fund 30	0.988***	0.387***	-0.282*	-0.0270	-0.112	-0.00188	0,756
	(0.0507)	(0.0819)	(0.118)	(0.0564)	(0.147)	(0.00269)	
Fund 31	0.932***	0.0272	-0.0132	-0.0775*	0.00181	0.00260*	0,922
	(0.0366)	(0.0474)	(0.0325)	(0.0385)	(0.00746)	(0.00128)	
Fund 32	0.938***	0.0396	-0.00218	-0.0371	-0.00722	0.00228	0,882
	(0.0895)	(0.0979)	(0.0693)	(0.0724)	(0.0149)	(0.00227)	
Fund 33	1.120***	0.395***	-0.231***	-0.114*	-0.0419	0.000203	0,856
	(0.0532)	(0.0655)	(0.0567)	(0.0522)	(0.0694)	(0.00209)	
Fund 34	1.117***	0.523***	-0.290**	-0.0554	0.0454	-0.00233	0,665
	(0.0623)	(0.0887)	(0.0942)	(0.0753)	(0.0502)	(0.00403)	
Fund 35	0.889***	0.156	0.0146	-0.138**	0.00737	-0.00176	0,844
	(0.0789)	(0.0876)	(0.0790)	(0.0516)	(0.0144)	(0.00231)	
Fund 36	0.770***	-0.259	-0.100	-0.102	0	-0.000128	0,660
	(0.148)	(0.224)	(0.0896)	(0.120)	(.)	(0.00886)	
Fund 37	1.001***	0.143	0.136	-0.0829	-0.0454*	0.00233	0,875
	(0.0750)	(0.0789)	(0.102)	(0.0900)	(0.0197)	(0.00306)	
Fund 38	1.023***	0.0737	0.293	-0.0270	-0.0212**	0.00655	0,833
	(0.182)	(0.176)	(0.231)	(0.206)	(0.00784)	(0.00416)	
Fund 39	0.949***	0.281***	-0.0226	-0.185***	-0.0367	-0.00123	0,841
	(0.0335)	(0.0595)	(0.0461)	(0.0513)	(0.0221)	(0.00219)	

Fund 40	0.832***	-0.00037	-0.0596	-0.168*	-0.020***	0.0000014	0,893
	(0.0605)	(0.110)	(0.0813)	(0.0763)	(0.00573)	(0.00336)	
Fund 41	0.969***	0.177**	-0.0868	-0.160**	0.0128	0.00327	0,868
	(0.0490)	(0.0644)	(0.0530)	(0.0499)	(0.00663)	(0.00193)	
Fund 42	0.312	-0.343*	-0.0431	-0.193	0.0795	0.00709	0,372
	(0.174)	(0.166)	(0.116)	(0.152)	(0.107)	(0.00702)	
Fund 43	0.460***	-0.148	-0.177	-0.248***	0.0613	0.0112*	0,585
	(0.0962)	(0.170)	(0.102)	(0.0750)	(0.0443)	(0.00473)	
Fund 44	0.789***	-0.0336	-0.0990	-0.102	0.696	0.0138	0,886
	(0.0620)	(0.0598)	(0.0564)	(0.0862)	(0.566)	(0.0144)	
Fund 45	0.491***	-0.169	-0.394***	0.149	-0.0214	-0.00933	0,807
	(0.134)	(0.189)	(0.0733)	(0.178)	(0.0224)	(0.00534)	
Fund 46	1.140***	0.241*	-0.246***	-0.345***	0.0165	-0.00392	0,823
	(0.0829)	(0.120)	(0.0745)	(0.0974)	(0.0366)	(0.00471)	
Fund 47	1.116***	0.317**	-0.206**	-0.360***	0.0808	-0.00440	0,833
	(0.0715)	(0.101)	(0.0661)	(0.0801)	(0.201)	(0.00600)	
Fund 48	1.153***	0.314*	-0.239**	-0.379***	0.0135	-0.00741	0,833
	(0.0843)	(0.127)	(0.0738)	(0.0922)	(0.0353)	(0.00431)	
Fund 49	0.997***	0.0653	-0.0698	-0.0219	0.0297	0.0000279	0,833
	(0.0363)	(0.0497)	(0.0372)	(0.0428)	(0.0378)	(0.00141)	
Fund 50	0.961***	0.359***	-0.0907	-0.111*	0.0129	-0.000717	0,808
	(0.0489)	(0.0745)	(0.0584)	(0.0519)	(0.0110)	(0.00245)	
Fund 51	1.115***	-0.0654	0.0335	0.0976	0.512**	-0.0172*	0,921
	(0.0942)	(0.104)	(0.0725)	(0.0853)	(0.171)	(0.00866)	
Fund 52	0.963***	0.0658	-0.0333	-0.0668	0.00814	0.00126	0,922
	(0.0371)	(0.0377)	(0.0271)	(0.0346)	(0.00472)	(0.00130)	
Fund 53	0.904***	-0.00727	-0.0661	-0.0904	-0.372	0.000591	0,928
	(0.0737)	(0.0560)	(0.0449)	(0.0596)	(0.239)	(0.00273)	
Fund 54	0.862***	0.0540	0.00804	-0.231*	0.00150	0.00412	0,609

