

Does Mutual Fund Flow Reflect Investor Sentiment?

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This paper examines the relationship between net aggregate equity fund flow and investor sentiment using weekly flow data. Using sentiment indicators from the American Association of Individual Investors and Investors Intelligence, I find that net aggregate equity fund flow in the current week is higher when individual investors became more bullish in the previous and current weeks. Moreover, higher net aggregate equity fund flow in the current week induces newsletter writers to become more bullish in the subsequent week. The relationship between net aggregate equity fund flow and investor sentiment remains strong even after accounting for the effects of risk premium and inflation. Overall, the evidence suggests that the behavior of equity fund investors is influenced not only by economic fundamentals, but also by investor sentiment.

Behavioral finance studies routinely challenge the traditional argument that market participants behave rationally (see, for example, Barber and Odean [2001], Barberis and Thaler [2002], Coval and Shumway [2001], DeBondt and Thaler [1985], Dreman and Lufkin [2000], Hirshleifer [2001], Kahneman and Riepe [1998], Shefrin and Statman [1985], Shiller and Pound [1989], and Shleifer [2000]). In addition, Black [1986] and DeLong et al. [1990] contend that noise traders acting in concert on non-fundamental signals can cause asset prices to deviate from their intrinsic values.

However, Shefrin and Statman [1994] offer an appealing alternative explanation of noise traders. Because noise traders do not all commit the same cognitive errors, cognitive biases cause some to be positive feedback traders, and others to be negative feedback traders. As a result, both momentum and contrarian traders may simultaneously participate in the financial markets.¹

The mounting evidence that investor trading behavior is driven by behavioral biases has seriously called into question the extent to which arbitrage can eliminate the divergence between prices and fundamental values. Market participants and watchers already seem to believe that sentiment plays a role in the financial markets. A recent *Business Week* article states:

On March 12, the stock market abruptly switched directions and rose 7% in the following three sessions. The powerful rally may have surprised many investors—but certainly not those who believe in sentiment

indicators. In the days leading up to the market's about-face, fans of this contrarian strategy found mounting evidence that investors were overly gloomy.... Elsewhere, investors continued to yank their money out of equity funds, to the tune of \$1.4 billion during the first week of March, marking the seventh straight week of redemptions (Scherreik [2003]).

While psychology plays a role in this phenomenon, Scherreik [2003] notes that money is a bigger factor. Rick Bensignor, the chief technical strategist at Morgan Stanley, states: "Overly gloomy investors hoard cash, which gives them plenty of buying power when their mood returns," (Scherreik [2003]). This perspective is consistent with that of Steven Norwitz, a spokesman at T. Rowe Price, who points out that:

Mutual fund cash flows seem to be the new sentiment indicator.... Analysts believe that as long as money is pouring into the stock market, it's only logical that stock prices will power higher (Raghavan [1994]).

Edelen and Warner [2001] and Warther [1995] document a positive relationship between fund flow and subsequent returns. Similarly, Neal and Wheatley [1998] find that fund flow can predict returns. Except for Warther, however, these studies do not formally address the impact of investor sentiment on fund flow.

But why should mutual fund flow reflect investor sentiment? Grossman [1976] and Grossman and Stiglitz [1980] argue that in a market with costly information acquisition and trading, rational investors have an incentive to become informed if the marginal benefits of becoming informed exceed the marginal costs. Mutual fund investors are generally considered to be the least informed investors in the market because they delegate their investment management to fund managers. As a result, Warther [1995] asserts, "mutual fund

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flows are a logical place to look for indicators of unsophisticated investor sentiment.”

For mutual fund flow to reflect investor sentiment, mutual fund investors must invest or divest in response to bullish or bearish sentiment. Interestingly, by using closed-end fund discounts as a proxy for investor sentiment, Warther [1995] finds they do not affect net aggregate inflow into equity mutual funds. Given the practitioner view that mutual fund flow is a measure of investor sentiment, Warther [1995] cautions it is not clear whether closed-end fund discounts or mutual fund flow properly measure investor sentiment.

This study aims to establish a relationship between net aggregate equity fund flow and investor sentiment. Similar to Warther's [1995] study, I examine the behavior of mutual fund investors at the aggregate level, in contrast to other studies done at the individual fund level (Ippolito [1992] and Sirri and Tufano [1998]). However, unlike Warther [1995], who uses closed-end fund discounts as an *indirect* measure of investor sentiment, I use a poll-based measure, which is generally regarded as a *direct* measure of sentiment. The use of these more popular measures from the *American Association of Individual Investors* and *Investor Intelligence* permits me to link what investors say with what they do. Also in contrast to the monthly data used by Warther [1995] and Brown and Cliff [2001], I use more recent and weekly data for net aggregate equity fund flow and investor sentiment.

By establishing a relationship between net aggregate equity fund flow and investor sentiment, this paper answers the following questions: Do mutual fund investors react to sentiment when moving money into and out of equity funds? Whose sentiment drives the behavior of mutual fund investors?

Understanding such a relationship is important for two reasons. Because net aggregate equity fund flow is positively related to market returns (Edelen and Warner [2001] and Warther [1995]), a significant relationship between net aggregate equity fund flow and investor sentiment would prove that investor sentiment affects market returns. Moreover, because market professionals consider investor sentiment as a measure of crowd psychology (Harding [1999]), and to the extent that such a measure captures non-fundamental signals, a significant relationship between net aggregate equity fund flow and investor sentiment would also imply that investor behavior in equity mutual funds is influenced by factors other than economic fundamentals.

