Mutual Fund Performance and Overpriced Stocks*

By Doron Avramov, Si Cheng, and Allaudeen Hameed

October 8, 2015

Abstract

We find a strong negative relation between the propensity of active mutual funds to hold overpriced stocks and their subsequent performance. High-propensity funds, or overpriced funds, display poor stock picking skills as they further purchase overpriced stocks during episodes of fund inflows, even when such stocks display low expected returns. Moreover, overpriced funds attract considerable capital inflows during high sentiment episodes, after controlling for the effects of past fund performance, especially funds displaying lottery-like characteristics. Eventually, overpriced funds are accountable for the negative performance characterizing the mutual fund industry.

---

* Doron Avramov (email: doron.avramov@huji.ac.il) is from The Hebrew University of Jerusalem; Si Cheng (email: s.cheng@qub.ac.uk) is from Queen's University Belfast, and Allaudeen Hameed (email: allaudeen@nus.edu.sg) is from National University of Singapore. We thank Yakov Amihud and Martin Cremers for helpful comments.

I. Introduction

Recent statistics from the Investment Company Institute show that the total net assets managed by 3,269 U.S. active equity funds exceed 6.3 trillion dollar as of June 2015. Such funds aim to create value for their investors through their skills in stock picking and market timing (e.g., Fama (1972) and Daniel, Grinblatt, Titman, and Wermers (DTGW) (1997)). As mutual funds typically undertake long-only positions, stock picking skills essentially amount to detecting undervalued investments.

However, rational and behavioral asset pricing theories have typically precluded the existence of undervaluation. Instead, such theories have argued that asset prices are likely to exceed their discounted value of expected future dividends. Notably, Miller (1977) asserts that in the presence of heterogeneous beliefs about fundamental values and impediments to short selling, asset prices reflect the views of the more optimistic investors. Subsequent models refine the intuition in Miller's conjecture and obtain overvaluation by linking short sale constraints to low breath of ownership (Chen, Hong, and Stein (2002)) as well as high search costs (Duffie, Gârleanu, and Pedersen (2002)).[1] The empirical evidence has largely been supportive of stock overpricing. In particular, Stambaugh, Yu, and Yuan (2012), Avramov, Chordia, Jostova, and Philipov (2013), and Drechsler and Drechsler (2014) show that prominent market anomalies extract their profitability from selling short overvalued stocks. Taking together economic theory and evidence, long-only active mutual funds are exposed to overpriced stocks and their stock picking skills may depend on their ability to avoid or, at least, underweight such stocks.

This paper investigates whether the propensity of active mutual funds to underweight overvalued stocks reflects managerial skills and thus predicts the cross-sectional differences in fund performance. To pursue this task, we originate a fund overpricing measure ─ the investment value-weighted average of overpricing of stocks held by the fund. Stock overpricing is computed following

[1] Similarly, the basic insight in Harrison and Kreps (1978), Scheinkman and Xiong (2003), and Hong, Scheinkman, and Xiong (2006) is that when agents agree to disagree and short selling is infeasible, asset prices may exceed their fundamental value as investors are willing to pay more for the right to sell the asset in the future. In Abreu and Brunnermeier (2002) and Brunnermeier and Nagel (2004), the dispersion of opinion among arbitrageurs causes a synchronization problem and they choose to ride the bubble leading to delayed corrections of overvalued stocks. Likewise, the positive feedback economy of De Long, Shleifer, Summers, and Waldmann (1990) recognizes the possibility of overpricing ─ arbitrageurs do not sell or short an overvalued asset, rather they buy it, in anticipation of future price increases due to further buying by trend chasing investors.

Stambaugh, Yu, and Yuan (2012, 2015) based on eleven anomalies that survive the exposures to the Fama and French (1993) three factors. In particular, funds overweighting stocks that are financially distressed, with higher equity issuance, higher accruals, higher operating assets, lower past returns, lower gross profitability, higher asset growth, lower return on assets, and higher abnormal capital investment, ceteris paribus, exhibit higher overpricing. Put another way, funds that heavily (lightly) weight overpriced stocks are considered to be overpriced (underpriced). We also examine the implications of fund overpricing for managerial trading activity in response to new capital, as well as investors' reactions to overpricing, as reflected through fund flows.

We hypothesize that fund overpricing reflects stock picking skills. Specifically, higher fund overpricing is associated with unskilled managers realizing lower future return, as the prices of overvalued stocks held by the fund converge to fundamental values during the investment period. On the other hand, to the extent that skilled fund managers stay away or underweight overpriced stocks, these funds may earn positive benchmark-adjusted returns. We further hypothesize that fund overpricing is associated with future performance only during high market sentiment periods. Indeed, as outlined by Stambaugh, Yu, and Yuan (2012), episodes of high market sentiment, along with short sale constraints, produce overvalued assets.

The empirical evidence is supportive of these hypotheses. The top decile of the most overpriced funds performs poorly, earning a benchmark-adjusted (DGTW-adjusted) return of −2.28% (−1.15%) per year and the corresponding figures for the least overpriced funds is positive at 0.78% (1.10%). The difference in performance between the least and the most overpriced funds is economically significant ranging between 2.24% and 2.27% per year. The performance gap widens considerably during episodes of high market sentiment: the most overpriced funds underperform the most underpriced funds by 7.39% in benchmark-adjusted return and by 3.9% in DGTW-adjusted return per year. In fact, significant positive benchmark-adjusted annual return of 2.09% is recorded for the most underpriced funds during high sentiment periods. In contrast, fund overpricing reveals no predictive power during low sentiment periods, with benchmark- and risk-adjusted returns being not different

from zero across almost all fund overpricing deciles.[2] These findings emphasize the joint effects of stock mispricing and investor sentiment on fund performance. Our findings on mutual funds complement the stock based evidence in Stambaugh, Yu, and Yuan (2012) on the interaction between overpricing and market sentiment.[3]

We find that the predictive power of fund overpricing is robust to alternative risk-adjustment models to recover alphas, accounting for gross-of-fee returns, as well as netting out the average overpricing in the fund's benchmark portfolio. We also show that fund overpricing is inversely related to fund performance after controlling for (a) fund characteristics such as past flows, total net assets, turnover, illiquidity based on stock holdings; and (b) other predictors of fund performance including tracking error (Wermers (2003)), industry concentration index (Kacperczyk, Sialm, and Zheng (2005)), return gap (Kacperczyk, Sialm, and Zheng (2008)), active share (Cremers and Petajisto (2009), Petajisto (2013)), and R-square (Amihud and Goyenko (2013)). For example, after controlling for fund characteristics and other measures of fund managerial skills, a one standard deviation increase in fund overpricing reduces the benchmark-adjusted (DTGW-adjusted) fund return by 1.94% (0.81%) per annum. The magnitude of the impact of overpricing is dramatically higher following periods of high investor sentiment. Overall, there is solid evidence that the tendency of active mutual funds to hold overpriced stocks is a novel measure of managerial stock picking skills.[4]

The analysis of managerial buying activities in response to fund inflows provides further insights in shaping up the relation between fund overpricing and subsequent performance. We find that managers of overpriced funds are more likely to purchase overpriced stocks and are less likely to purchase underpriced stocks in the subsequent quarter. Indeed, overpriced funds respond to fund inflows by continuing to purchase overpriced stocks, especially during periods of high investor sentiment, revealing a preference for overpriced stocks, even when such stocks realize, on average,

[2] In our entire sample of mutual funds, the average alpha is −0.58% per year with respect to the CAPM and −0.7% with respect to the FFC model, both of which are statistically significant. Indeed, a large body of work shows that the average mutual fund alpha (net of fees) is negative after adjusting for equity styles or risk benchmarks (e.g., Malkiel (1995), Gruber (1996), Carhart (1997), Wermers (2000), Christoffersen and Musto (2002), Gil-Bazo and Ruiz-Verdú (2009)). We find that the average alpha becomes indistinguishable from zero when twenty percent of the most overpriced funds are excluded. Ultimately, the average negative alpha associated with active funds emerges from such, ex ante identifiable, funds holding the most overpriced stocks.

[3] Another related work by Moskowitz (2000) shows that active funds perform worse during expansionary periods.

[4] Our evidence on the cross-sectional relation between fund overpricing and performance adds to Pástor, Stambaugh, and Taylor (2015)'s evidence on the relation between time variation in fund trading activity and manager skill. They find that funds trade more when investor sentiment is high, consistent with funds trading heavily when stocks are more mispriced.

low future performance. In contrast, the most underpriced funds attempt to deliver superior performance: these funds display a higher likelihood of purchasing the least underpriced stocks while avoiding the most overpriced stocks. Hence, the trading activity of managers of overpriced funds appears to be consistent with our argument that it reflects poor stock selection skills. We also note that more overpriced funds charge high fees while they have lower manager tenure, which incentivize low skilled managers to remain active instead of adopting a low-fee passive strategy.

In investigating the relation between fund overpricing and future fund performance, we note that stock return predictability based on known anomalies does not mechanically translate into fund return predictability. Indeed, in the presence of managerial skills, active mutual funds are not a mere collection of individual stocks. For one, in our sample, the cross-fund differences in the degree of fund overpricing are smaller than the observed overpricing in the entire universe of individual stocks. In addition, mutual fund managers could use their informational advantage to respond to stock overpricing by adjusting their holdings (not reflected in the quarter-end reported holdings) away from overpriced stocks, mitigating the predictability of returns based on the fund level overpricing. For example, Kacperczyk, Sialm, and Zheng (2008) show that the unobserved actions of mutual funds predict performance. Of course, if fund overpricing is unrelated to managerial skills, funds with the same benchmarks would perform similarly even when their overpricing measures differ. Our findings still hold when the experiments are based on benchmark-adjusted returns as well as benchmark-adjusted overpricing.

Finally, we examine investor reaction to fund overpricing in terms of its relation to future fund flows. Miller's (1977) basic assertion implies that overpriced funds are likely to be held by optimistic investors. In periods of high sentiment, overpriced funds could attract additional flows if optimistic investors, buoyed by positive market sentiment, pour more money into such funds. For example, overpriced funds tend to hold high credit risk firms, which, in turn, exhibit unique lottery-like characteristics (see Coelho, John, and Taffler (2012)). Kumar (2009) documents investor preference for assets displaying lottery-like characteristics, such as positive return skewness, even when such assets deliver poor average returns. Additionally, Bailey, Kumar, and Ng (2011) show that behaviorally biased individual investors are influenced by such lottery-like features in their

investment in mutual funds.[5] Hence, optimistic investors who display preferences towards lottery-like assets are likely to purchase overpriced funds. On the other hand, prior studies have also shown that fund flows are influenced by other fund characteristics, in particular past fund returns, as investors are known to chase past performance (e.g., Chevalier and Ellison (1997)) and overpriced funds are recent underperformers. Altogether, controlling for past performance, we predict that higher fund overpricing attracts more investor capital.

As hypothesized, there is a significant positive relation between fund flow and (lagged) propensity of funds to hold overpriced stocks, controlling for fund characteristics, including past returns. Considering the state of investor sentiment, the positive overpricing-flow relationship is concentrated in high sentiment periods. In addition, we observe greater flows to overpriced funds that record higher marketing expenses as well as positive return skewness, confirming that they attract optimistic investors favoring lottery-like assets. Our findings imply that low skilled managers may be catering to the preference of their optimistic investors by investing in characteristics associated with overpriced stocks and get rewarded with additional flows, despite the lower expected future returns.

The rest of the paper is organized as follows. Section II describes the data and the construction of variables of interest. Section III presents some stylized patterns of mutual fund overpricing. Section IV studies the implications of fund overpricing for future performance. Section V relates mutual fund overpricing to fund investment of inflows and investor response in terms of flows. Section VI concludes.