	(0.0907)	(0.160)	(0.0731)	(0.0967)	(0.000895)	(0.00518)	
Fund 55	0.499	0.0852	0.111	0.00221	0.0169	0.00145	0,263
	(0.262)	(0.236)	(0.110)	(0.117)	(0.0198)	(0.00882)	
Fund 56	0.963***	0.138**	-0.00534	-0.130**	-0.0232	-0.00195	0,912
	(0.0316)	(0.0471)	(0.0368)	(0.0442)	(0.0619)	(0.00172)	
Fund 57	0.963***	0.0432	-0.0514*	-0.0942**	0.0171*	-0.000250	0,943
	(0.0320)	(0.0372)	(0.0246)	(0.0305)	(0.00706)	(0.00105)	
Fund 58	0.886***	-0.0386	-0.104*	-0.0283	0.0135	-0.00491	0,833
	(0.0659)	(0.0832)	(0.0472)	(0.0698)	(0.0251)	(0.00315)	
Fund 59	0.966***	0.0631	-0.109**	-0.0752*	0.0252*	0.000396	0,926
	(0.0311)	(0.0554)	(0.0346)	(0.0328)	(0.0118)	(0.00124)	
Fund 60	1.004***	-0.192	-0.00188	-0.0750	0.00765	0.000221	0,878
	(0.0425)	(0.164)	(0.0665)	(0.0512)	(0.0118)	(0.00217)	
Fund 61	1.006***	0.0684	-0.0859*	-0.0571	-0.00136	-0.000086	0,943
	(0.0371)	(0.0635)	(0.0428)	(0.0427)	(0.00409)	(0.00234)	
Fund 62	0.849***	-0.0123	-0.149	-0.122	-0.000014	0.000961	0,769
	(0.198)	(0.192)	(0.0773)	(0.0890)	(0.000281)	(0.00286)	
Fund 63	0.904***	0.145**	-0.0249	-0.154***	0.0220	0.000569	0,878
	(0.0373)	(0.0516)	(0.0350)	(0.0383)	(0.0288)	(0.00172)	
Fund 64	0.351	-0.163	-0.0156	-0.386***	-0.139	0.0186**	0,715
	(0.229)	(0.213)	(0.0946)	(0.0985)	(0.0747)	(0.00625)	
Fund 65	1.005***	0.504***	-0.0798	-0.137	0.0800	-0.00556*	0,763
	(0.0504)	(0.0829)	(0.0667)	(0.0738)	(0.0536)	(0.00256)	
Fund 66	0.887***	0.345	-0.190	-0.0503	0.0300	-0.0148*	0,698
	(0.119)	(0.234)	(0.121)	(0.172)	(0.0565)	(0.00741)	
Fund 67	0.974***	0.0706	-0.0731*	-0.0836*	0.0554	-0.00141	0,923
	(0.0364)	(0.0463)	(0.0322)	(0.0417)	(0.173)	(0.00180)	
Fund 68	0.961***	0.349***	0.0565	-0.0545	0.120	-0.000211	0,833
	(0.0494)	(0.0718)	(0.0649)	(0.0647)	(0.139)	(0.00234)	