Sentiment Indices

The two most popular direct measures of sentiment are from the *American Association of Individual Investors* (AAII) and *Investor Intelligence* (II). The AII sentiment is based on a survey of randomly selected

AAII members who give their stock market expectations over the next six months. It has been conducted since July 1987. Fisher and Statman [2000] find a significant negative relationship between the AII sentiment level and the S&P 500 returns in the subsequent month, but a significant positive relationship between the monthly change in AII sentiment and the monthly change in the stock allocations of individual investors. The response from survey participants can be classified as bullish, bearish, or neutral. The survey results are reported weekly in *Barron's* and are available at www.aaii.com.

The II sentiment is based on a weekly analysis of about 140 independent investment newsletters. This sentiment indicator is widely recognized as a reliable contrarian indicator of market movements (Siegel [2002] and Pring [1991]), although Solt and Statman [1988] and Clarke and Statman [1998] argue against using it to predict the direction of the stock market. Each week, the editor of II classifies newsletters as bullish, bearish, or expecting a correction. II has compiled its sentiment data since 1963.

Figure 1 shows the weekly AII and II bullish sentiment, defined as the ratio of bullish respondents to the sum of bullish and bearish respondents, from January 1992–August 2001.

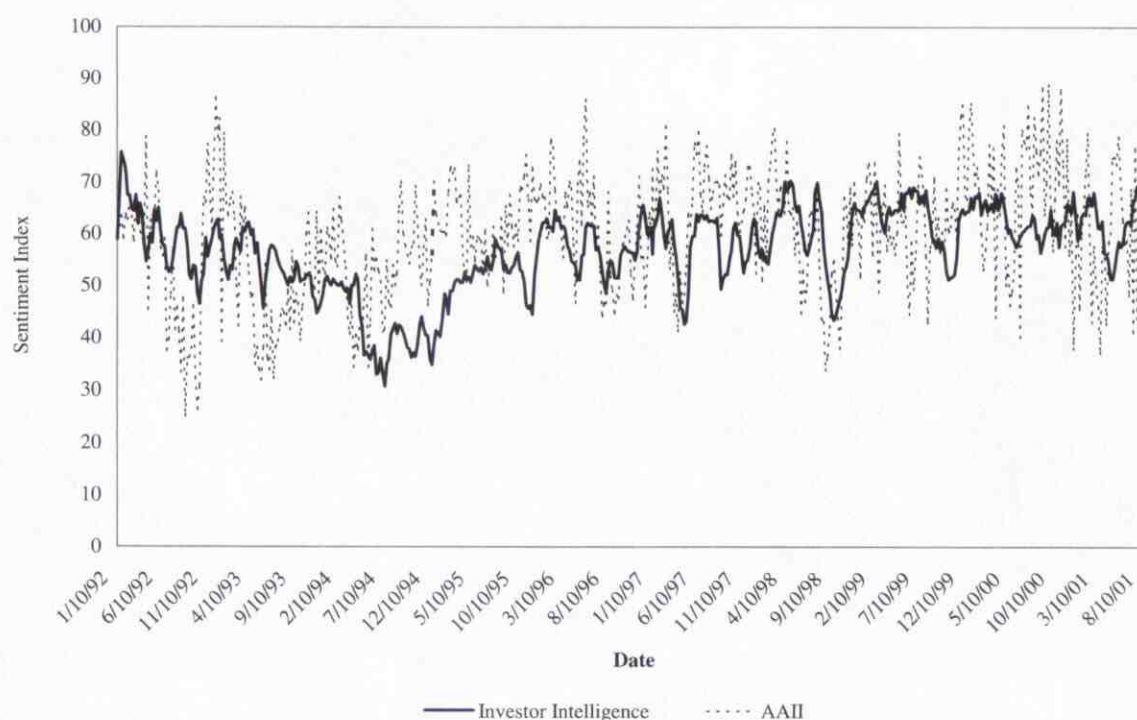
Three features of Figure 1 are noteworthy. First, both the AII and II bullish sentiment indices experience periodic spikes. Siegel [2002] observes that the periodic spikes in the II bullish sentiment coincide with major market events. For example, the 1994 collapse of the bond market and the 1997 Asian financial crisis both caused declines in the index. The index also fell during July–September 1998, as a result of the Russian debt problem and the subsequent fall of Long-Term Capital Management.

Second, although both indices have similar time series behavior, the AII index is more volatile, suggesting that individual investors exhibit more diversity in sentiment than newsletter writers. Third, for most of the period from January 10, 1992–August 31, 2001, both the AII and II bullish sentiment indices stayed within the 40%–70% range. Pring [1991] suggests that important buy signals occur when the II indicator falls below 35% and then rises. On the other hand, a decline from 80% to below 75% signals impending trouble.