II. Variable Construction and Data

A. Fund Overpricing Measure

We measure the degree of mutual fund overpricing by aggregating the mispricing of the stocks held by the fund. We rely on a set of eleven anomalies to identify mispriced stocks, following Stambaugh, Yu, and Yuan (2012). Specifically, stock-level overpricing is based on the eleven anomalies which survive the exposure to the three factors of Fama and French (1993). Each anomaly

[5] Solomon, Soltes, and Sosyura (2014) find that stock characteristics play a role in attracting flows, especially when the stocks are featured in the media. Musto (1999) shows that funds window dress their reported holdings to attract flows, particularly the recent badly performing funds.

reflects mispriced stocks and by combining many anomalies, we obtain mispricing information that is common across all these anomalies (Stambaugh, Yu, and Yuan (2015)). We proceed to construct fund-level overpricing as the investment value-weighted average of overpricing of stocks in a fund's portfolio. The eleven anomalies consist of failure probability (e.g., Campbell, Hilscher, and Szilagyi (2008), Chen, Novy-Marx, and Zhang (2011)), O-score (Ohlson (1980), Chen, Novy-Marx, and Zhang (2011)), net stock issuance (Ritter (1991), Loughran and Ritter (1995)), composite equity issuance (Daniel and Titman (2006)), total accruals (Sloan (1996)), net operating assets (Hirshleifer, Hou, Teoh, and Zhang (2004)), momentum (Jegadeesh and Titman (1993)), gross profitability (Novy-Marx (2013)), asset growth (Cooper, Gulen, and Schill (2008)), return on assets, and abnormal capital investment (Titman, Wei, and Xie (2004)). The details on the construction of the firm specific variables underlying these eleven anomalies are provided in Appendix A. Most anomalies are constructed on annual basis, while the failure probability, O-score, and return on assets are computed quarterly, and momentum is formed monthly. For anomalies based on information from financial statements, we use the fiscal year-end but consider the accounting variables observable in June of the next calendar year.

For each anomaly, we rank the stocks in each quarter with the highest rank indicating the most overpriced stock. Ranks are normalized to follow a [0, 1] uniform distribution. For example, more overpriced stocks, or stocks with higher failure probability, higher O-score, higher net stock issuance, higher composite equity issuance, higher total accruals, higher net operating assets, lower past six-month returns, lower gross profitability, higher asset growth, lower return on assets, and higher abnormal capital investment receive higher ranks (closer to 1). A stock's composite rank is the equal-weighted average of its ranks across all eleven anomalies, as in Stambaugh, Yu, and Yuan (2015). The quarterly fund-level *Overpricing* measure is then computed as the investment value-weighted average of overpricing of stocks in a fund's most recently reported portfolio holdings.[6]

B. Data Sources and Sample Description

[6] Because most anomalies are formed annually and do not vary within a quarter, we also construct the overpricing measure at the annual frequency. Our findings are similar across the sampling frequencies.

We obtain quarterly institutional equity holdings from Thomson-Reuters's mutual fund holdings database. The database contains quarter-end security holding information for all registered mutual funds that report their holdings to the U.S. Securities and Exchange Commission (SEC). We match the holdings database to the Center for Research in Security Prices (CRSP) mutual fund database, which reports monthly total returns and total net assets (TNA). We focus on U.S. equity mutual funds and include all CRSP/CDA-merged general equity funds that have one of the following Lipper objectives: "EI", "EMN", "G", "GI", "I", "LSE", "MC", "MR", or "SG". We eliminate index funds by deleting those whose name includes any of the following strings: "Index", "Ind", "Ix", "Indx", "S&P", "500", "Dow", "DJ", "Nasdaq", "Mkt", "Barra", "Wilshire", and "Russell". We consolidate multiple share classes into portfolios by adding together share-class TNA and by value-weighting share-class characteristics (e.g., returns, fees) based on lagged share-class TNA. Similar to Elton, Gruber, and Blake (1996) and Amihud and Goyenko (2013), funds are required to have TNA of at least USD 15 million. Our test period is 1981–2010, and the sample consists of 1,888 actively managed equity mutual funds.

Daily and monthly common stock data are from the CRSP database while quarterly and annual financial statement data come from the COMPUSTAT database. We use these data to construct the eleven anomalies as described earlier.

Our *Overpricing* measure at the fund level mirrors the selection of mispriced stocks by funds and, hence, reflects the stock picking skills of fund managers. To ensure that our measure is different from other managerial skill proxies documented in literature, we control for *Active Share* (Cremers and Petajisto (2009), Petajisto (2013)),[7] *R-square* (Amihud and Goyenko (2013)), *Industry Concentration Index* (Kacperczyk, Sialm, and Zheng (2005)), *Return Gap* (Kacperczyk, Sialm, and Zheng (2008)), and *Tracking Error* (Wermers (2003), Cremers and Petajisto (2009)). For each fund, we also construct a list of control variables, including the logarithm of the fund TNA, expense ratio, turnover, the logarithm of the age of the fund, the logarithm of manager tenure, and the logarithm of the stock illiquidity. Fund attributes formed based on stock characteristics (e.g., illiquidity) are computed as the

[7] We thank Antti Petajisto for making the active share data publicly available: http://www.petajisto.net/data.html.

investment value-weighted average of stock characteristics. Detailed descriptions of all variables are provided in Appendix A.

Table 1 provides the summary statistics of stocks sorted into deciles based on the overpricing measure. It is apparent that stock overpricing is negatively related to future performance: stocks in the most overpriced decile earn about 2% less per month than the least overpriced stocks, over the next quarter. In addition, overpriced stocks are smaller firms, more illiquid, less covered by analysts, have higher book-to-market ratio, are more distressed and exhibit higher idiosyncratic volatility – features commonly associated with high potential overpricing and greater arbitrage risk and other impediments to arbitrage leading to price correction.

Interestingly, mutual funds, in general, hold less overpriced stocks. Mutual funds hold only 6.3% of stocks in the highest decile of overpriced stocks, significantly less than the unconditional expected holdings of 10%. On the other hand, mutual fund ownership of the least overpriced stocks is slightly above 10% in the lowest few deciles. Mutual fund ownership also monotonically declines with stock overpricing. As shown in the Internet Appendix Table IA1, we note that overpricing at the fund level is significantly lower than the stock average: the mean and median overpricing at the fund level is 44%, and is lower than the corresponding average of 50% for the universe of investable stocks. In what follows, we explore the variation in the mutual fund holdings of overpriced stocks and its relation to managerial skills.

III. Stylized Patterns of Mutual Fund Overpricing

We first characterize the performance and other characteristics of mutual funds with varying propensity to hold overpriced stocks. To pursue the task, we sort mutual funds into ten groups based on *Overpricing* at the beginning of each quarter q. For each decile, we report average fund return, age, expense ratio, along with other characteristics during quarter q and subsequent quarters.

The evidence is reported in Table 2. Notice that there is a fairly large dispersion in mutual fund holding of overpriced stocks with the overpricing measure ranging between 0.38 for the least overpriced funds and 0.52 for the most overpriced funds. In unreported results, we find that the difference in the overpricing of the extreme deciles is highly stable over the entire 1981 to 2011

sample period. Indeed, the difference between the extreme deciles is unaffected by the trend towards index-like investing by active managers (Stambaugh (2014)), which would have reduced the cross-fund differences in their holdings of overpriced stocks. Moreover, the propensity of a fund to hold overpriced stocks in a quarter continues into subsequent quarters. Specifically, Table 2 shows that the average fund-level *Overpricing* across the deciles is similar in the next quarter (quarter $q+1$), and even one year ahead in quarter $q+4$.

Table 2 also shows that the funds characterized by high *Overpricing* at the beginning of the quarter display low contemporaneous returns. For example, the difference in fund returns between the low and high overpricing deciles ("LMH") is 0.35% per month (t=2.09), or 4.19% annualized. The corresponding difference in benchmark-adjusted (DGTW-adjusted) fund returns is 4.49% (4.36%) per year. Overpriced funds also hold more illiquid stocks. For perspective, the average illiquidity of stocks held by the most overpriced funds is more than twice that of the least overpriced funds. Additionally, funds with high *Overpricing* are typically younger funds with higher expense ratio, higher turnover, and shorter manager tenure, but they have similar total net assets as other funds. We also report the average fund flows in the following quarter $q+1$. We show that despite their poor performance, the most overpriced funds attract more flows than their lowest overpricing counterpart, and the difference is 3.31% per year, albeit insignificant (t=−1.55).[8]

The persistence in *Overpricing* is confirmed in Fama-MacBeth regressions of fund *Overpricing* on its lagged value as well as a set of lagged control variables, including *Lag(Fund Return)*, *Lag(Fund Flow)*, *Log(Fund TNA)*, *Expense Ratio*, *Turnover*, *Log(Fund Age)*, *Log(Manager Tenure)* and *Log(Stock Illiquidity)*. The results (reported in Internet Appendix Table IA2) indicate that there is strong positive autocorrelation of *Overpricing* in both quarterly as well as annual frequencies. The quarterly (annual) autocorrelation coefficient is statistically significant at 0.91 (0.75). We also observe a slightly stronger persistence among funds with higher overpricing. Consistent with the univariate results in Table 2, overpriced funds have low recent fund returns, are younger, have high expenses and turnover and the manager has a shorter tenure. In sum, the propensity for mutual funds to

[8] The insignificant overpricing-flow relationship could be due to two conflicting forces unconditionally. On one hand, overpriced funds are associated with poor performance, which typically leads to lower fund flow. On the other hand, overpriced funds may attract optimistic investors and, hence more capital. We control for past performance in Section V.

overweight overpriced stocks is highly persistent in both the cross section and the time series and is correlated with several prominent fund characteristics.

IV. Overpricing and Fund Performance

A. Overpricing as a Predictor of the Cross-Section of Fund Performance

In this section, we perform a comprehensive set of tests on whether mutual fund overpricing predicts cross-sectional differences in future fund performance. While stock level overpricing is negatively related to subsequent stock returns, this does not translate mechanically to the predictability of fund performance for several reasons. Indeed, in the presence of managerial skills a mutual fund is not a mere collection of individual stocks. For one, Table 1 shows that cross-fund differences in overpricing are smaller than the cross-sectional variation in stock overpricing measures. Next, if fund managers respond to stock overpricing by adjusting their holdings (not reflected in the quarter end report), and hence, mitigate the effects of stock overpricing, fund level overpricing will not reliably forecast fund returns. Finally, if the fund overpricing is unrelated to fund managers' ability to select stocks, fund overpricing should be unrelated to benchmark-adjusted fund performance. Consequently, we measure abnormal fund performance using various proxies advocated in the literature. In addition to total fund returns and benchmark-adjusted fund returns (BMK), we compute fund returns adjusted for risk using the CAPM and the Fama-French-Carhart (FFC) four factor model (Carhart (1997)), as well as characteristic-adjusted returns in Daniel, Grinblatt, Titman, and Wermers (DGTW) (1997). Our approach is to sort mutual funds into deciles according to lagged *Overpricing* at the beginning of each month m, and examine the value-weighted (i.e., fund TNA-weighted) average fund return realized in month $m + 1$.