Fund 69	0.910***	0.336***	-0.00478	-0.0357	-0.0374	-0.00375	0,732
	(0.0687)	(0.0896)	(0.0735)	(0.0669)	(0.0283)	(0.00273)	
Fund 70	1.009***	0.121	-0.0186	-0.167*	-0.0368	0.00268	0,727
	(0.0290)	(0.0652)	(0.0585)	(0.0770)	(0.0462)	(0.00312)	
Fund 71	0.907***	0.0563	-0.114*	-0.0530	0.00579	0.00335	0,896
	(0.0330)	(0.0649)	(0.0481)	(0.0470)	(0.0618)	(0.00246)	
Fund 72	0.743***	0.157	-0.104	-0.223*	-0.167	-0.00595	0,607
	(0.185)	(0.186)	(0.0999)	(0.0963)	(0.133)	(0.00438)	
Fund 73	0.907***	0.261**	-0.0738	-0.198**	-0.00212	0.000026	0,716
	(0.0980)	(0.101)	(0.0877)	(0.0740)	(0.00893)	(0.00292)	
Fund 74	0.888***	0.280***	0.0288	-0.0465	0.00269	0.00142	0,760
	(0.0574)	(0.0777)	(0.0609)	(0.0522)	(0.0238)	(0.00219)	
Fund 75	0.880***	-0.00825	-0.0427	-0.0798*	-0.0318	0.000726	0,924
	(0.0322)	(0.0360)	(0.0283)	(0.0331)	(0.0241)	(0.00120)	
Fund 76	0.885***	-0.0498	-0.0234	-0.0715*	0.00978	0.00225*	0,936
	(0.0306)	(0.0385)	(0.0266)	(0.0297)	(0.0146)	(0.00106)	
Fund 77	1.022***	-0.00115	-0.176***	-0.0693	0.151	-0.00233	0,937
	(0.0325)	(0.0749)	(0.0475)	(0.0490)	(0.149)	(0.00243)	
Fund 78	0.899***	0.0256	-0.0649*	-0.0894*	-0.0230	0.000853	0,833
	(0.0325)	(0.0437)	(0.0328)	(0.0399)	(0.0358)	(0.00184)	
Fund 79	1.070***	0.171	-0.207**	-0.116*	-0.0250	0.000417	0,899
	(0.0503)	(0.112)	(0.0757)	(0.0586)	(0.0184)	(0.00375)	
Fund 80	0.976***	0.157	-0.176*	-0.0423	-0.135	-0.00282	0,833
	(0.0684)	(0.139)	(0.0784)	(0.0860)	(0.202)	(0.00420)	
Fund 81	0.936***	-0.170	-0.111	-0.107	0.0336	0.000434	0,833
	(0.0585)	(0.0921)	(0.0631)	(0.0736)	(0.0386)	(0.00307)	
Fund 82	0.946***	0.323*	-0.258**	-0.346**	0.00804	-0.0174*	0,833
	(0.115)	(0.156)	(0.0810)	(0.123)	(0.253)	(0.00768)	

Fund 83	0.953***	0.00177	-0.0210	-0.0131	0.0185*	-0.00134	0,833
	(0.0335)	(0.0391)	(0.0262)	(0.0285)	(0.00904)	(0.000979)	
Fund 84	0.869***	-0.0674	-0.154**	-0.0683	0.456	-0.00316	0,932
	(0.0603)	(0.0830)	(0.0506)	(0.0812)	(0.575)	(0.00800)	
Fund 85	0.994***	0.0407	-0.0868*	-0.0509	0.0134	-0.000575	0,807
	(0.0334)	(0.0621)	(0.0368)	(0.0361)	(0.0243)	(0.00238)	
Fund 86	0.975***	-0.156	0.0354	-0.134*	0.0105	0.00313	0,942
	(0.0546)	(0.104)	(0.0556)	(0.0535)	(0.0126)	(0.00215)	
Fund 87	1.040***	0.142**	0.0477	-0.0730	0.0308	-0.00202	0,948
	(0.0538)	(0.0548)	(0.0560)	(0.0566)	(0.0335)	(0.00182)	
Fund 88	1.029***	0.0767	0.0180	-0.0738	0.0190	-0.00235	0,833
	(0.0567)	(0.0670)	(0.0520)	(0.0429)	(0.0209)	(0.00257)	
Fund 89	1.020***	0.108	-0.0285	-0.0986	0.00460	-0.00118	0,944
	(0.0636)	(0.0605)	(0.0499)	(0.0522)	(0.0277)	(0.00182)	
Fund 90	0.996***	-0.00310	-0.00816	-0.0561	-0.0263	0.000405	0,710
	(0.0521)	(0.106)	(0.0527)	(0.0521)	(0.0363)	(0.00315)	
Fund 91	1.003***	0.314**	-0.526***	-0.115	-0.0147	0.00173	0,704
	(0.0590)	(0.105)	(0.0982)	(0.0705)	(0.0558)	(0.00326)	
Fund 92	0.947***	0.000297	0.141**	0.00706	-0.0120	-0.000834	0,744
	(0.0397)	(0.0636)	(0.0462)	(0.0410)	(0.0729)	(0.00244)	
Fund 93	0.238	-0.224	0.139	-0.336	-0.113	0.0206	0,205
	(0.393)	(0.426)	(0.265)	(0.181)	(0.245)	(0.0155)	
Fund 94	1.043***	0.235***	-0.163***	-0.0506	0.176	-0.00177	0,912
	(0.0406)	(0.0624)	(0.0466)	(0.0482)	(0.125)	(0.00178)	
Fund 95	0.909***	0.479***	-0.570***	0.0195	0.121	-0.0184**	0,853
	(0.114)	(0.145)	(0.0856)	(0.102)	(0.186)	(0.00701)	
Fund 96	1.045***	0.266	0.0632	-0.249	0.0697	-0.00885	0,691
	(0.139)	(0.232)	(0.0975)	(0.220)	(0.122)	(0.00919)	
Fund 97	1.147***	0.282*	-0.318**	-0.354***	0.0152	0.00284	0,858