Mutual Fund Flow

I purchased data on net aggregate equity mutual fund flow from the AMG Data Corporation, www.amgdata.com. AMG has collected weekly fund flow since 1992. Each week AMG collects and verifies data from over 500 sources on 16,900 open-end mutual funds. Its weekly reports reflect net fund flows from all major market categories.²

FIGURE 1
Weekly Levels of Bullish Investor Sentiment, January 10, 1992–August 31, 2001



For equity mutual funds, the weekly AMG fund flow represents 93% of all equity funds with 60% of net assets under management. AMG uses two methods to report mutual fund flow: fund flow including distributions and fund flow excluding distributions. Fund flow excluding distributions does not treat reinvested dividends and capital gains as inflow. Because reinvested distributions represent shareholder liability to the IRS, not incoming assets, fund flow excluding distributions more accurately reflects the actual activity of marginal investors, and is used here.

Figure 2 shows the weekly net aggregate equity fund flow as a percentage of aggregate assets of all equity funds from January 1992–August 2001.³

Net aggregate equity fund flow also exhibits periodic spikes. Furthermore, its time-series behavior appears similar to that of the sentiment indices.

Summary Statistics

Table 1 reports the summary statistics of the weekly levels in bullish sentiment indices and the weekly returns on the Wilshire 5000. The Wilshire 5000 returns are computed as the natural logarithm of the relative price levels in week t and week $t-1$. Table 1 also shows the summary statistics of weekly dollar net aggregate equity mutual fund flow, net aggregate equity mutual fund flow as a percentage of aggregate assets of all equity funds, weekly ninety-day Treasury bill yields as a proxy for inflation, and the weekly equity risk pre-

mium, measured as the difference between the weekly returns of the S&P 500 and the weekly yield of ten-year Treasury bonds.

From January 10, 1992–August 31, 2001, weekly AAI and II bullish sentiments average 59.6% and 56.8%, respectively. Confirming the time series behavior shown in Figure 1, the AAI bullish sentiment displays greater variability (a standard deviation of 11.81% versus 8.16%).⁴

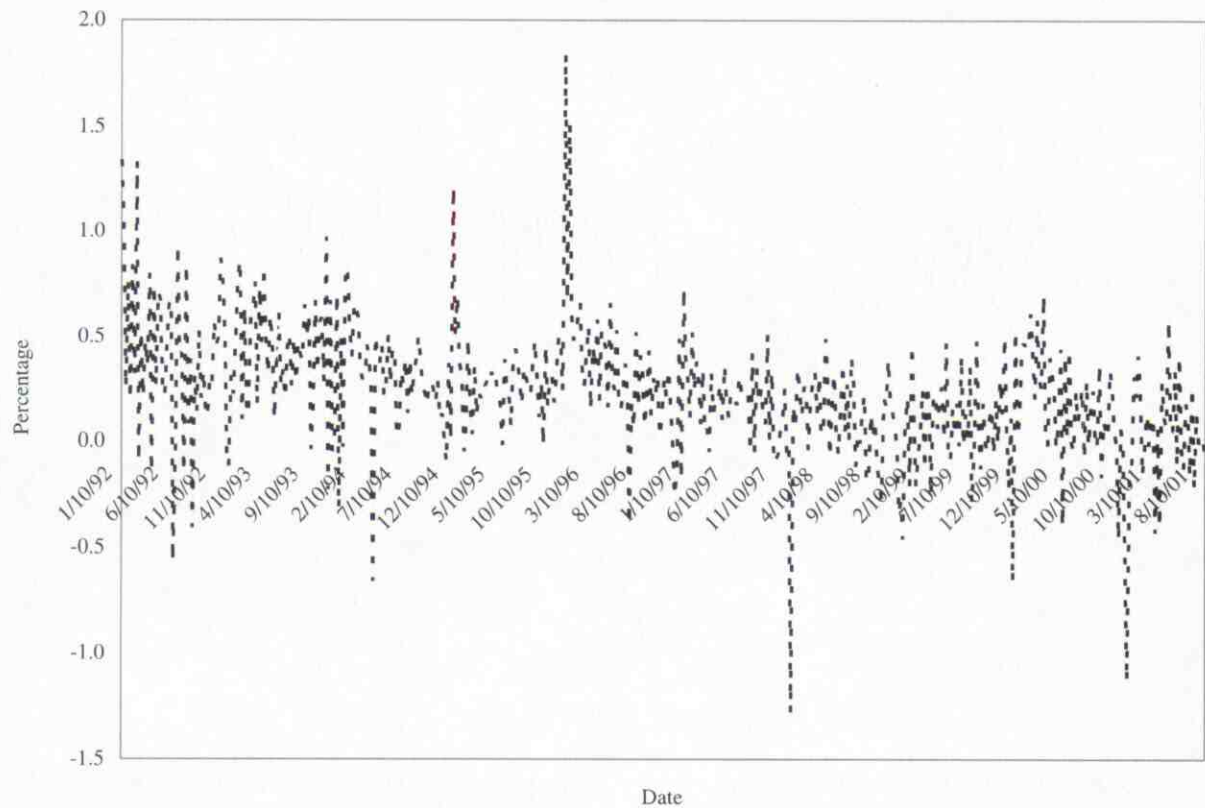
Table 1 also shows that the weekly average Wilshire 5000 return is 0.26% with a standard deviation of 2.14% from January 10, 1992–August 31, 2001. On average, the ninety-day Treasury bill weekly yield is 0.09%, while the weekly equity risk premium is 0.08%. Over this period, the weekly average net aggregate equity fund flow is \$1.8 billion (0.24%), with a standard deviation of \$3.1 billion (0.30%).⁵

Mutual Fund Flow and Market Returns Relationship

To establish the relationship between equity fund flow and market returns, Table 2 shows regression analyses of the weekly Wilshire 5000 returns on the percentage net aggregate equity fund flow. Due to the high autocorrelation in the monthly fund flow data, Warther [1995] separates the expected and unexpected components of fund flow and finds that an AR(3) model is appropriate. I follow this procedure, and find that an AR(14) fits weekly data well.