Table 3 reports the abnormal fund return in each overpricing decile as well as the differential return between the least and the most overpriced funds ("LMH"). It is evident from Panel A of Table 3 that the most overpriced funds underperform the least overpriced (or most underpriced) funds by 3.07% per year in benchmark-adjusted return over the sample period. The corresponding DGTW-adjusted (benchmark and FFC-adjusted) return difference between funds with high and low *Overpricing* is economically significant at 2.27% (2.24%) per annum. In addition to generating low

investment returns, the overpriced funds exhibit higher return dispersion. For instance, the most overpriced funds generate monthly return volatility of 5.64% while the corresponding figure for the least overpriced funds is 4.06%. Indeed, the annual Sharpe ratio generated by the least overpriced funds is 0.43 (monthly Sharpe ratio multiplied by the square root of 12), while the corresponding figure for the most overpriced funds is 0.17. The evidence suggests that fund overpricing is a strong candidate to predict cross-sectional differences in fund performance.

Stambaugh, Yu, and Yuan (2012) show that investment strategies based on market anomalies are most profitable during high sentiment periods and primarily stem from the short leg of the trade. They attribute the sentiment effect to binding short-sale constraints, which are especially at work during episodes of high investor sentiment. To examine the impact of investor sentiment on the overpricing-fund performance relation, we split the sample into high (above median) versus low (below median) sentiment periods based on the Baker and Wurgler (2006, 2007) investor sentiment index.[9]

The basic hypothesis is that overpricing could distinguish among funds only during high sentiment periods because only then assets are more likely to be overvalued, as indicated by Miller (1977). Panels B and C of Table 3 report fund performance during periods of high and low investor sentiment. As hypothesized, fund overpricing predicts performance only during the high sentiment period, while otherwise there is no significant difference in performance of funds characterized by high versus low overpricing. Following high sentiment periods, the most overpriced funds deliver a monthly benchmark-adjusted return of −0.44% or an annual return of −5.32%, which is drastically lower than the 2.09% per annum associated with the least overpriced funds. The return differential between the lowest and the highest overpriced funds is economically and statistically significant and is independent of the metric used to measure performance. For example, when investor sentiment is high, the annualized benchmark-adjusted (DGTW-adjusted) return difference between the most and the least overpriced funds is 7.39% (3.9%). In contrast, there is no difference in the performance of funds with high and low overpricing following low sentiment periods across all fund performance metrics.

[9] We thank Jeffry Wurgler for making their index of investor sentiment publicly available.

Of course, the existing literature has proposed various approaches to gauge mutual fund managerial skills. To list, Cremers and Petajisto (2009) and Petajisto (2013) show that *Active Share* — the sum of the absolute deviations of the fund's portfolio holdings from its benchmark index holdings — predicts superior fund performance. Amihud and Goyenko (2013) employ an alternative active share measure — the *R-square* obtained from a regression of fund returns on a multifactor benchmark model. They show that lower *R-square* is associated with greater selectivity and better performance. Kacperczyk, Sialm, and Zheng (2005) find that mutual funds with holdings concentrated in only a few industries outperform their more diverse counterparts. Their *Industry Concentration Index* (*ICI*) is defined as the sum of the squared deviations of the fund's portfolio holdings in each industry from the industry weights of the total stock market. Kacperczyk, Sialm, and Zheng (2008) use *Return Gap* — the difference between the gross-of-fee fund return and the holding-based return to proxy for fund managers' unobserved actions, and show that it leads to better future performance. Finally, *Tracking Error* — the volatility of the difference between a portfolio return and its benchmark index return — also measures the activeness of fund management (e.g., Cremers and Petajisto (2009)). It should also be noted that Chen, Ibbotson, and Hu (2010) and Idzorek, Xiong, and Ibbotson (2012) find that mutual funds which hold less liquid stocks significantly outperform mutual funds that hold more liquid stocks. The latter findings suggest that fund illiquidity based on stock holdings also predicts future performance.

To give prominence to these important variables, we examine the role of *Overpricing* in predicting mutual fund performance controlling for all the above noted predictors of managerial skills. Specifically, we estimate the following quarterly panel regression model:

$$Perf_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-1} + \beta_2 Sentiment_{q-1} + \beta_3 Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q}. \quad (1)$$

where $Perf_{f,q}$ is the performance of fund f in quarter q, $Overpricing_{f,q-1}$ is the overpricing measure at the fund level, $Sentiment_{q-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, and the vector *M* stacks all other control variables. We use four measures of fund performance ($Perf_{f,q}$): total fund returns, benchmark-adjusted returns, DTGW-adjusted returns, and

benchmark and Fama-French-Carhart (FFC) adjusted returns.[10] The control variables include measures of managerial skills, that is, *Active Share*, (logistic transformation of) *R-square*, *Industry Concentration Index, Return Gap, Tracking Error*, as well as fund specific variables *Lag(Fund Return), Lag(Fund Flow), Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age), Log(Manager Tenure)*, and *Log(Stock Illiquidity)*. The model in Equation (1) is estimated with quarter and fund fixed effects and standard errors clustered at the fund level.

The results are reported in Table 4. Across all fund performance measures and regression specifications, *Overpricing* is negatively and significantly associated with future fund performance. For example, in Model 2 (Model 7) of Panel A, one standard deviation higher *Overpricing* reduces annualized raw (DGTW-adjusted) fund returns by 2.85% (0.81%), after controlling for the other measures of managerial skills and fund characteristics. For illustration, the annual impact of the fund return is-2.85%, computed as $-5.11\% \times 4.654\% \times 12$, where -5.11% is the regression coefficient and 4.654% is the standard deviation of *Overpricing*. Indeed, that controlling for the other skill measures does not alter our findings indicates that fund overpricing is an economically distinguished quantity.

To examine return predictability of the extreme overpriced funds separately, we consider two dummy variables: $Dummy(Underpricing)_{f,q-1}$ — takes a value of one if $Overpricing_{f,q-1}$ is in the bottom decile across all funds in that quarter, while $Dummy(Overpricing)_{f,q-1}$ — takes a value of one if the $Overpricing_{f,q-1}$ is in the top decile. We find that the return predictability exists in both groups with a stronger effect among the highest overpriced funds. Investing in the least overpriced funds leads to 1.88% higher annual raw fund return (Model 3) or 0.76% higher DGTW-adjusted return (Model 8) in the subsequent period, while overpriced funds underperform by 3.12% in annual raw return or 1.32% in DGTW-adjusted annual return over the same period.

Considering investor sentiment, the impact of *Overpricing* on performance is the strongest during high sentiment periods. Notice in particular that the slope coefficient featuring the interaction between

[10] Empirically, we estimate the benchmark and FFC-adjusted alpha in a given month as the difference between the benchmark-adjusted return of the fund and its realized risk premium, defined as the vector of beta — estimated from a rolling Fama-French-Carhart four-factor model for the five years preceding the month in question — times the vector of realized factors for that month. We then compute the average of monthly alpha values of funds within a given quarter.

overpricing and sentiment is negative and significantly so (Models 4 and 9) ─ suggesting that the relation between overpricing and future performance is stronger (more negative effect) during episodes of higher market sentiment. Supporting statistical evidence is the negative slope coefficient of the interaction between the overpricing dummy and sentiment as well as the positive slope coefficient of the interaction between the underpricing dummy and sentiment (Models 5 and 10).

We also gauge the economic magnitude of the combined effect of *Overpricing* and investor sentiment. Specifically, we create a dummy variable *High Sentiment* taking a value of one when investor sentiment is above median over the sample period. We then replace the *Sentiment* variable in Models 5 and 10 with the *High Sentiment* dummy. The (unreported) evidence shows that the regression coefficient for the interaction of *Dummy(Overpricing)* and *High Sentiment* is −0.649 (t=−11.33) for raw return and −0.199 (t=−4.55) for DGTW-adjusted return. The additional tests suggest that high *Overpricing* funds underperform by 7.79% in raw return and 2.34% in DGTW-adjusted return per year during high sentiment period. This represents a marked increase in magnitude from 3.12% in raw return or 1.32% in DGTW-adjusted return, without conditioning on sentiment state.

Panel B of Table 4 presents similar negative evidence on the relation between the *Overpricing* measure and fund performance when fund returns are adjusted for benchmark returns or further adjusted by the Fama-French-Carhart (FFC) model. We also find that the role of investor sentiment stands out even after considering different measures of fund performance as well as adjusting for all previously documented performance predictors and traditional fund characteristics. The robust evidence emerging from Table 4 supports the notion that the negative effect of high *Overpricing* on future fund returns is strongly consistent with binding short-sale constraints, as discussed by Miller (1977) and further validated by Stambaugh, Yu, and Yuan (2012). This relation is amplified when market sentiment is high as it coincides with an increasing number of overpriced funds on the market.

B. Robustness Tests

We provide four sets of robustness tests of the main results in Table 4. The first two tests consider alternative transformation of the *Overpricing* measure. The first is benchmark-adjusted overpricing (*BMK-adjusted Overpricing*), where the fund overpricing is adjusted by netting out its benchmark

average. More specifically, the benchmark level overpricing is the average overpricing of funds corresponding to that benchmark. The second uses the change in overpricing (Δ*Overpricing*) given the persistence in the fund overpricing level. The results using *BMK-adjusted Overpricing* are reported in Table 5 Panel A, while Panel B reports the same for Δ*Overpricing*. For brevity, we report only the benchmark-adjusted return and benchmark and FFC-adjusted return, following Cremers and Petajisto (2009), noting that the other fund performance measures leave the evidence unchanged.

The layout of the columns in Panel A of Table 5 is the same as that of Table 4. The tests based on *BMK-adjusted Overpricing* show a similar statistical and economic impact, confirming that the relationship between mutual fund overpricing and its performance is robust among comparable funds. Notice in particular that all the regression coefficients pertaining to overpricing are negative and significant, while all coefficients pertaining to underpricing are positive and significant.

In Panel B of Table 5, we estimate the following quarterly panel regression specification:

$$Perf_{f,q} = \alpha_0 + \beta_1 \Delta Overpricing_{f,q-1} + \beta_2 Overpricing_{f,q-1} + \beta_3 Sentiment_{q-1} + \beta_4 \Delta Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q} \quad (2)$$

where $\Delta Overpricing_{f,q-1}$ is the change in overpricing level of fund f in quarter q, and all other variables are defined as in Equation (1). As previously, we estimate a panel specification with quarter and fund fixed effects and standard errors clustered at the fund level.

The evidence suggests a negative effect of the Δ*Overpricing* on fund performance, on a stand-alone basis as well as on a joint basis after controlling for the level effect. For example, a one percent increase in Δ*Overpricing* translates to an economically significant 45 bps lower benchmark-adjusted return per year (Model 3) and 12 bps lower annualized return if further adjusted by the Fama-French-Carhart model (Model 8).[11]

The next two robustness tests consider whether the findings in Table 4 are affected when fund returns are measured before fees or at annual frequency. While thus far we have focused on the net return delivered to mutual fund investors after all fees and expenses, we next re-estimate Equation (1) using gross-of-fee fund return as the dependent variable. Gross-of-fee investment return measures the

[11] The dependent variable is reported as a percentage of monthly return. Thus, the impact of a 1% increase in $\Delta Overpricing$ can be estimated for Model 3, for instance, as $-3.721\% \times 1\% \times 12 = 45$ bps, where -3.721% is the regression parameter.

managerial skills in selecting stocks that outperform their benchmarks. The gross-of-fee fund return is computed as the fund total return plus one-twelfth of the annualized expense ratio. The results are reported in Table IA3 of the Internet Appendix. We confirm that performance is significantly worse for more overpriced funds, even on a gross-of-fee basis, especially during the high sentiment period.