	(0.0795)	(0.136)	(0.100)	(0.0605)	(0.0122)	(0.00415)

Standard errors in parentheses
* p<0.05, ** p<0.01, ***p<0.001

Table 6: Carhart + Flow(t) Regression on Separate Funds

This table shows the results from running Carhart's four factor model + flow in period *t* (Equation 5), on all 97 funds in the sample separately. Standard errors corresponding to the coefficients are reported in parantheses below the coefficient estimates. Thorough descriptions of the model specifications are found in chapter 4.1.1. *"Factor Models for Performance"* and 4.1.2 *"Flow"*.

	MRP	SMB	HML	PR1YR	Flow	Constant	Adjusted R-squared
Fund 1	0.965***	0.0574	-0.0624	-0.0631	-0.0134	0.00218	0,961
	(0.0376)	(0.0583)	(0.0344)	(0.0392)	(0.00916)	(0.00186)	
Fund 2	1.040***	0.430*	-0.159*	-0.158	-0.0126	-0.00305	0,621
	(0.0481)	(0.189)	(0.0621)	(0.177)	(0.0463)	(0.00311)	
Fund 3	1.056***	0.318***	-0.155**	-0.0125	-0.00517	-0.00192	0,865
	(0.0430)	(0.0692)	(0.0543)	(0.0597)	(0.0369)	(0.00231)	
Fund 4	1.116***	0.482***	-0.339***	0.0398	0.122***	-0.000697	0,829
	(0.0516)	(0.0803)	(0.0711)	(0.0621)	(0.0354)	(0.00219)	
Fund 5	0.960***	0.0968	-0.108**	-0.0625	-0.0466	-0.000910	0,922
	(0.0429)	(0.0505)	(0.0332)	(0.0333)	(0.0601)	(0.00136)	
Fund 6	0.847***	-0.107	-0.121*	-0.0503	-0.0687	-0.00633	0,934
	(0.0419)	(0.0884)	(0.0568)	(0.0729)	(0.0867)	(0.00386)	
Fund 7	0.995***	0.183	-0.233	-0.232	0.0355	0.00524	0,716
	(0.0393)	(0.102)	(0.146)	(0.186)	(0.0321)	(0.00380)	
Fund 8	1.096***	0.231***	-0.0772*	-0.0624*	-0.0120**	-0.00172	0,833
	(0.0369)	(0.0587)	(0.0378)	(0.0276)	(0.00461)	(0.00136)	
Fund 9	1.000***	0.100	-0.121**	0.0600	-0.160	-0.00133	0,788
	(0.0410)	(0.0523)	(0.0456)	(0.0650)	(0.130)	(0.00279)	