FIGURE 2

Weekly Percentage Net Aggregate Equity Fund Flow, January 10, 1992–August 31, 2001

**Table 1.** Weekly Summary Statistics of Net Aggregate Equity Fund Flow, Bullish Investor Sentiment, and Market Returns, January 10, 1992–August 31, 2001

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
AAII Bullish Sentiment (%)	59.59	60.33	11.81	25.00	88.83
II Bullish Sentiment (%)	56.79	57.74	8.16	30.70	75.85
Wilshire 5000 Return (%)	0.26	0.41	2.14	-12.97	8.23
Three-Month Treasury Bill Yields (%)	0.09	0.10	0.02	0.05	0.12
Equity Risk Premium (%)	0.08	0.20	2.08	-12.91	6.19
Net Aggregate Equity Fund Flow (\$ million)	1,835.93	1,839.33	3,068.55	-20,588.78	15,325.88
Net Aggregate Equity Fund Flow (%)	0.24	0.23	0.30	-1.28	1.84

Note: The AAI and II bullish sentiment data are from the *American Association of Individual Investors* and *Investor Intelligence*, respectively. The weekly return on the Wilshire 5000, obtained from Wilshire Associates, is computed as the natural logarithm of relative price levels in weeks t and $t-1$. The weekly yield of three-month Treasury bills, obtained from the Federal Reserve, is used as a proxy for inflation. The equity risk premium is measured as the difference between weekly S&P 500 returns and the weekly yield of ten-year Treasury bonds. The weekly dollar net aggregate equity fund flow and net aggregate equity fund flow as a percentage of aggregate assets of all equity funds are from AMG Data Corporation.

In both Models 1 and 2, the coefficients for lagged fund flow variables from weeks $t-4$ through $t-14$ are not significant, and are not reported here to conserve space. Model 1 describes the relationship between the Wilshire 5000 returns and the percentage net aggregate equity fund flow without decomposing it into the expected and unexpected components. Although Wilshire 5000 returns are strongly and positively related to concurrent net aggregate flow into equity funds, fund flow in the previous two weeks seems to significantly affect the returns as well. Model 2 investi-

gates this relationship further by examining the impact on the Wilshire 5000 returns of expected and unexpected components of fund flow.

Similar to Warther [1995], the concurrent expected fund flow is not significantly related to the Wilshire 5000 returns, while the coefficient for concurrent unexpected fund flow is positive and highly significant (at the 1% level). The coefficient for week $t-1$ unexpected fund flow is also positive and significant at the 5% level. Together, the results in Table 2 suggest that higher fund flow in the previous and current weeks

Table 2. *Regression of Wilshire 5000 Returns on Percentage Net Aggregate Equity Fund Flow, January 10, 1992–August 31, 2001*

Independent Variables	Model 1	Model 2
Constant	0.238 (1.170)	0.251 (0.680)
Fund Flow Week <i>t</i>	1.537*** (3.652)	
Fund Flow Week <i>t</i> –1	0.742** (2.222)	
Fund Flow Week <i>t</i> –2	–0.995*** (–2.675)	
Fund Flow Week <i>t</i> –3	–0.410 (–0.937)	
Expected Fund Flow Week <i>t</i>		0.121 (0.084)
Unexpected Fund Flow Week <i>t</i>		1.797*** (3.859)
Unexpected Fund Flow Week <i>t</i> –1		0.952** (2.409)
Unexpected Fund Flow Week <i>t</i> –2		–0.672 (–1.303)
Unexpected Fund Flow Week <i>t</i> –3		–0.269 (–0.573)
<i>F</i> -statistics	2.117***	2.257***
Adjusted <i>R</i> ² (%)	3.312	4.061

Note: The dependent variable is the weekly Wilshire 5000 returns. An AR(14) model was used to decompose net aggregate equity fund flow into expected and unexpected fund flows. Due to their insignificance, the coefficients for lagged fund flow variables from weeks 4 through 14 are not reported to conserve space. Expected fund flow is computed from Model 1, and unexpected fund flow is actual fund flow minus expected fund flow. *T*-statistics, computed using heteroskedasticity-consistent standard errors, are in parentheses.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

leads to higher market returns. This finding supports practitioner claims that higher fund flow will power up the stock market.

Previous studies also suggest that small firm returns are more sensitive to sentiment than large firm returns (Lee, Shleifer, and Thaler [1991]). To confirm this result, Table 3 shows three regression models that relate the weekly returns of two sized-based NYSE-AMEX-Nasdaq decile portfolios. The decile 1 portfolio contains the smallest firms; decile 10 contains the largest. The decile portfolios are value-weighted and constructed on the basis of the market value of equity at the beginning of each year. Returns on decile portfolios come from the Center for Research in Security Prices (CRSP). Model 2 in Table 2 is used to examine the relationship between net aggregate equity fund flow and the returns on size-decile portfolios.