Hitherto, we conduct the empirical tests at quarterly frequency to capture the short-term impact of mispricing in the mutual fund industry. We also expand our analysis to longer horizon and re-estimate Equation (1) performing the panel regressions at annual frequency. The results are reported in Table IA4 in the Internet Appendix. The overall evidence indicates that overpricing does predict performance over the subsequent year. As previously, high fund *Overpricing* leads to low future performance. For example, one standard deviation increase in *Overpricing* reduces the benchmark-adjusted (benchmark and FFC-adjusted) return by 0.53% (0.4%) per year in Model 2 (Model 7). It is also worth noting that *Overpricing* is negatively associated with fund performance over the subsequent year only when investor sentiment is high. We also go further and investigate the long-term performance impact up to three years, and find that the predictive power of mutual fund overpricing does not go beyond one year. Overall, the mutual fund *Overpricing* provides an indicator of managerial skills, and predicts fund performance above and beyond existing predictors.

C. The Source of Negative Alpha in Active Mutual Fund Industry

It is evident from Table 4 that future fund performance is negatively related to fund overpricing. To gauge the overall economic significance of our findings, we examine the performance of the funds in the two extreme groups. First, we check the extent to which overpriced funds contribute to the average (negative) alpha observed in the mutual fund universe. Second, we ask whether the funds that hold the least overpriced stocks deliver significant positive future performance.

Studies on fund performance (e.g., Malkiel (1995), Gruber (1996), Carhart (1997), Wermers (2000), Christoffersen and Musto (2002), Gil-Bazo and Ruiz-Verdú (2009)) agree that the average mutual fund alpha is negative, upon adjusting for equity styles used by funds that are known to be related to the cross section of average stock returns or even upon adjusting for the market factor only. For example, in our entire sample of mutual funds, the annualized CAPM-adjusted alpha is −0.58%

(t=−1.88) and −0.7% (t=−2.14) based on the FFC model, both of which are statistically significant. However, we find that the average mutual fund alpha is indistinguishable from zero when twenty percent of the most overpriced funds are excluded from the sample. This suggests that the documented negative performance of actively managed funds is attributable to the, ex-ante identifiable, twenty percent of those funds holding the most overpriced stocks.

The poor performance of overpriced funds, particularly following high sentiment periods, could be related to the evidence on the effect of business cycles on fund performance since economic recessions are characterized by low market sentiment. Our finding that overpriced funds are less likely to underperform in low sentiment periods complements the finding in Moskowitz (2000), who shows that actively managed funds perform better during economic recessions when the marginal utility of wealth is high (see also Kosowski (2011) and Kacperczyk, Van Nieuwerburgh, and Veldkamp (2014)).

We also examine if the least overpriced funds generate positive future performance. While there is some evidence of positive returns on underpriced stocks in Table 1, the fund level evidence is not convincingly strong. Focusing on the entire sample period in Panel A of Table 3, the decile of least overpriced funds generate investment payoffs that are positively significant with respect to the benchmark plus the market factor (1.12% per year) as well as with respect to the DGTW characteristic selectively metric (1.1% per year). However, adjusting for benchmark return as well as market, size, value, and momentum factors leaves a small and insignificant alpha. We obtain similar findings when the fund returns are conditioned on high sentiment and low sentiment periods in Panels B and C of Table 3. For example, unreported results show that in high market sentiment periods, the least overpriced funds generate an annualized Fama-French alpha of 1.61% (t=2.27), which is significant at conventional levels. Adjusting for exposure to momentum, however, reduces the alpha to an insignificant 0.6% per year. Interestingly, none of the funds exhibit significant (positive or negative) alpha during low sentiment episodes.

In sum, actively managed mutual funds that load on the eleven anomalies considered here do not generate reliable positive risk-adjusted investment returns. This finding supports the notion that long-only fund investments do not produce positive alphas, on average. This is consistent with the asset pricing theories, noted in the introduction, that admit the possibility of overvalued investments, but

preclude undervaluation. The evidence also complements the findings in Stambaugh, Yu, and Yuan (2012), Avramov, Chordia, Jostova, and Philipov (2013), and Drechsler and Drechsler (2014), all of which study anomalies among individual stocks and they generally agree that the profitability of anomaly based trading strategies is attributable to the short side of the trade. Thus, taking long-only positions, purely on the basis of public information, does not deliver positive payoffs. Of course, in the context of mutual funds, the presence of managerial skills could alter the findings attributable to individuals stocks. However, even the least overpriced funds, based on the known 11 anomalies, can, at best, generate returns that are compatible with common benchmarks.

V. Overpricing and Fund Flow

Our findings suggest that mutual funds vary in their ability to avoid overpriced stocks, leading to an economically significant impact on the net return received by their investors. However, holding overpriced stocks could be due to the inheritance of a bad portfolio or simply bad luck. In this section, we first investigate the mutual fund manager's trading decision in response to new capital. Next, we examine mutual fund investor's reaction to overpricing as reflected in the net fund flows. In the end, we discuss the managerial incentives to invest in overpriced stocks.

A. How Do Fund Managers Respond to New Capital?

We first investigate the fund manager's response to new capital. Specifically, we examine whether managers buy underpriced or overpriced stocks in reaction to inflows and whether the managerial response depends upon fund overpricing. We pursue that task by estimating the following quarterly logistic regression:

$$Mispricing^{+}_{f,i,q} = \alpha_0 + \beta_1 Dummy(Underpricing)_{f,q-1} + \beta_2 Dummy(Overpricing)_{f,q-1} + \beta_3 Dummy(Inflow)_{f,q-1} + \beta_4 Dummy(Underpricing)_{f,q-1} \times Dummy(Inflow)_{f,q-1} + \beta_5 Dummy(Overpricing)_{f,q-1} \times Dummy(Inflow)_{f,q-1} + c_1 M_{f,q-1} + c_2 N_{i,q-1} + e_{f,i,q}, \quad (3)$$

where $Mispricing^{+}_{f,i,q}$ refers to a dummy variable that equals to one if mutual fund f increases its holding in stock i in quarter q and zero otherwise, separately reporting the estimates for underpriced and overpriced stocks. $Dummy(Underpricing)_{f,q-1}$ and $Dummy(Overpricing)_{f,q-1}$ are dummy

variables representing funds in the least and most overpriced fund deciles respectively; and $Dummy(Inflow)_{f,q-1}$ is equal to one if the average flow in quarter $q-1$ for fund f is positive and zero otherwise. The vector *M* stacks all other fund-level control variables, including the *Fund Return*, *Log(Fund TNA)*, *Expense Ratio*, *Turnover*, *Log(Fund Age)* and *Log(Manager Tenure)*, and the vector *N* stacks all stock-level control variables, including the *Stock Return*, *Stock Turnover* and *Log(Stock Illiquidity)*. We estimate the logistic regression with year fixed effects and with standard errors clustered at the fund-stock level. We focus on the purchase of stocks associated with inflow (rather than stocks sold by funds) as underpriced (overpriced) funds hold more underpriced (overpriced) stocks, by construction, and therefore naturally sell more underpriced (overpriced) stocks. In sum, we examine whether funds increase their holding of underpriced or overpriced stocks as they receive new capital and whether their trading activities depend upon fund overpricing.

Table 6 reports the results. Models 1 and 2 use the data over the full sample period, while Models 3 and 4 are based on the sub-sample of high sentiment periods. As shown in Model 1, the likelihood of funds increasing their holding of underpriced stocks is higher for funds that belong to the least overpriced decile. In contrast, most overpriced funds are less likely to purchase underpriced stocks in the next quarter (Model 1) and have a higher probability of buying overpriced stocks (Model 2). Interestingly, the most overpriced funds respond to inflows by continuing to purchase overpriced stocks rather than underpriced stocks, as depicted by the β_5 coefficient in Equation (3). These findings continue to hold during periods of high sentiment.

The evidence is thus consistent with fund managers holding the least overpriced stocks attempting to deliver reasonably good performance to their investors, as they tilt their portfolios towards less overpriced stocks over time, buying such stocks as inflows emerge. In contrast, managers of the most overpriced funds tend to purchase more overpriced stocks during episodes of positive inflows. The evidence comparing the investment choices of underpriced and overpriced funds confirms that fund overpricing proxies for the stock selection ability of the mutual fund managers. The cumulative evidence reinforces fund overpricing as a measure of stock selection skill. Specifically, the least

overpriced funds trade to reduce their exposure to overpriced stocks while managers of overpriced funds display poor stock picking skills and continue to load on overpriced stocks.

B. Overpricing as a Predictor of the Cross-Section of Fund Flow

We next examine mutual fund investor's reaction to overpricing as reflected through the net fund flows. Interestingly, the assertion in Miller (1977) is consistent with overpriced funds being most likely held by optimistic investors. More specifically, in periods of high sentiment, overpriced funds could attract additional flows as optimistic investors, buoyed by positive market sentiment, pour more money into these funds. Furthermore, optimistic investors may be influenced by lottery-like characteristics of overpriced stocks as reflected in Table 1 such as low price, high idiosyncratic volatility, and high idiosyncratic skewness. Kumar (2009) documents investor preference for lottery-like stocks even when such stocks deliver poor returns. Additionally, Bailey, Kumar, and Ng (2011) find that behaviorally biased individual investors are influenced by such lottery-like characteristics in their investments in mutual funds. On the other hand, mutual fund investors are known to chase past performance (e.g., Chevalier and Ellison (1997)) and overpriced funds are recent underperformers. Hence, we predict a positive relation between overpricing and future flows, after controlling for past performance.

To assess the relation between fund overpricing and fund flows, we estimate the quarterly panel regressions of the following form:

$$Flow_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-1} + \beta_2 Sentiment_{q-1} + \beta_3 Overpricing_{f,q-1} \times Sentiment_{q-1} + \beta_4 Perf_{f,q-1} + cM_{f,q-1} + e_{f,q} \quad (4)$$

where $Flow_{f,q}$ refers to the average monthly flow of fund f in quarter q, and all other variables are defined as in Equation (1). We estimate a panel specification with quarter and fund fixed effects, with standard errors clustered at the fund level.

Table 7 presents the results. As expected, past performance is a strong predictor of flows as slope coefficients of past fund return variables are positive and economically significant. Focusing on the predictive power of *Overpricing*, which is the core of our analysis, several findings are noteworthy. First, there is a strong positive relationship between *Overpricing* and fund flow. A one standard

deviation increase in *Overpricing* is associated with a higher annual flow of 2.63% (Model 3). Second, the flow-overpricing relation is sensitive to the state of market sentiment. In particular, the positive flow-overpricing relationship is amplified when investor sentiment is high, as the interaction between overpricing and sentiment is positive and highly significant (Model 5). Moreover, the positive influence of investor sentiment on flows is confined to overpriced funds, while it is non-existent for underpriced funds (Model 6). Unreported evidence suggests that our results remain the same after controlling for lagged fund flow.[12] Hence, funds that hold overpriced stocks attract additional flows, controlling for the effects of past returns, particularly during high sentiment periods. On the other hand, flows to underpriced funds are not affected by the level of underpricing or market sentiment.

While fund overpricing may be deemed to be unobservable by mutual fund investors, we consider other assessable existing measures of managerial skills. Indeed, we find higher flows to funds with higher R-square (Amihud and Goyenko (2013)) and lower tracking error (Cremers and Petajisto (2009)). This observation reinforces our contention that after controlling for response of flows to past fund performance, overpriced funds and those reflecting low skills seem to attract more flows.[13]

Since fund flows could be driven by investor demand in a particular style or benchmark, we further consider the benchmark-adjusted flow and benchmark-adjusted overpricing (*BMK-adjusted Overpricing*), where the fund flow and overpricing are adjusted by netting out their benchmark average. The results are reported in Panel A of Table 8. The layout of the columns is the same as that of Table 7. The tests based on *BMK-adjusted Overpricing* provide confirming evidence that overpriced funds attract more investor capitals, especially during periods of high sentiment, and this is not simply driven by mutual fund investors chasing a particular style.