Fund 10	0.892***	-0.0504	-0.259***	0.0419	-0.0372	-0.00460	0,869
	(0.0797)	(0.171)	(0.0669)	(0.128)	(0.164)	(0.00695)	
Fund 11	1.050***	0.219*	-0.308**	0.0328	0.152	0.00110	0,824
	(0.0628)	(0.1000)	(0.0980)	(0.0651)	(0.0813)	(0.00362)	
Fund 12	1.049***	0.290**	-0.180**	-0.104*	0.0199	0.00129	0,961
	(0.0463)	(0.0890)	(0.0569)	(0.0503)	(0.0268)	(0.00237)	
Fund 13	0.961***	0.0216	-0.155***	-0.00067	-0.0287	0.000787	0,916
	(0.0408)	(0.0489)	(0.0427)	(0.0350)	(0.0302)	(0.00141)	
Fund 14	0.941***	0.00650	-0.0790*	-0.0312	-0.0206	0.000554	0,833
	(0.0433)	(0.0592)	(0.0355)	(0.0380)	(0.0364)	(0.00166)	
Fund 15	0.972***	0.0382	-0.0812*	-0.0126	-0.00519	0.00173	0,833
	(0.0402)	(0.0488)	(0.0334)	(0.0322)	(0.0214)	(0.00117)	
Fund 16	1.014***	0.157	-0.144*	-0.0447	-0.00386	0.000295	0,833
	(0.0586)	(0.111)	(0.0708)	(0.0582)	(0.0162)	(0.00262)	
Fund 17	0.932***	-0.0258	-0.0584	-0.0259	-0.00710	-0.000358	0,925
	(0.0689)	(0.0788)	(0.0528)	(0.0465)	(0.0214)	(0.00140)	
Fund 18	0.940***	0.0147	-0.0575	-0.0503	0.00158	0.00111	0,833
	(0.0310)	(0.0385)	(0.0317)	(0.0297)	(0.00399)	(0.00191)	
Fund 19	0.980***	0.0256	-0.0308	-0.098***	-0.208	-0.00225	0,941
	(0.0246)	(0.0421)	(0.0245)	(0.0286)	(0.189)	(0.00201)	
Fund 20	0.949***	0.0170	-0.0585*	-0.0937**	-0.0168	-0.00158	0,920
	(0.0350)	(0.0468)	(0.0272)	(0.0327)	(0.0243)	(0.00147)	
Fund 21	0.956***	0.0393	-0.0757	-0.130	-0.0111	0.00209	0,865
	(0.0290)	(0.0343)	(0.0518)	(0.0754)	(0.0318)	(0.00200)	
Fund 22	0.929***	0.0162	-0.0884	-0.0588	0.00107	-0.000362	0,847
	(0.0527)	(0.0481)	(0.0816)	(0.0402)	(0.00348)	(0.00163)	
Fund 23	0.952***	0.00290	-0.0515	-0.103**	-0.00471	0.00163	0,921
	(0.0325)	(0.0471)	(0.0311)	(0.0318)	(0.0121)	(0.00135)	

Fund 24	0.992***	0.0738	-0.0607*	-0.111***	0.0224	0.000859	0,914
	(0.0351)	(0.0423)	(0.0286)	(0.0324)	(0.0184)	(0.00146)	
Fund 25	0.903***	-0.0257	-0.0227	-0.0580	-0.0172	-0.0000738	0,891
	(0.0406)	(0.0511)	(0.0420)	(0.0356)	(0.0135)	(0.00155)	
Fund 26	0.940***	0.0112	-0.0643*	-0.0500	-0.00207	-0.000338	0,878
	(0.0405)	(0.0466)	(0.0285)	(0.0325)	(0.0346)	(0.00145)	
Fund 27	1.063***	0.527***	-0.128*	-0.240***	0.135***	0.000283	0,809
	(0.0607)	(0.0874)	(0.0624)	(0.0584)	(0.0241)	(0.00265)	
Fund 28	0.907***	0.0405	-0.00735	-0.0905*	0.0319	0.00171	0,833
	(0.0331)	(0.0474)	(0.0307)	(0.0362)	(0.0895)	(0.00125)	
Fund 29	0.911***	0.0247	-0.00751	-0.0939**	0.0543***	0.00204	0,914
	(0.0334)	(0.0468)	(0.0308)	(0.0353)	(0.0120)	(0.00128)	
Fund 30	0.998***	0.396***	-0.286*	-0.0314	-0.179	-0.00253	0,757
	(0.0499)	(0.0798)	(0.117)	(0.0582)	(0.166)	(0.00294)	
Fund 31	0.925***	0.0214	-0.0137	-0.0819*	0.00799	0.00253*	0,923
	(0.0399)	(0.0511)	(0.0323)	(0.0410)	(0.0120)	(0.00125)	
Fund 32	0.938***	0.0478	-0.00085	-0.0378	-0.00102	0.00202	0,882
	(0.0896)	(0.0997)	(0.0699)	(0.0735)	(0.0172)	(0.00225)	
Fund 33	1.125***	0.391***	-0.232***	-0.120*	-0.0840	-0.00005	0,857
	(0.0535)	(0.0646)	(0.0555)	(0.0522)	(0.0489)	(0.00207)	
Fund 34	1.135***	0.514***	-0.286**	-0.0551	-0.191	-0.00460	0,684
	(0.0659)	(0.0928)	(0.0937)	(0.0777)	(0.127)	(0.00435)	
Fund 35	0.888***	0.155	0.0156	-0.138**	0.00962	-0.00172	0,844
	(0.0795)	(0.0890)	(0.0780)	(0.0513)	(0.0321)	(0.00214)	
Fund 36	0.770***	-0.259	-0.100	-0.102	0	-0.000128	0,660
	(0.148)	(0.224)	(0.0896)	(0.120)	(.)	(0.00886)	
Fund 37	1.085***	0.236*	0.232	-0.0584	-0.0732	0.00202	0,846
	(0.0952)	(0.0993)	(0.133)	(0.117)	(0.0456)	(0.00324)	
Fund 38	0.995***	0.0644	0.257	-0.0579	-0.00171	0.00613	0,833