Note from Table 3 the positive and significant relationship between unexpected fund flow and the returns of both deciles 1 and 10 portfolios. Concurrent expected fund flow does not affect the returns of these portfolios. More importantly, the coefficients of concurrent unex-

pected fund flow and unexpected fund flow in the previous two weeks are larger for decile 1 than for decile 10.

To further assess the significance of these coefficients, the last column of Table 3 shows a regression of the size premium (returns of decile 1 minus returns of decile 10) on the expected and unexpected fund flow. Concurrent unexpected fund flow is only weakly positively related to size premium (11% significance level). On the other hand, there is a strong positive relationship between unexpected fund flow in the previous two weeks and the size premium. This evidence implies that a larger size premium is associated with a higher unexpected fund flow, which confirms the prior findings that small firm returns are more sensitive to investor sentiment.

Investor Sentiment and Mutual Fund Flow Relationship

Table 4 shows the results of regression analyses that examine the relationship between the percentage net aggregate equity mutual fund flow and changes in bullish sentiments, defined as the difference between bullish sentiment indicators from week *t* – 1 to *t*. The regressions also control for the changes in weekly yield of the ninety-day Treasury bills as a proxy for changes in inflation, and differences between the weekly S&P 500 returns and weekly ten-year Treasury bond yields as a proxy for the equity risk premium.

The Wilshire 5000 return in the previous week is included in the regressions to examine whether fund investors move money into and out of equity funds in response to recent market movements. The regressions also contain a January dummy variable to capture seasonality in fund flows. Cassidy [2002] notes there is usually a strong net fund flow in January because many employees invest their year-end bonuses at that time. The regressions contain fourteen-week lagged percentage fund flow variables to control for the persistence of fund flow, but the coefficients are not reported to conserve space.

Model 1 excludes the effect of sentiment on net aggregate equity fund flow. Note the positive and highly significant coefficient for the January dummy. This result supports Cassidy's [2002] claim that net equity inflow is significantly higher in January. Similarly, the coefficient for equity risk premium is positive and highly significant, indicating that mutual fund investors tend to move money into equity funds when the equity risk premium rises.

On the other hand, the coefficient for changes in inflation is not significant, implying that mutual fund investors are not concerned with inflationary changes when moving money. The significance of the coefficient for the Wilshire 5000 return over the previous week suggests positive feedback trading. Equity mu-

Table 3. *Regressions of Decile Returns and Size Premium on Percentage Net Aggregate Equity Fund Flow January 10, 1992–August 31, 2001*

Independent Variables	Decile 1	Decile 10	Decile 1–Decile 10
Constant	0.569 (1.292)	0.263 (0.691)	0.306 (0.693)
Expected Fund Flow Week <i>t</i>	−1.169 (−0.689)	0.072 (0.048)	−1.241 (−0.728)
Unexpected Fund Flow Week <i>t</i>	2.560*** (4.372)	1.741*** (3.675)	0.819 (1.626)
Unexpected Fund Flow Week <i>t</i> −1	2.893*** (5.219)	0.930** (2.312)	1.963*** (3.864)
Unexpected Fund Flow Week <i>t</i> −2	1.445** (2.022)	−0.652 (−1.233)	2.097*** (2.823)
Unexpected Fund Flow Week <i>t</i> −3	−0.576 (−0.758)	−0.245 (−0.517)	−0.331 (−0.374)
<i>F</i> -statistics	5.589***	2.069***	2.779**
Adjusted <i>R</i> -squared (%)	13.389	3.477	5.653

Note: The dependent variable is weekly returns of the NYSE+AMEX+Nasdaq decile portfolios, obtained from the Center for Research in Security Prices (CRSP). Weekly returns are computed as the natural logarithm of the relative price index in weeks *t* and *t*−1. The decile 1 portfolio contains the smallest firms, and decile 10 contains the largest firms. Decile portfolios are value-weighted and constructed on the basis of the market value of equity at the beginning of each year. An AR(14) model was used to decompose net aggregate equity fund flow into expected and unexpected fund flows. The coefficients for lagged fund flow variables from weeks 4 through 14 are not reported to conserve space. Expected fund flow is computed using Model 1 from Table 2, and unexpected fund flow is actual fund flow minus expected fund flow. *T*-statistics, computed using heteroskedasticity-consistent standard errors, are in parentheses.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4. *Regressions of Percentage Net Aggregate Equity Fund Flow on Changes in Bullish Sentiment Full Period: January 10, 1992–August 31, 2001*