Given that both fund flow and fund overpricing are persistent over time, we also employ the change in overpricing (Δ*Overpricing*) as presented in Panel B of Table 8. The result implies a positive effect of the Δ*Overpricing* on fund flow, on a stand-alone basis as well as on a joint basis after controlling for the level of overpricing. For example, a one percent increase in Δ*Overpricing* is

[12] Since the main regression specification includes fund fixed effects, we do not report results including lagged flow as an independent variable.

[13] These results are robust when we re-estimate Equation (4) at the annual frequency (results reported in Internet Appendix Table IA5). The positive relationship between fund overpricing and flows remains in the stand-alone model in the subsequent year. Unreported results show that the impact of overpricing on fund flows becomes weaker in the second year and disappears afterwards.

associated with 0.34% higher flow per year (Model 6). Therefore, funds that hold overpriced stocks are rewarded by additional flows, after controlling for other known predictors of fund flow.

C. The Managerial Incentives to Invest in Overpriced Stocks

Recent evidence suggests that characteristics of stocks held by mutual funds may affect flows. For example, Solomon, Soltes, and Sosyura (2014) find that funds holding past winners attract additional inflows only if such winner stocks are featured in the media. Also, funds window dress their reported stock holdings to attract flows, particularly funds that are bad recent performers (Musto (1999)). This is echoed by investor surveys and anecdotal evidence indicating that fund managers are often under pressure to hold hot, well-publicized stocks (Moeller (1999), McDonald (2000), Solomon, Soltes, and Sosyura (2014)). While *Overpricing* and other managerial skill measures may not be directly observable by investors, we examine whether such funds display other characteristics that attract investor attention and hence, flow. The candidate fund characteristics that we examine include idiosyncratic volatility and skewness of fund returns (representing lottery-like features of funds) as well as expense ratio and marketing expense incurred by the funds.

As shown in Table 9, we find some evidence that flows are positively affected by idiosyncratic volatility and skewness but not by expense ratios (on its own) (see Models 1 and 2). More interestingly, high *Overpricing* interacts significantly with marketing expense (and skewness) to predict additional flows into the fund (see Models 4 and 8). In other words, funds holding overpriced stocks but spend more on fund marketing attract additional flows. This suggests that the optimistic investors in these funds are swayed by the marketing activities, despite underperformance of the funds. The evidence is consistent with the existing literature showing that investors purchase funds that attract their attention through marketing and advertising (Jain and Wu (2000), Barber, Odean, and Zheng (2005)).

Notice also that overpriced funds hold stocks that share characteristics associated with lottery-type investments in Kumar (2009): stocks that have low share price, high idiosyncratic volatility, and high distress risk (skewness). Observe also from Model 8 that the interaction between overpricing and skewness is significantly positive and further the overpricing itself is no longer significant, suggesting

that investors could reward the overpricing funds by higher inflows due to their demand for lottery-type investments.

Our findings that flows are positively influenced by fund overpricing is related to the literature on dumb money effect in the mutual fund industry (e.g., Teo and Woo (2004), Frazzini and Lamont (2008)). Specifically, Teo and Woo (2004) attribute their dumb money effect to the style-level positive feedback trading model of Barberis and Shleifer (2003). Frazzini and Lamont (2008) show that money flows into funds that hold growth stocks and out of funds holding value stocks, and earns low returns associated with the reallocation. Our overpricing measure goes beyond the size and book-to-market styles, as it accounts for eleven distinct anomalies that survive the adjustment to the SMB and HML common factors. Indeed, we add to these important studies by arguing that the flow into overpriced funds is consistent with Miller's basic intuition that investors who are optimistic about a particular fund tilt their investments into these funds. This interpretation is reinforced by the amplification of the flow-overpricing effect during periods of high sentiment.

The overall evidence suggests that although managers of overpriced funds exhibit low stock picking skills, they seem to be rewarded with positive flows during high sentiment periods, consistent with Miller's argument that investor optimism perpetuates stock overpricing. Our findings imply that skilled managers compete on performance and attract capital through their attempts to outperform their benchmarks, while less skilled managers entice optimistic investors via marketing efforts and catering to their preference rather than sharpen their stock selection ability over time. We also note that overpriced funds appear to charge higher fees but have lower tenure (as reported in Table 2), which further incentivizes low skilled managers to remain active instead of adopting a passive strategy.

VI. Conclusion

Stocks are likely to be overpriced when investors have heterogeneous beliefs about asset values and short-sale constraints are binding (Miller (1977)). Actively managed mutual funds typically undertake long-only investments, and hence, are disposed to holding overpriced assets. Here, we study the predictive relation between fund level overpricing and subsequent fund performance. Our

newly proposed fund level overpricing measure is the investment value-weighted average of overpricing in the stocks held by the fund, where stock overpricing is identified using eleven prominent market anomalies. Funds are considered to be overpriced if they overweight stocks that are financially distressed, with higher equity issuance, higher accruals, higher operating assets, lower past six-month returns, lower gross profitability, higher asset growth, lower return on assets, and higher abnormal capital investment.

We show that the propensity of active mutual funds to hold overpriced stocks is a strong predictor of future fund performance. In particular, funds that rank in the top decile in terms of fund level overpricing underperform funds in the bottom decile by 3.07% per year in benchmark-adjusted returns. The performance of overpriced funds diminishes dramatically following periods of high sentiment, with annual benchmark-adjusted return being 7.39% lower than least overpriced funds. In low sentiment periods, on the other hand, cross-sectional differences in fund returns are unrelated to fund overpricing.

Moreover, overpriced funds have a higher probability of purchasing the most overpriced stocks, particularly following quarters of fund inflows. The higher likelihood of buying overpriced rather than underpriced stocks, despite the low expected future returns, is inconsistent with investment behavior expected from skilled managers. On the other hand, funds belonging to the least overpriced funds tend to have a higher probability of purchasing underpriced stocks, and also investing in underpriced stocks in response to capital inflows, consistent with fund overpricing reflecting managerial skills. Additional evidence on the flows to mutual funds sheds light on the mechanism that links fund (and stock) level overpricing, market sentiment, and subsequent fund returns. The evidence shows that funds holding a high proportion of overpriced stocks attract more investor capital, particularly following high investor sentiment. Mutual fund investors seem to be chasing overpriced funds, and in particular those who also spend more on marketing activities and display greater fund return skewness. The latter is consistent with investor preference for assets with lottery-like characteristics (Barberis and Huang (2008), Kumar (2009), Bailey, Kumar, and Ng (2011), and Han and Kumar (2013)).

Our findings also provide a novel intuition to understand the role of delegated portfolio management. From mutual fund managers' perspective, they aim to maximize revenue by attracting

more capital and/or setting higher fees. On one hand, skilled managers adopt a performance enhancing strategy and attract capital through outperforming the benchmark. On the other hand, unskilled managers, not able to improve their stock selection ability over time, target optimistic investors by engaging in marketing activities and catering to investor preference (such as holding overpriced, lottery-like stocks). Finally, overpriced funds appear to charge higher fees, which further incentivizes low skilled managers to remain active instead of adopting a low-fee passive strategy. Overall, the influence of mutual fund overpricing on cross-sectional differences in fund performance is explained by the joint effects of investor sentiment, impediments to short-selling faced by these funds, and the cross-sectional differences in stock picking skills.

References

Abreu, D., and M. K. Brunnermeier. 2002. Synchronization Risk and Delayed Arbitrage. *Journal of Financial Economics* 66:341−360.

Amihud, Y. 2002. Illiquidity and Stock Returns: Cross-Section and Time-Series Effects. *Journal of Financial Markets* 5:31−56.

Amihud, Y., and R. Goyenko. 2013. Mutual Fund's R^2 as Predictor of Performance. *Review of Financial Studies* 26:667−694.

Ang, A., R. Hodrick, Y. Xing, and X. Zhang. 2006. The Cross-Section of Volatility and Expected Returns. *Journal of Finance* 61:259–299.

Avramov, D., T. Chordia, G. Jostova, and A. Philipov. 2013. Anomalies and Financial Distress. *Journal of Financial Economics* 108:139–159.

Bailey, W., A. Kumar, and D. Ng. 2011. Behavioral Biases of Mutual Fund Investors. *Journal of Financial Economics* 102:1−27.

Baker, M., and J. Wurgler. 2006. Investor Sentiment and the Cross-Section of Stock Returns. *Journal of Finance* 61:1645–1680.

Baker, M., and J. Wurgler. 2007. Investor Sentiment in the Stock Market. *Journal of Economic Perspectives* 21:129–151.

Barber, B, M., T. Odean, and L. Zheng. 2005. Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows. *Journal of Business* 78:2095−2119.

Barberis, N., and M. Huang. 2008. Stocks as Lotteries: The Implications of Probability Weighting for Security Prices. *American Economic Review* 98:2066−2100.

Barberis, N., and A. Shleifer. 2003. Style Investing. *Journal of Financial Economics* 68:161–199.

Brinson, G. P., L. R. Hood, and G. L. Beebower. 1986. Determinants of Portfolio Performance. *Financial Analysts Journal* 42:39–44.

Brunnermeier, M. K., and S. Nagel. 2004. Hedge Funds and the Technology Bubble. *Journal of Finance* 59:2013−2040.

Campbell, J. Y., J. Hilscher, and J. Szilagyi. 2008. In Search of Distress Risk. *Journal of Finance* 63:2899–2939.

Carhart, M. M. 1997. On Persistence in Mutual Fund Performance. *Journal of Finance* 52:57–82.

Chen, J., H. Hong, and J. C. Stein. 2002. Breadth of Ownership and Stock Returns. *Journal of Financial Economics* 66:171−205.

Chen, Z., R. G. Ibbotson, and W. Y. Hu. 2010. Liquidity as an Investment Style. Working Paper.

Chen, L., R. Novy-Marx, and L. Zhang. 2011. An Alternative Three-Factor Model. Working Paper.

Chevalier, J., and G. Ellison. 1997. Risk Taking by Mutual Funds as a Response to Incentives. *Journal of Political Economy* 105:1167−1200.

Coelho, L., K. John, and R. Taffler. 2012. Bankrupt Firms: Who's Buying? Working Paper.

Cooper, M. J., H. Gulen, and M. J. Schill. 2008. Asset Growth and the Cross-Section of Stock Returns. *Journal of Finance* 63:1609–1651.

Christoffersen, S. E. K., and D. K. Musto. 2002. Demand Curves and the Pricing of Money Management. *Review of Financial Studies* 15:1499–1524.

Cremers, K. J. M., and A. Petajisto. 2009. How Active Is Your Fund Manager? A New Measure That Predicts Performance. *Review of Financial Studies* 22:3329–3365.

Daniel, K., M. Grinblatt, S. Titman, and R. Wermers. 1997. Measuring Mutual Fund Performance with Characteristic-based Benchmarks. *Journal of Finance* 52:1035–1058.

Daniel, K. D., and S. Titman. 2006. Market Reactions to Tangible and Intangible Information. *Journal of Finance* 61:1605–1643.

De Long, J. B., A. Shleifer, L. H. Summers, and R. J. Waldmann. 1990. Positive Feedback Investment Strategies and Destabilizing Rational Speculation. *Journal of Finance* 45:379–395.

Drechsler, I., and Q. F. Drechsler. 2014. The Shorting Premium and Asset Pricing Anomalies. Working Paper.

Duffie, D., N. Gârleanu, and L. H. Pedersen. 2002. Securities Lending, Shorting, and Pricing. *Journal of Financial Economics* 66:307−339.

Elton, E. J., M. J. Gruber, and C. R. Blake. 1996. Survivorship Bias and Mutual Fund Performance. *Review of Financial Studies* 9:1097–1120.

Fama, E. F. 1972. Components of Investment Performance. *Journal of Finance* 27:551–567.