	(0.170)	(0.167)	(0.222)	(0.199)	(0.00701)	(0.00409)	
Fund 39	0.948***	0.281***	-0.0180	-0.184***	0.0279	-0.00103	0,841
	(0.0337)	(0.0597)	(0.0461)	(0.0512)	(0.0388)	(0.00219)	
Fund 40	0.842***	-0.0220	-0.0102	-0.124	0.00912	-0.00147	0,885
	(0.0615)	(0.121)	(0.0894)	(0.0758)	(0.00469)	(0.00353)	
Fund 41	0.949***	0.141*	-0.0643	-0.167***	0.0290***	0.00297	0,875
	(0.0483)	(0.0634)	(0.0474)	(0.0488)	(0.00626)	(0.00185)	
Fund 42	0.329	-0.387**	-0.128	-0.217	-0.189*	0.0116	0,430
	(0.170)	(0.133)	(0.113)	(0.134)	(0.0843)	(0.00636)	
Fund 43	0.435***	-0.160	-0.186	-0.242**	-0.0185	0.0129**	0,573
	(0.0903)	(0.171)	(0.0992)	(0.0788)	(0.0433)	(0.00495)	
Fund 44	0.817***	-0.0461	-0.0660	0.0116	0.619	0.0127	0,873
	(0.0708)	(0.0646)	(0.0735)	(0.122)	(0.467)	(0.0108)	
Fund 45	0.464**	-0.189	-0.424***	0.179	-0.0193	-0.00983	0,807
	(0.150)	(0.186)	(0.0697)	(0.176)	(0.0191)	(0.00548)	
Fund 46	1.120***	0.236*	-0.237***	-0.320***	0.0791*	-0.00299	0,832
	(0.0784)	(0.115)	(0.0708)	(0.0927)	(0.0340)	(0.00475)	
Fund 47	1.138***	0.320***	-0.204**	-0.338***	0.189**	-0.00203	0,833
	(0.0706)	(0.0963)	(0.0648)	(0.0781)	(0.0602)	(0.00447)	
Fund 48	1.135***	0.342**	-0.237***	-0.369***	0.0754	-0.00593	0,833
	(0.0850)	(0.117)	(0.0708)	(0.0942)	(0.0457)	(0.00462)	
Fund 49	0.993***	0.0656	-0.0694	-0.0204	0.0368	0.00000713	0,833
	(0.0374)	(0.0492)	(0.0370)	(0.0422)	(0.0453)	(0.00144)	
Fund 50	0.935***	0.332***	-0.0885	-0.114*	0.0570***	-0.00203	0,820
	(0.0482)	(0.0733)	(0.0534)	(0.0499)	(0.0148)	(0.00220)	
Fund 51	1.123***	-0.0244	0.0157	0.143	0.0792**	-0.00670	0,908
	(0.128)	(0.122)	(0.0624)	(0.0954)	(0.0279)	(0.00738)	
Fund 52	0.957***	0.0612	-0.0369	-0.0706*	0.0224***	0.00103	0,924
	(0.0367)	(0.0373)	(0.0275)	(0.0346)	(0.00670)	(0.00127)	