Independent Variables	Model 1	Model 2	Model 3
Constant	0.023 (1.084)	0.021 (0.980)	0.020 (0.987)
January Dummy	0.203*** (4.027)	0.205*** (3.893)	0.202*** (3.931)
Change in Inflation in Week <i>t</i>	−1.542 (−0.126)	−1.350 (−0.113)	−0.656 (−0.057)
Equity Risk Premium in Week <i>t</i>	0.025*** (4.326)	0.021*** (3.562)	0.015** (2.422)
Wilshire 5000 Return in Week <i>t</i> −1	0.012* (1.859)	0.010 (1.544)	0.003 (0.368)
Change in AAII Bullish Sentiment in Week <i>t</i> −1		0.002* (1.786)	
Change in AAII Bullish Sentiment in Week <i>t</i>		0.003** (2.432)	
Change in AAII Bullish Sentiment in Week <i>t</i> + 1		0.000 (0.021)	
Change in II Bullish Sentiment in Week <i>t</i> −1			−0.003 (−0.533)
Change in II Bullish Sentiment in Week <i>t</i>			0.013** (2.220)
Change in II Bullish Sentiment in Week <i>t</i> + 1			0.021*** (3.733)
<i>F</i> -statistics	9.418***	8.573***	9.435***
Adjusted <i>R</i> ² (%)	23.657	24.578	26.632

Note: The dependent variable is weekly net aggregate equity fund flow as a percentage of aggregate assets of all equity funds. The above regressions also include fourteen-week lagged percentage net aggregate equity fund flow as independent variables. For brevity, their coefficients are not reported. *T*-statistics, computed using heteroskedasticity-consistent standard errors, are in parentheses. Changes in bullish sentiment are defined as the difference between bullish sentiments in weeks *t* and *t*−1. Change in bullish sentiment in week *t* has been made orthogonal to change in bullish sentiment in week *t*−1, and change in bullish sentiment in week *t* + 1 has been made orthogonal to changes in bullish sentiment in weeks *t*−1 and *t*. This procedure was carried out for both AAII and II sentiments.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

tual fund investors seem to respond to recent market performance, in contrast to Warther's [1995] analysis.

Model 2 describes the relationship between net aggregate equity fund flow and changes in the AAI bullish sentiments in weeks $t-1$, t , and $t+1$. In this model, change in week t AAI sentiment was made orthogonal to change in week $t-1$ AAI sentiment. Likewise, change in week $t+1$ AAI sentiment was made orthogonal to changes in weeks t and $t-1$ sentiments. Orthogonalization captures additional information in weeks t and $t+1$ changes in sentiment that is not contained in the changes in sentiment over the previous week(s).

Note that the coefficients for changes in AAI bullish sentiment in weeks $t-1$ and t are positive and statistically significant at the 10% and 5% levels, respectively. In contrast, the coefficient for change in week $t+1$ AAI bullish sentiment is not statistically significant. These findings indicate both a contemporaneous and a non-contemporaneous relationship between investor sentiment and net aggregate equity fund flow, contrary to Warther's [1995] findings. Specifically, there is a higher net fund flow into equity funds in week t , when individual investors became more bullish in the previous and current weeks.

Model 3 describes the relationship between net aggregate equity fund flow and changes in the II bullish sentiments in weeks $t-1$, t , and $t+1$. Similar to Model 2, change in week t sentiment was made orthogonal to change in week $t-1$ sentiment. Likewise, change in week $t+1$ sentiment was made orthogonal to changes in weeks t and $t-1$ sentiments.

The coefficients for changes in II bullish sentiment in weeks t and $t+1$ are both positive and statistically significant. However, the coefficient for change in week $t-1$ is negative and not statistically significant. Again, these findings suggest both a contemporaneous and non-contemporaneous relationship between sentiment and net equity fund flow. In particular, there is a higher net fund flow into equity funds in the current week, when newsletter writers are currently more bullish. Note, however, that the non-contemporaneous relationship between newsletter writer sentiment and net aggregate equity fund flow is different from that between individual investor sentiment and net aggregate equity fund flow in Model 2.

The significant positive coefficient for change in II bullish sentiment in week $t+1$ in Model 3 implies that a higher net aggregate equity fund flow in week t induces newsletter writers to be more bullish in the subsequent week. This result is consistent with the notion that newsletter writers believe that current inflow into equity funds will subsequently propel the market to a higher level, which therefore makes them more bullish the following week.⁶

Note from Models 2 and 3 the strong evidence of the January seasonality effect in net aggregate equity

fund flow. This is again consistent with Cassidy's [2002] assertion. However, there is no evidence that equity mutual fund investors follow a feedback trading strategy. More importantly, the relationship between net aggregate equity fund flow and changes in sentiment is very strong even after controlling for the effects of risk premium and changes in inflation. This implies that the behavior of equity mutual fund investors is influenced by investor sentiment as well as by economic fundamentals.

The results in Table 4 suggest that Warther's [1995] failure to find a significant relationship between closed-end fund discounts and net aggregate equity fund flow is probably due to the use of closed-end fund discounts as a measure of sentiment. Using the daily fund flow of three Fidelity funds, Goetzmann and Massa [2003] also find that bullish sentiment, proxied by market timing newsletter recommendations, is positively related to fund flow.

Robustness Tests

To examine the robustness of these results, I first reran Models 2 and 3 in Table 4 without orthogonalizing changes in the AAI and II sentiments. The results with respect to both measures are qualitatively similar to those first reported in Table 4.

Second, I replaced changes in weekly sentiment with the weekly unusual level of bullish sentiment, computed as the difference between the week t sentiment index from its ten-week moving average.⁷ Using this alternative measure, I again reran Models 2 and 3. The results indicate a positive and significant (at the 5% level) contemporaneous relationship between net aggregate equity fund flow and the unusual level of AAI bullish sentiment, suggesting a higher inflow into equity mutual funds when individual investors are currently unusually bullish.