Fama, E. F., and K. R. French. 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics* 33:3–56.

Fama, E. F., and J. MacBeth. 1973. Risk, Return, and Equilibrium: Empirical Tests. *Journal of Political Economy* 71:607–636.

Frazzini, A., and O. A. Lamont. 2008. Dumb Money: Mutual Fund Flows and the Cross-Section of Stock Return. *Journal of Financial Economics* 88: 299–322.

Gil-Bazo, J., and P. Ruiz-Verdú. 2009. The Relation between Price and Performance in the Mutual Fund Industry. *Journal of Finance* 64:2153–2183.

Gruber, M. J. 1996. Another Puzzle: The Growth in Actively Managed Mutual Funds. *Journal of Finance* 51:783–810.

Han, B., and A. Kumar. 2013. Speculative Retail Trading and Asset Prices. *Journal of Financial and Quantitative Analysis* 48:377–404.

Harrison, J. M., and D. M. Kreps. 1978. Speculative Investor Behavior in a Stock Market with Heterogeneous Expectations. *Quarterly Journal of Economics* 92:323–336.

Hirshleifer, D., K. Hou, S. H. Teoh, and Y. Zhang. 2004. Do Investors Overvalue Firms With Bloated Balance Sheets? *Journal of Accounting and Economics* 38:297–331.

Hong, H., J. Scheinkman, and W. Xiong. 2006. Asset Float and Speculative Bubbles. *Journal of Finance* 61:1073−1117.

Idzorek, T. M., J. X. Xiong, and R. G. Ibbotson. 2012. The Liquidity Style of Mutual Funds. Working Paper.

Jain, P. C., and J. S. Wu. 2000. Truth in Mutual Fund Advertising: Evidence on Future Performance and Fund Flows. *Journal of Finance* 55:937−958.

Jegadeesh, N., and S. Titman. 1993. Returns to Buying Winners and Selling Losers: Implications for Market Efficiency. *Journal of Finance* 48:65–91.

Kacperczyk, M., C. Sialm, and L. Zheng. 2005. On The Industry Concentration of Actively Managed Equity Mutual Funds. *Journal of Finance* 60:1983–2012.

Kacperczyk, M., C. Sialm, and L. Zheng. 2008. Unobserved Actions of Mutual Funds. *Review of Financial Studies* 21:2379–2416.

Kacperczyk, M., S. Van Nieuwerburgh, and L. Veldkamp. 2014. Time-Varying Fund Manager Skill. *Journal of Finance* 69:1455–1484.

Kosowski, R. 2011. Do Mutual Funds Perform When It Matters Most to Investors? US Mutual Fund Performance and Risk in Recessions and Expansions. *Quarterly Journal of Finance* 1:607–664.

Kumar, A. 2009. Who Gambles in the Stock Market? *Journal of Finance* 64:1889−1933.

Loughran, T., and J. R. Ritter. 1995. The New Issues Puzzle. *Journal of Finance* 50:23–51.

Malkiel, B. G. 1995. Returns from Investing In Equity Mutual Funds 1971 To 1991. *Journal of Finance* 50:549–572.

McDonald, I. 2000. A Must To A Bust: Scores of Funds Get Burned On Big Qualcomm Bets. TheStreet.com, June 15.

Miller, E. M. 1977. Risk, Uncertainty, and Divergence of Opinion. *Journal of Finance* 32:1151–1168.

Moeller, S. 1999. Effort-less Marketing for Financial Advisors: 5 Steps to a Super-Profitable Business and a Wonderful Life. American Business Visions, Tustin, CA.

Moskowitz, T. J. 2000. Mutual Fund Performance: An Empirical Decomposition Into Stock-Picking Talent, Style, Transactions Costs, and Expenses: Discussion. *Journal of Finance* 55:1695–1703.

Musto, D. 1999. Investment Decisions Depend On Portfolio Disclosures. *Journal of Finance* 54:935–952.

Newey, W. K., and K. D. West. 1987. A Simple Positive-Definite Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. *Econometrica* 55:703–708.

Novy-Marx, R. 2013. The Other Side of Value: The Gross Profitability Premium. *Journal of Financial Economics* 108:1–28.

Ohlson, J. A. 1980. Financial Ratios and the Probabilistic Prediction of Bankruptcy. *Journal of Accounting Research* 18:109–131.

Pástor, L., R. F. Stambaugh, and L. A. Taylor. 2015. Do Funds Make More When They Trade More? Working Paper.

Petajisto, A. 2013. Active Share and Mutual Fund Performance. *Financial Analysts Journal* 69:73–93.

Ritter, J. R. 1991. The Long-Run Performance of Initial Public Offerings. *Journal of Finance* 46:3–27.

Scheinkman, J. A., and W. Xiong. 2003. Overconfidence and Speculative Bubbles. *Journal of Political Economy* 111:1183−1220.

Sloan, R. G. 1996. Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings? *Accounting Review* 71:289–315.

Solomon, D. H., E. Soltes, and D. Sosyura. 2014. Winners in the Spotlight: Media Coverage of Fund Holdings as a Driver of Flows. *Journal of Financial Economics* 113:53–72.

Stambaugh, R. F. 2014. Presidential Address: Investment Noise and Trends. *Journal of Finance* 69:1415–1453.

Stambaugh, R. F., J. Yu, and Y. Yuan. 2012. The Short of It: Investor Sentiment and Anomalies. *Journal of Financial Economics* 104:288–302.

Stambaugh, R. F., J. Yu, and Y. Yuan. 2015. Arbitrage Asymmetry and the Idiosyncratic Volatility Puzzle. *Journal of Finance* 70:1903–1948.

Teo, M., and S. Woo. 2004. Style Effects in the Cross-Section of Stock Returns. *Journal of Financial Economics* 74:367–398.

Titman, S., K. Wei, and F. Xie. 2004. Capital Investments and Stock Returns. *Journal of Financial and Quantitative Analysis* 39:677–700.

Wermers, R. 2000. Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses. *Journal of Finance* 55:1655–1695.

Wermers, R. 2003. Are Mutual Fund Shareholders Compensated for Active Management Bets? Working Paper.

Appendix A: Variable Definitions

Variables	Definitions
A. Anomaly Measures	
Failure Probability	Failure probability in a given month t is computed as follows: $Distress_{i,t} = -9.164 - 20.264 \times \overline{NIMTA}_{i,t} + 1.416 \times TLMTA_{i,t} - 7.129 \times \overline{EXRET}_{i,t} + 1.411 \times SIGMA_{i,t} - 0.045 \times RSIZE_{i,t} - 2.132 \times CASHMTA_{i,t} + 0.075 \times MB_{i,t} - 0.058 \times PRICE_{i,t}$, where $TLMTA_{i,t}$ is the ratio of total liabilities (COMPUSTAT quarterly item LTQ) divided by the sum of market equity and total liabilities of stock i in month t, $SIGMA_{i,t}$ is the annualized three-month rolling sample standard deviation, $RSIZE_{i,t}$ is the logarithm of the ratio of the stock market equity to that of the S&P 500 index, $CASHMTA_{i,t}$ is the ratio of cash and short-term investments (item CHEQ) divided by the sum of market equity and total liabilities, $MB_{i,t}$ is the market-to-book ratio, $PRICE_{i,t}$ is the logarithm of the price per share and truncated above at 15 USD. $\overline{NIMTA}_{i,t}$ and $\overline{EXRET}_{i,t}$ are further computed as follows: $\overline{NIMTA}_{i,t} = \frac{1-\phi^3}{1-\phi^{12}}\left(NIMTA_{i,t-3:t-1} + \cdots + \phi^9 NIMTA_{i,t-12:t-10}\right)$, $\overline{EXRET}_{i,t} = \frac{1-\phi}{1-\phi^{12}}\left(EXRET_{i,t-1} + \cdots + \phi^{11} EXRET_{i,t-12}\right)$, $EXRET_{i,t} = \log(1+R_{i,t}) - \log(1+R_{S\&P500,t})$, where $\phi = 2^{-1/3}$, $NIMTA_{i,t-3:t-1}$ is the ratio of net income (item NIQ) divided by the sum of market equity and total liabilities, $R_{i,t}$ is the return of stock i in month t, and $R_{S\&P500,t}$ is the return of S&P 500 index, following Campbell, Hilscher, and Szilagyi (2008) and Chen, Novy-Marx, and Zhang (2011).
O-Score	O-Score in a given quarter q is computed as follows: $OScore_{i,q} = -1.32 - 0.407 \times \log\left(ADJASSET_{i,q}/CPI_q\right) + 6.03 \times TLTA_{i,q} - 1.43 \times WCTA_{i,q} + 0.076 \times CLCA_{i,q} - 1.72 \times OENEG_{i,q} - 2.37 \times NITA_{i,q} - 1.83 \times FUTL_{i,q} + 0.285 \times INTWO_{i,q} - 0.521 \times CHIN_{i,q}$, where $ADJASSET_{i,q}$ is the adjusted total assets of stock i in quarter q, defined as total assets (COMPUSTAT quarterly item ATQ) plus 10% of the difference between market equity and book equity, CPI_q is the consumer price index, $TLTA_{i,q}$ is the leverage ratio defined as the book value of debt (item DLCQ plus item DLTTQ) divided by $ADJASSET_{i,q}$, $WCTA_{i,q}$ is the ratio of working capital (item ACTQ − item LCTQ) divided by $ADJASSET_{i,q}$, $CLCA_{i,q}$ is the ratio of current liabilities (item LCTQ) divided by current assets (item ACTQ), $OENEG_{i,q}$ is a dummy variable taking a value of one if total liabilities (item LTQ) exceeds total assets and zero otherwise, $NITA_{i,q}$ is the ratio of net income (item NIQ) divided by $ADJASSET_{i,q}$, $FUTL_{i,q}$ is the ratio of fund provided by operations (item PIQ) divided by total liabilities, and $INTWO_{i,q}$ is a dummy variable taking a value of one if net income is negative for the last two quarters and zero otherwise. $CHIN_{i,q}$ is further computed as follows: $CHIN_{i,q} = \left(NI_{i,q} - NI_{i,q-1}\right)/\left(\left|NI_{i,q}\right| + \left|NI_{i,q-1}\right|\right)$, where $NI_{i,q}$ is the net income of stock i in quarter q, following Ohlson (1980) and Chen, Novy-Marx, and Zhang (2011).
Net Stock Issuance	Net stock issuance in a given year t is computed as follows: $NetStk_{i,t} = \log\left(SHROUT_{i,t}/SHROUT_{i,t-1}\right)$, where $SHROUT_{i,t}$ is the split-adjusted number of shares outstanding of stock i in year t.
Composite Equity Issuance	Composite equity issuance in a given year t is computed as follows: $CompEqu_{i,t} = \log\left(ME_{i,t}/ME_{i,t-5}\right) - LR_{i,t-5:t}$, where $ME_{i,t}$ is the market equity of stock i in year t, $LR_{i,t-5:t}$ is the cumulative log return on stock i over the previous five years, following Daniel and Titman (2006).
Total Accruals	Total accruals in a given year t is computed as follows: $Accruals_{i,t} = \left[\left(\Delta CA_{i,t} - \Delta Cash_{i,t}\right) - \left(\Delta CL_{i,t} - \Delta STD_{i,t} - \Delta TP_{i,t}\right) - Dep_{i,t}\right]/\overline{ASSET}_{i,t}$, where $\Delta CA_{i,t}$ is the change in current assets (COMPUSTAT annual item ACT) of stock i in year t, $\Delta Cash_{i,t}$ is the change in cash and short-term investments (item CHE), $\Delta CL_{i,t}$ is the change in current liabilities (item LCT), $\Delta STD_{i,t}$ is the change in debt included in current liabilities (item DLC), $\Delta TP_{i,t}$ is the change in income taxes payable (item TXP), $Dep_{i,t}$ is the depreciation and amortization expense (item DP), and $\overline{ASSET}_{i,t}$ is the average total assets (item AT) of the beginning and end of year t, following Sloan (1996).
Net Operating Assets	Net operating assets in a given year t is computed as follows: $NOA_{i,t} = \left[\left(ASSET_{i,t} - Cash_{i,t}\right) - \left(ASSET_{i,t} - STD_{i,t} - LTD_{i,t} - MI_{i,t} - PS_{i,t} - CE_{i,t}\right)\right]/ASSET_{i,t-1}$, where $ASSET_{i,t}$ is the total assets (COMPUSTAT annual item AT) of stock i in year t, $Cash_{i,t}$ is the cash and short-term investments (item CHE), $STD_{i,t}$ is the debt included in current liabilities (item DLC), $LTD_{i,t}$ is the long term debt (item DLTT), $MI_{i,t}$ is the minority interests (item MIB), $PS_{i,t}$ is the preferred stocks (item PSTK), and $CE_{i,t}$ is the common equity (item CEQ), following Hirshleifer, Hou, Teoh, and Zhang (2004).