Fund 53	0.903***	-0.0142	-0.0689	-0.0909	-0.389	0.000646	0,928
	(0.0770)	(0.0580)	(0.0476)	(0.0596)	(0.588)	(0.00279)	
Fund 54	0.927***	0.193	0.000597	-0.173*	0.0441***	-0.000909	0,889
	(0.0791)	(0.100)	(0.0728)	(0.0810)	(0.000615)	(0.00235)	
Fund 55	0.491	0.0702	0.124	-0.00986	0.00275	0.00311	0,256
	(0.254)	(0.229)	(0.104)	(0.107)	(0.0107)	(0.00749)	
Fund 56	0.961***	0.135**	-0.00678	-0.131**	-0.0446	-0.00212	0,912
	(0.0308)	(0.0485)	(0.0367)	(0.0447)	(0.0902)	(0.00197)	
Fund 57	0.964***	0.0448	-0.0505*	-0.0945**	-0.000842	-0.000323	0,942
	(0.0318)	(0.0376)	(0.0245)	(0.0312)	(0.00886)	(0.00105)	
Fund 58	0.885***	-0.0532	-0.1000*	-0.0280	0.0748***	-0.00641*	0,833
	(0.0625)	(0.0829)	(0.0476)	(0.0655)	(0.0198)	(0.00295)	
Fund 59	0.973***	0.0759	-0.106**	-0.0738*	0.0621**	0.000183	0,930
	(0.0315)	(0.0472)	(0.0358)	(0.0324)	(0.0233)	(0.00106)	
Fund 60	1.001***	-0.193	-0.00781	-0.0783	-0.00353	-0.0000896	0,878
	(0.0391)	(0.186)	(0.0649)	(0.0522)	(0.0181)	(0.00227)	
Fund 61	1.002***	0.0733	-0.0877	-0.0635	-0.0160	-0.0000863	0,947
	(0.0355)	(0.0662)	(0.0465)	(0.0436)	(0.0105)	(0.00226)	
Fund 62	0.849***	-0.00745	-0.146	-0.102	0.0130	0.000602	0,771
	(0.183)	(0.174)	(0.0777)	(0.0759)	(0.0232)	(0.00265)	
Fund 63	0.906***	0.150**	-0.0250	-0.150***	-0.00497	0.000841	0,877
	(0.0381)	(0.0528)	(0.0352)	(0.0392)	(0.0331)	(0.00160)	
Fund 64	0.450	-0.214	0.0487	-0.333**	0.0366	0.00782	0,651
	(0.269)	(0.315)	(0.119)	(0.115)	(0.0714)	(0.00916)	
Fund 65	0.968***	0.482***	-0.0680	-0.151*	0.211**	-0.00491	0,772
	(0.0516)	(0.0814)	(0.0627)	(0.0703)	(0.0655)	(0.00258)	
Fund 66	0.884***	0.301	-0.197	-0.0296	0.0400	-0.0140	0,700
	(0.114)	(0.228)	(0.117)	(0.166)	(0.0364)	(0.00766)	

Fund 67	0.976***	0.0693	-0.0759*	-0.0961*	-0.285	-0.00373*	0,924
	(0.0353)	(0.0469)	(0.0326)	(0.0436)	(0.168)	(0.00177)	
Fund 68	0.945***	0.330***	0.0561	-0.0468	0.228	0.000322	0,833
	(0.0495)	(0.0704)	(0.0639)	(0.0624)	(0.117)	(0.00221)	
Fund 69	0.882***	0.324***	-0.0189	-0.0464	0.0681*	-0.00425	0,742
	(0.0704)	(0.0923)	(0.0693)	(0.0689)	(0.0307)	(0.00267)	
Fund 70	1.009***	0.123	-0.0257	-0.158*	0.0145	0.00323	0,727
	(0.0290)	(0.0664)	(0.0526)	(0.0707)	(0.0420)	(0.00358)	
Fund 71	0.905***	0.0527	-0.112*	-0.0546	-0.0236	0.00297	0,896
	(0.0318)	(0.0639)	(0.0448)	(0.0466)	(0.0334)	(0.00236)	
Fund 72	0.738***	0.154	-0.114	-0.214*	-0.0585	-0.00449	0,600
	(0.182)	(0.184)	(0.0974)	(0.0970)	(0.135)	(0.00500)	
Fund 73	0.830***	0.211*	-0.101	-0.232***	0.0501*	-0.00194	0,789
	(0.0805)	(0.101)	(0.0792)	(0.0602)	(0.0219)	(0.00245)	
Fund 74	0.881***	0.267***	0.0270	-0.0384	0.0296	0.00118	0,762
	(0.0572)	(0.0794)	(0.0620)	(0.0527)	(0.0266)	(0.00221)	
Fund 75	0.881***	-0.00644	-0.0430	-0.0776*	0.00671	0.00115	0,923
	(0.0323)	(0.0367)	(0.0283)	(0.0334)	(0.0250)	(0.00124)	
Fund 76	0.883***	-0.0531	-0.0251	-0.0704*	0.0103	0.00227*	0,936
	(0.0302)	(0.0375)	(0.0263)	(0.0298)	(0.0240)	(0.00108)	
Fund 77	1.019***	0.0242	-0.158***	-0.0659	0.222	-0.00294	0,939
	(0.0302)	(0.0698)	(0.0428)	(0.0466)	(0.114)	(0.00223)	
Fund 78	0.898***	0.0299	-0.0641	-0.0916*	-0.00298	0.00114	0,833
	(0.0319)	(0.0442)	(0.0330)	(0.0394)	(0.0361)	(0.00180)	
Fund 79	1.065***	0.188	-0.211**	-0.1000	0.00628	-0.000347	0,897
	(0.0508)	(0.110)	(0.0756)	(0.0644)	(0.0253)	(0.00373)	
Fund 80	0.979***	0.161	-0.169	-0.0462	0.0293	-0.00124	0,833
	(0.0747)	(0.114)	(0.0920)	(0.0991)	(0.125)	(0.00474)	
Fund 81	0.929***	-0.191*	-0.105	-0.138	-0.0409	0.00182	0,833