On the other hand, there is only a non-contemporaneous relationship between net aggregate equity fund flow and the unusual level of II bullish sentiment. Specifically, there is a negative and significant (at the 10% level) relationship between net aggregate equity fund flow in week t and the unusual level of bullish sentiment in week $t-1$. Moreover, I also found a positive and significant (at the 1% level) relationship between net aggregate equity fund flow in week t and the unusual level of bullish sentiment in week $t+1$. These results imply that investors in equity mutual funds act in a contrarian manner in response to the unusual bullishness of the newsletter writers in the previous week. In turn, the newsletter writers become unusually bullish the subsequent week in response to a higher net aggregate equity fund flow in the current week. Again, these findings highlight the importance of sentiment in explaining the behavior of equity mutual fund investors.

For a third robustness test, I divided the January 10, 1992–August 31, 2001 period into two subperiods of equal length. I then ran the same three regression models from Table 4. The results are reported in Tables 5 and 6.

Table 5 shows that the January dummy variable has positive and statistically significant coefficients across Models 1–3. The coefficients for equity risk premium and changes in inflation are not statistically significant in all models.

Interestingly, over the January 10, 1992–November 1, 1996 subperiod, there is evidence of positive feedback trading. Mutual fund investors tended to move money into equity funds in response to good recent market performance. More importantly, Table 5 indicates a positive contemporaneous relationship between the sentiment of individual investors and net aggregate equity fund flow, but a positive non-contemporaneous relationship between the sentiment of newsletter writers and net aggregate equity fund flow. When individual investors are more bullish in the current week, mutual fund investors pour more money into equity funds. An increase in the net aggregate equity fund flow in the current week then leads newsletter writers to be more bullish the subsequent week.

For the November 8, 1996–August 31, 2001 subperiod, Table 6 reveals highly significant coefficients (at the 1% level) for the January dummy variable in Models 1–3. The equity risk premium has positive and highly significant coefficients (at the 1% level) in all three models. Changes in inflation and the Wilshire 5000 return in the previous week show no statistical significance. The coefficient for changes in the week $t - 1$ AAII bullish sentiment is positive and statistically significant at the 10% level. In addition, the coefficient for changes in the week $t + 1$ II bullish sentiment is positive and statistically significant at the 1% level, while changes in weeks t and $t - 1$ are only significant at the 13% and 12% levels, respectively.

These results again confirm that mutual fund investors move more money into equity funds in the current week when individual investors were more bullish the previous week. On the other hand, a higher net aggregate equity fund flow in the current week induces newsletter writers to be more bullish the following week.

Overall, the relationship between net aggregate equity fund flow and both sentiments is robust with respect to alternative specification of sentiment measures and time periods. The relationship between net aggregate

Table 5. Robustness Tests of the Regressions of Percentage Net Aggregate Equity Fund Flow on Changes in Bullish Sentiment Subperiod: January 10, 1992–November 1, 1996

Independent Variables	Model 1	Model 2	Model 3
Constant	0.194*** (3.132)	0.185*** (3.094)	0.187*** (3.204)
January Dummy	0.178** (2.164)	0.166* (1.934)	0.179** (2.049)
Change in Inflation in Week t	-22.518 (-1.030)	-22.857 (-1.060)	-21.732 (-1.034)
Equity Risk Premium in Week t	0.016 (0.835)	0.006 (0.283)	0.004 (0.208)
Wilshire 5000 Return in Week $t-1$	0.058*** (3.940)	0.054*** (3.296)	0.046*** (2.822)
Change in AAII Bullish Sentiment in Week $t-1$		0.000 (0.180)	
Change in AAII Bullish Sentiment in Week t		0.004* (1.683)	
Change in AAII Bullish Sentiment in Week $t + 1$		0.001 (0.581)	
Change in II Bullish Sentiment in Week $t-1$			0.000 (0.038)
Change in II Bullish Sentiment in Week t			0.009 (1.055)
Change in II Bullish Sentiment in Week $t + 1$			0.015* (1.857)
F-statistics	3.263***	2.967***	3.038***
Adjusted R^2 (%)	14.667	14.844	15.298

Note: The dependent variable is weekly net aggregate equity fund flow as a percentage of aggregate assets of all equity funds. The above regressions also include fourteen-week lagged percentage net aggregate equity fund flows as independent variables. For brevity, their coefficients are not reported. *T*-statistics, computed using heteroskedasticity-consistent standard errors, are in parentheses. Changes in bullish sentiment are defined as the difference between bullish sentiments in weeks t and $t-1$. Change in bullish sentiment in week t has been made orthogonal to change in bullish sentiment in week $t-1$, and change in bullish sentiment in week $t + 1$ has been made orthogonal to changes in bullish sentiment in weeks $t-1$ and t . This procedure was carried out for both AAII and II sentiments.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6. *Robustness Tests of the Regressions of Percentage Net Aggregate Equity Fund Flow on Changes in Bullish Sentiment Subperiod: November 8, 1996–August 31, 2001*