Momentum	Formation period return in a given month m is computed as the cumulative six-month return from month $m-6$ to month $m-1$, following Jegadeesh and Titman (1993).
Gross Profitability	Gross profitability in a given year t is computed as follows: $GP_{i,t} = (REVT_{i,t} - COGS_{i,t})/ASSET_{i,t}$, where $REVT_{i,t}$ is the total revenue (COMPUSTAT annual item REVT) of stock i in year t, $COGS_{i,t}$ is the cost of goods sold (item COGS), $ASSET_{i,t}$ is the total assets (item AT), following Novy-Marx (2013).
Asset Growth	Asset growth in a given year t is computed as follows: $ASSETG_{i,t} = (ASSET_{i,t} - ASSET_{i,t-1})/ASSET_{i,t-1}$, where $ASSET_{i,t}$ is the total assets (COMPUSTAT annual item AT) of stock i in year t, following Cooper, Gulen, and Schill (2008).
Return on Assets	Return on assets in a given quarter q is computed as follows: $ROA_{i,q} = INCOME_{i,q}/ASSET_{i,q-1}$, where $INCOME_{i,q}$ is the income before extraordinary items (COMPUSTAT quarterly item IBQ) of stock i in quarter q, and $ASSET_{i,q-1}$ is the total assets (item ATQ).
Abnormal Capital Investment	Abnormal capital investment in a given year t is computed as follows: $CI_{i,t} = \frac{CE_{i,t}}{(CE_{i,t-1}+CE_{i,t-2}+CE_{i,t-3})/3} - 1$, where $CE_{i,t}$ is the ratio of capital expenditures (COMPUSTAT annual item CAPX) divided by sales (item SALE) of stock i in year t, following Titman, Wei and Xie (2004).
B. Managerial Skill Measures	
Overpricing	For each of the eleven anomalies above, we rank the stocks in each quarter with the highest rank indicating the most overpriced stock (lowest future return), and the ranks are normalized to follow a [0, 1] uniform distribution. A stock's composite rank is the equal-weighted average of its ranks for all anomalies, following Stambaugh, Yu, and Yuan (2015). The fund-level overpricing is then computed as the investment value-weighted average of overpricing of stocks in a fund's most recently reported holding portfolio.
Active Share	Active share in a given quarter q is computed as follows: $AS_{f,q} = \frac{1}{2}\sum_{i\in f}\left\|w_{i,f,q} - w_{i,idx,q}\right\|$, where $w_{i,f,q}$ is the investment weight of stock i by fund f in quarter q, and $w_{i,idx,q}$ is the portfolio weight in the index, following Cremers and Petajisto (2009), and Petajisto (2013).
R-square (TR^2)	R-square of fund f in a given month m, $R^2_{f,m}$ is obtained from the Fama-French-Carhart four-factor model with a twenty-four-month estimation period. More specifically, we regress monthly fund excess return on the market, size, book-to-market, and momentum factor returns. The logistic transformation of R-square in a given month m is then computed as follows: $TR^2_{f,m} = \log\left[\sqrt{R^2_{f,m}+c}/\left(1-\sqrt{R^2_{f,m}+c}\right)\right]$, where $c = 0.5/n$, and n is the sample size ($n = 24$), following Amihud and Goyenko (2013).
Industry Concentration Index (*ICI*)	Industry concentration index in a given quarter q is computed as follows: $ICI_{f,q} = \sum_{j=1}^{10}(\omega_{j,f,q} - \bar{\omega}_{j,q})^2$, where $\omega_{j,f,q}$ is the investment weight of industry j in fund f in quarter q, $\bar{\omega}_{j,q}$ is the investment weight of industry j in the market portfolio in the same quarter, following Kacperczyk, Sialm, and Zheng (2005).
Return Gap	Return gap is computed as the difference between fund gross-of-fee return and holding-based return, where gross-of-fee return is the fund total return plus one-twelfth of the annualized expense ratio, and holding-based return is the investment value-weighted average of stock returns of a fund's most recently reported holding portfolio, following Kacperczyk, Sialm, and Zheng (2008).
Tracking Error (in %)	Tracking error in a given quarter q is computed as the standard deviation of the difference between monthly fund gross-of-fee return and its gross-of-fee benchmark index return.
C. Fund Performance and Flow Measures (in %)	
Fund Return	The monthly return reported by CRSP survivorship bias free mutual fund database. When a portfolio has multiple share classes, its total return is computed as the share class TNA-weighted return of all share classes, where the TNA values are one-month lagged.
Benchmark-adjusted Return	Fund returns minus the average return of the funds in the same benchmark.
Benchmark and Fama-French-Carhart (FFC)-adjusted Return	Benchmark-adjusted fund return minus the productions between a fund's four-factor betas multiplied by the realized four factor returns in a given month. The four Fama-French-Carhart factors include market, size, book-to-market, and momentum. The betas of the fund are estimated as the exposures of the fund to the relevant risk factors with a five-year estimation period.
DGTW-adjusted Return	The investment-value weighted average of stock-level DGTW adjusted returns, according to a fund's most recently reported holding information. More specifically, stock returns are adjusted by the style average, where stock styles are created by double-sorting stocks into 25

	independent book-to-market and size portfolios, following Daniel, Grinblatt, Titman, and Wermers (1997).
Gross-of-Fee Fund Return	Fund total return plus one-twelfth of the annualized expense ratio.
Gross-of-Fee Benchmark-adjusted Return	Gross-of-fee fund returns minus the average gross-of-fee return of the funds in the same benchmark.
Gross-of-Fee Benchmark and Fama-French-Carhart (FFC)-adjusted Return	Gross-of-fee benchmark-adjusted fund return minus the productions between a fund's four-factor betas multiplied by the realized four factor returns in a given month. The estimation method is the same as in the Benchmark and FFC-adjusted Return above.
Fund Flow	Fund flow in a given month m is computed as follows: $Flow_{f,m} = \left[TNA_{f,m} - TNA_{f,m-1} \times \left(1 + r_{f,m}\right)\right]/TNA_{f,m-1}$, where $TNA_{f,m}$ refers to the total net asset of fund f in month m, and $r_{f,m}$ refers to fund total return in the same month.
D. Stock Characteristics	
Log (Stock ILLIQ)	The logarithm of the stock illiquidity, and the stock illiquidity measure in a given month m is computed as follows: $ILLIQ_{i,m} = \left(\sum_{d \in m} \left|R_{i,d,m}\right|/VOLD_{i,d,m}\right)/D_{i,m} \times 10^8$, where $R_{i,d,m}$ refers to the percentage return of stock i in day d of month m, $VOLD_{i,d,m}$ refers to the dollar trading volume at the same time, and $D_{i,m}$ is the number of trading days for stock i in month m, following Amihud (2002).
Mutual Fund Ownership (in %)	The mutual fund ownership in a given quarter q is computed as: $IO_{i,q} = \sum_f SHR_{i,f,q}/SHROUT_{i,q}$, where $SHR_{i,f,q}$ refers to the number of shares of stock i held by fund f in quarter q, and $SHROUT_{i,q}$ refers to the shares outstanding at the same time.
Analyst Coverage	The number of analyst following the firm as reported in I/B/E/S in each quarter.
Book-to-Market	The book-to-market ratio in a given quarter q is computed as: $BM_{i,q} = BE_{i,q}/ME_{i,q}$, where $BE_{i,q}$ refers to the book value of equity of stock i in quarter q, computed as the summation of stockholders' equity and deferred taxes, minus the preferred stock, and $ME_{i,q}$ refers to its market value at the end of the same quarter.
Stock IdioVol (in %)	For each stock i, a Fama and French three-factor model is estimated using daily returns in each month m: $R^e_{i,d,t} = \alpha_i + \beta_{MKT,i}MKT_{d,t} + \beta_{SMB,i}SMB_{d,t} + \beta_{HML,i}HML_{d,t} + e_{i,d,t}$, where $R^e_{i,d,t}$ refers to the excess return of stock i in day d of month t, $MKT_{d,t}$, $SMB_{d,t}$, and $HML_{d,t}$ refer to the three Fama and French factors (market, size and book-to-market). The idiosyncratic volatility for stock i in month t is computed as the standard deviation of the residual $e_{i,d,t}$, following Ang, Hodrick, Xing, and Zhang (2006).
E. Other Fund Characteristics	
Log (Fund TNA)	The logarithm of total net asset as reported in CRSP survivorship bias free mutual fund database, in millions.
Expense Ratio (in %)	The annualized expense ratio as reported in CRSP survivorship bias free mutual fund database.
Turnover	The turnover ratio as reported in CRSP survivorship bias free mutual fund database.
Log (Fund Age)	The logarithm of number of operational months since inception.
Log (Manager Tenure)	The logarithm of number of months since the current portfolio manager took control.
Log (Stock Illiquidity)	The logarithm of the investment value-weighted average of illiquidity of stocks in a fund's most recently reported holding portfolio. The Amihud stock illiquidity measure is computed as above.
Marketing Expense (in %)	The annualized 12B-1 fee plus one-seventh of the front-end-load fee as reported in CRSP survivorship bias free mutual fund database.
Idiosyncratic Volatility (in %)	Similar to stock-level idiosyncratic volatility described above, fund-level idiosyncratic volatility is computed by estimating a four-factor model in each month. The four Fama-French-Carhart factors include market, size, book-to-market, and momentum.
Skewness (in %)	The third moment (skewness) of fund return.