	(0.0626)	(0.0956)	(0.0603)	(0.0757)	(0.0301)	(0.00313)	
Fund 82	0.931***	0.295	-0.260**	-0.363**	-0.137	-0.0192**	0,833
	(0.110)	(0.159)	(0.0809)	(0.128)	(0.201)	(0.00693)	
Fund 83	0.955***	-0.00193	-0.0204	-0.0217	0.0242*	-0.00126	0,833
	(0.0332)	(0.0387)	(0.0260)	(0.0278)	(0.0117)	(0.000969)	
Fund 84	0.873***	-0.0705	-0.162***	-0.0557	0.260	-0.00544	0,929
	(0.0695)	(0.0800)	(0.0470)	(0.0909)	(0.521)	(0.00644)	
Fund 85	0.988***	0.0272	-0.0853*	-0.0414	-0.0696	-0.00108	0,814
	(0.0342)	(0.0641)	(0.0373)	(0.0376)	(0.0455)	(0.00216)	
Fund 86	1.000***	-0.0997	0.00366	-0.130**	0.0387	0.00344	0,950
	(0.0438)	(0.114)	(0.0780)	(0.0446)	(0.0292)	(0.00236)	
Fund 87	1.048***	0.156**	0.0372	-0.0652	0.0262	-0.00211	0,948
	(0.0519)	(0.0495)	(0.0553)	(0.0565)	(0.0305)	(0.00177)	
Fund 88	1.023***	0.0662	0.00970	-0.0676	-0.0352*	-0.00142	0,833
	(0.0535)	(0.0657)	(0.0512)	(0.0435)	(0.0173)	(0.00249)	
Fund 89	1.004***	0.0919	-0.0354	-0.0877	0.0306*	-0.000614	0,946
	(0.0648)	(0.0595)	(0.0487)	(0.0483)	(0.0155)	(0.00206)	
Fund 90	1.002***	-0.00539	-0.0130	-0.0580	0.0143	-0.000516	0,708
	(0.0626)	(0.115)	(0.0531)	(0.0608)	(0.0170)	(0.00310)	
Fund 91	0.990***	0.288**	-0.510***	-0.120	0.118	0.00180	0,711
	(0.0595)	(0.102)	(0.0939)	(0.0673)	(0.0639)	(0.00324)	
Fund 92	0.948***	0.00238	0.142**	0.00637	0.000679	-0.000928	0,743
	(0.0414)	(0.0648)	(0.0434)	(0.0417)	(0.0547)	(0.00267)	
Fund 93	0.297	-0.301	0.0569	-0.339	0.115	0.0108	0,205
	(0.383)	(0.414)	(0.274)	(0.186)	(0.162)	(0.00950)	
Fund 94	1.042***	0.240***	-0.173***	-0.0550	-0.0472	-0.00190	0,910
	(0.0409)	(0.0649)	(0.0473)	(0.0538)	(0.0813)	(0.00178)	
Fund 95	0.935***	0.519**	-0.597***	0.0428	-0.106	-0.0145*	0,852
	(0.112)	(0.160)	(0.0924)	(0.0971)	(0.111)	(0.00732)	

Fund 96	0.986***	0.257	0.0525	-0.222	0.148	-0.0102	0,729
	(0.133)	(0.214)	(0.0851)	(0.179)	(0.1000)	(0.00816)	
Fund 97	1.121***	0.307*	-0.321**	-0.358***	0.0415	0.00383	0,863
	(0.0660)	(0.137)	(0.0978)	(0.0606)	(0.0283)	(0.00388)	

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001