Independent Variables	Model 1	Model 2	Model 3
Constant	0.009 (0.317)	0.005 (0.168)	0.004 (0.135)
January Dummy	0.280*** (4.185)	0.288*** (4.096)	0.286*** (4.367)
Change in Inflation in Week t	11.082 (0.830)	9.579 (0.748)	10.474 (0.879)
Equity Risk Premium in Week t	0.026*** (4.069)	0.024*** (3.787)	0.018*** (2.639)
Wilshire 5000 Return in Week $t - 1$	0.003 (0.404)	0.002 (0.251)	-0.004 (-0.505)
Change in AAII Bullish Sentiment in Week $t - 1$		0.003* (1.820)	
Change in AAII Bullish Sentiment in Week t		0.002 (1.162)	
Change in AAII Bullish Sentiment in Week $t + 1$		0.000 (0.218)	
Change in II Bullish Sentiment in Week $t - 1$			-0.009 (-1.558)
Change in II Bullish Sentiment in Week t			0.011 (1.595)
Change in II Bullish Sentiment in Week $t + 1$			0.022*** (2.994)
F-statistics	3.740***	3.492***	4.246***
Adjusted R^2 (%)	16.424	17.309	21.425

Note: The dependent variable is weekly net aggregate equity fund flow as a percentage of aggregate assets of all equity funds. The above regressions also include fourteen-week lagged percentage net aggregate equity fund flows as independent variables. For brevity, their coefficients are not reported. T -statistics, computed using heteroskedasticity-consistent standard errors, are in parentheses. Changes in bullish sentiment are defined as the difference between bullish sentiments in weeks t and $t - 1$. Change in bullish sentiment in week t has been made orthogonal to change in bullish sentiment in week $t - 1$, and change in bullish sentiment in week $t + 1$ has been made orthogonal to changes in bullish sentiment in weeks $t - 1$ and t . This procedure was carried out for both AAII and II sentiments.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

equity fund flow and II sentiment is statistically stronger than that between net aggregate equity fund flow and AAII sentiment. Tables 4–6 consistently show that sentiment of individual investors in the current or previous week is positively related to net aggregate equity fund flow in the current week, while the sentiment of newsletter writers in the subsequent week is positively related to net aggregate equity fund flow in the current week.

The main results indicate that mutual fund investors react to the sentiment of individual investors when moving money into and out of equity mutual funds. And this trading behavior subsequently affects the sentiment of newsletter writers.

Conclusion

By examining the relationship between the poll-based investor sentiment measures and net aggregate equity fund flow, this study links what investors say with what they do. The results reconcile the differences between the practitioner view and empirical evidence regarding the impact of investor sentiment on the behavior of equity mutual fund investors.

Using weekly data, I find that the sentiment of both individual investors and newsletter writers is related to net aggregate equity fund flow. Fund investors pour money into equity funds in the current week when individual investors were more bullish in the current and previous weeks. In addition, newsletter writers subsequently become more bullish when fund investors put more money into equity mutual funds in the current week.

This relationship between investor sentiment and net aggregate equity fund flow is strong even after accounting for the effect of equity risk premium and changes in inflation. Furthermore, there is a strong January seasonality effect in net aggregate equity fund flow, but mixed evidence that equity fund investors are positive feedback traders. Overall, the evidence supports the notion that the behavior of equity fund investors is influenced not only by economic fundamentals, but also by investor sentiment.

Notes

1. Indeed, Grinblatt and Keloharju [2000] find the presence of both momentum and contrarian traders in the Finnish market, while Kumar and Dhar [2002] document the presence of both

- types of traders in the U.S. market. Gompers and Metrick [2001] show that momentum trading by mutual funds is offset by contrarian trading by other institutions. For further evidence of momentum and contrarian trading by individual and institutional traders, see Badrinath and Wahal [2002], Fisher and Statman [2000, 2003], and Nofsinger and Sias [1999].
2. It would have been ideal to examine the impact of investor sentiment on equity and bond fund flow as well as on fund flow in different categories of equity and bond funds. Budgetary constraints, unfortunately, prevented such an analysis.
 3. As an alternative measure, I computed the weekly net aggregate equity fund flow as a percentage of the total value series of the CRSP's stock indices or as a percentage of the entire stock market (NYSE+AMEX+NASDAQ). The results based on this alternative measure are virtually identical to those reported in the tables.
 4. Because the sentiment indices are highly autocorrelated, subsequent analysis uses changes in the sentiment indices.
 5. To alleviate concern about non-stationarity of the series reported in Table 1, I ran Phillips-Perron unit root tests for each series. The null hypothesis of unit root was strongly rejected for all series except for the three-month Treasury bill yields. First-differencing the Treasury bill yields results in a stationary series. As a result, subsequent analysis uses the first difference in three-month Treasury bill yields as a proxy for changes in inflation.
 6. To test whether the sentiment of individual investors is more important than the sentiment of newsletter writers in explaining the variation in net aggregate equity fund flow, I included weeks $t-1$, t , and $t+1$ changes in AAI and II sentiments in one regression. Multicollinearity is not a problem. The coefficients of the sentiment variables remained significant and had the same signs as in Table 3. This result confirms the importance of both groups' sentiments in explaining the variation. To conserve space, this result is not reported.
 7. The choice of a ten-week period to compute the moving average was motivated by Pring [1991], who suggests using a ten-week period to smooth out the fluctuations in the sentiment index. The results do not change if the average of the AAI and II sentiment indices reported in Table 1 is used to compute the weekly unusual level of bullish sentiments.
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