Table 1: Overpricing and Stock Characteristics

Stocks are sorted into deciles according to lagged overpricing in quarter q. This table reports, for each decile portfolio, the average overpricing (in %), Log(Stock Price), Log(Stock Size), Log(Stock Illiquidity), mutual fund ownership, analyst coverage, book-to-market ratio, idiosyncratic volatility, failure probability, O-Score and the market share represented by each decile portfolio in formation quarter q, as well as the average stock return in the following quarter $q + 1$ over the entire sample period from 1981 to 2010. The rows "LMH" report the difference in values between low and high overpricing portfolios ("Bottom 10% − Top 10%"). Appendix A provides the detailed definition of each variable. Newey-West adjusted t-statistics are shown in parentheses. Numbers with "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Overpricing and Stock Characteristics												
Rank of Overpricing	Overpricing_q	$\text{Stock Return}_{q+1}$	Market Share_q	$\text{Log (Stock Price)}_q$	$\text{Log (Stock Size)}_q$	$\text{Log (Stock ILLIQ)}_q$	$\text{Mutual Fund Ownership}_q$	$\text{Analyst Coverage}_q$	Book-to-Market_q	Stock IdioVol_q	$\text{Failure Probability}_q$	O-Score_q
Low	29.514	1.968	0.252	3.007	5.794	6.043	10.549	3.201	0.636	2.002	-8.452	-3.238
2	36.835	1.729	0.181	2.859	5.655	6.251	10.629	3.093	0.731	2.160	-8.159	-2.826
3	41.150	1.583	0.133	2.733	5.485	6.463	10.522	2.925	0.797	2.281	-7.936	-2.500
4	44.721	1.590	0.111	2.594	5.284	6.720	10.233	2.797	0.842	2.437	-7.725	-2.220
5	48.013	1.515	0.089	2.449	5.078	7.004	9.832	2.593	0.887	2.625	-7.510	-1.924
6	51.280	1.386	0.073	2.313	4.892	7.282	9.413	2.406	0.923	2.814	-7.294	-1.651
7	54.706	1.263	0.060	2.175	4.718	7.512	8.908	2.266	0.950	2.987	-7.067	-1.374
8	58.551	1.010	0.046	2.021	4.557	7.743	8.354	2.087	0.952	3.190	-6.873	-1.081
9	63.409	0.827	0.035	1.815	4.366	7.990	7.715	1.908	0.931	3.475	-6.586	-0.724
High	72.573	-0.048	0.020	1.474	4.049	8.405	6.331	1.592	0.900	4.021	-6.067	-0.153
LMH	-43.059***	2.016***	0.232***	1.533***	1.745***	-2.362***	4.219***	1.609***	-0.265***	-2.019***	-2.386***	-3.085***
	(-132.41)	(7.11)	(16.26)	(23.46)	(15.77)	(-13.75)	(7.81)	(9.00)	(-8.16)	(-14.43)	(-28.64)	(-65.81)

Table 2: Mutual Fund Overpricing and Other Fund Characteristics

At the beginning of each quarter, mutual funds are sorted into deciles according to lagged overpricing in quarter q. This table reports, for each decile portfolio, the average overpricing (in %), fund return, Log(Fund TNA), Expense Ratio, Log(Fund Age), Log(Manager Tenure) and Log(Stock Illiquidity) in formation quarter q, the average overpricing (in %) and fund flow in the following quarter $q+1$, as well as the average overpricing (in %) in quarter $q+4$ over the entire sample period from 1981 to 2010. Fund returns are further adjusted by the benchmark return of funds and the Daniel, Grinblatt, Titman, and Wermers (1997) model. The rows "LMH" report the difference in values between low and high overpricing portfolios ("Bottom 10% − Top 10%"). Appendix A provides the detailed definition of each variable. Newey-West adjusted t-statistics are shown in parentheses. Numbers with "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Mutual Fund Overpricing and Other Fund Characteristics													
Rank of Overpricing	$Overpricing_q$	$Fund\ Return_q$	$BMK\text{-}adjusted_q$	$DGTW_q$	$Log\ (Fund\ TNA)_q$	$Expense\ Ratio_q$	$Turnover_q$	$Log\ (Fund\ Age)_q$	$Log\ (Manager\ Tenure)_q$	$Log\ (Stock\ Illiquidity)_q$	$Overpricing_{q+1}$	$Fund\ Flow_{q+1}$	$Overpricing_{q+4}$
Low	38.041	1.088	0.156	0.179	5.378	1.041	0.624	5.308	4.443	2.702	38.617	0.197	39.569
2	39.977	1.010	0.079	0.102	5.691	1.009	0.655	5.329	4.365	2.711	40.283	0.244	40.789
3	41.014	0.959	0.037	0.064	5.818	0.991	0.683	5.325	4.359	2.821	41.195	0.127	41.429
4	41.947	0.947	0.029	0.063	5.785	1.014	0.723	5.303	4.339	3.004	42.042	0.170	42.059
5	42.940	0.978	0.035	0.064	5.766	1.028	0.754	5.286	4.339	3.325	42.959	0.266	42.835
6	44.051	0.955	0.013	0.052	5.735	1.079	0.796	5.215	4.352	3.818	43.979	0.394	43.806
7	45.345	0.954	-0.013	0.062	5.734	1.091	0.794	5.115	4.355	4.207	45.320	0.376	44.944
8	46.790	0.921	-0.044	0.020	5.667	1.121	0.810	5.053	4.314	4.673	46.657	0.363	46.175
9	48.571	0.822	-0.146	-0.044	5.569	1.164	0.823	4.974	4.305	5.124	48.242	0.315	47.608
High	52.040	0.739	-0.218	-0.184	5.380	1.243	0.854	4.965	4.345	5.599	51.213	0.473	49.780
LMH	-13.998***	0.349**	0.374***	0.363***	-0.001	-0.202***	-0.230***	0.343***	0.098***	-2.897***	-12.596***	-0.276	-10.212***
	(-38.26)	(2.09)	(2.92)	(4.62)	(-0.03)	(-14.44)	(-8.00)	(8.45)	(3.70)	(-16.11)	(-32.61)	(-1.55)	(-23.49)

Table 3: Returns to Investment Strategies Sorted by Mutual Fund Overpricing

At the beginning of each month, mutual funds are sorted into deciles according to lagged overpricing in month m. Panel A reports the month $m+1$ (value-weighted) return, volatility, and sharp ratio for each decile portfolio as well as the strategy of going long (short) the one-month underpriced (overpriced) funds ("LMH") over the entire sample period from 1981 to 2010. Fund returns are further adjusted by the benchmark return of funds, the Daniel, Grinblatt, Titman and Wermers (1997) model, the benchmark return and CAPM, as well as the benchmark return and Fama-French-Carhart (FFC) model. Panels B and C report similar statistics in the sub-period when investor sentiment is high (above median) and low (below median) in month m, respectively. Appendix A provides the detailed definition of each variable. Newey-West adjusted t-statistics are shown in parentheses. Numbers with "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Panel A: Returns to Investment Strategies Sorted by Fund Overpricing (1981 ─ 2010)							
Rank of Overpricing	Return	BMK-adjusted	DGTW	BMK & CAPM	BMK & FFC	Volatility	Sharpe Ratio
Low	0.914***	0.065	0.092**	0.093**	0.050	4.061	0.124
	(3.95)	(1.30)	(2.51)	(2.01)	(1.38)		
2	0.851***	0.012	0.022	0.025	0.014	4.174	0.105
	(3.59)	(0.34)	(0.63)	(0.73)	(0.50)		
3	0.829***	0.012	0.018	0.018	0.013	4.218	0.099
	(3.37)	(0.38)	(0.52)	(0.58)	(0.47)		
4	0.829***	-0.007	-0.003	-0.012	-0.037	4.258	0.098
	(3.38)	(-0.23)	(-0.07)	(-0.38)	(-1.39)		
5	0.879***	0.013	0.054	-0.001	-0.026	4.436	0.105
	(3.43)	(0.41)	(1.48)	(-0.05)	(-0.69)		
6	0.947***	0.070**	0.097**	0.065**	0.050	4.414	0.121
	(3.62)	(2.50)	(2.26)	(2.33)	(1.55)		
7	0.846***	-0.026	0.014	-0.048	-0.039	4.676	0.093
	(3.11)	(-0.64)	(0.31)	(-1.26)	(-0.99)		
8	0.823***	-0.053	-0.034	-0.083**	-0.056*	4.896	0.084
	(2.92)	(-1.39)	(-0.80)	(-2.34)	(-1.73)		
9	0.753**	-0.131**	-0.029	-0.173***	-0.115***	5.182	0.066
	(2.54)	(-2.51)	(-0.54)	(-3.29)	(-2.66)		
High	0.691**	-0.190**	-0.096	-0.257***	-0.137**	5.635	0.049
	(2.10)	(-2.34)	(-1.31)	(-3.22)	(-2.36)		
LMH	0.223	0.256**	0.189**	0.350***	0.187**	3.028	0.074
	(1.32)	(2.11)	(2.32)	(3.06)	(2.24)		

Table 3—Continued

Panel B: Returns to Investment Strategies Sorted by Fund Overpricing (High Sentiment)							
Rank of Overpricing	Return	BMK-adjusted	DGTW	BMK & CAPM	BMK & FFC	Volatility	Sharpe Ratio
Low	0.872**	0.174**	0.215***	0.184***	0.068	4.653	0.080
	(2.31)	(2.38)	(4.03)	(2.74)	(1.16)		
2	0.772**	0.081*	0.131***	0.084*	0.050	4.809	0.057
	(1.99)	(1.89)	(2.75)	(1.94)	(1.16)		
3	0.688*	0.050	0.063	0.052	0.042	4.866	0.039
	(1.72)	(1.12)	(1.15)	(1.17)	(1.10)		
4	0.674*	0.002	0.056	-0.000	-0.063	4.888	0.036
	(1.68)	(0.04)	(1.02)	(-0.01)	(-1.35)		
5	0.691	0.004	0.112*	-0.003	-0.076	5.129	0.037
	(1.64)	(0.07)	(1.95)	(-0.06)	(-1.47)		
6	0.713*	0.067	0.136**	0.067	0.017	5.047	0.042
	(1.69)	(1.54)	(2.31)	(1.52)	(0.38)		
7	0.567	-0.103	0.053	-0.114**	-0.104*	5.409	0.012
	(1.29)	(-1.65)	(0.88)	(-2.13)	(-1.91)		
8	0.454	-0.158***	-0.041	-0.169***	-0.110**	5.654	-0.008
	(1.03)	(-2.97)	(-0.68)	(-3.43)	(-2.56)		
9	0.273	-0.305***	-0.110	-0.321***	-0.169***	6.011	-0.038
	(0.59)	(-3.95)	(-1.55)	(-4.25)	(-2.89)		
High	0.181	-0.443***	-0.111	-0.470***	-0.204**	6.702	-0.048
	(0.35)	(-3.27)	(-0.95)	(-3.73)	(-2.04)		
LMH	0.691***	0.616***	0.325**	0.654***	0.272*	3.674	0.188
	(2.75)	(3.19)	(2.50)	(3.71)	(1.86)		
Panel C: Returns to Investment Strategies Sorted by Fund Overpricing (Low Sentiment)							
Rank of Overpricing	Return	BMK-adjusted	DGTW	BMK & CAPM	BMK & FFC	Volatility	Sharpe Ratio
Low	0.956***	-0.043	-0.030	-0.001	0.008	3.381	0.187
	(3.92)	(-0.75)	(-0.72)	(-0.01)	(0.21)		
2	0.929***	-0.058	-0.088**	-0.021	-0.015	3.435	0.177
	(3.82)	(-1.13)	(-2.08)	(-0.45)	(-0.49)		
3	0.969***	-0.026	-0.026	-0.017	-0.010	3.459	0.187
	(3.79)	(-0.64)	(-0.60)	(-0.42)	(-0.29)		
4	0.984***	-0.015	-0.061	-0.023	-0.013	3.526	0.187
	(3.95)	(-0.41)	(-1.47)	(-0.66)	(-0.47)		
5	1.066***	0.023	-0.003	0.006	0.018	3.619	0.205
	(4.15)	(0.62)	(-0.07)	(0.18)	(0.51)		
6	1.181***	0.072*	0.059	0.057	0.062	3.674	0.233
	(4.39)	(1.84)	(1.02)	(1.45)	(1.54)		
7	1.125***	0.051	-0.024	0.038	0.050	3.800	0.210
	(4.06)	(1.01)	(-0.37)	(0.72)	(0.93)		
8	1.192***	0.052	-0.026	0.007	0.015	3.980	0.217
	(4.04)	(1.06)	(-0.41)	(0.16)	(0.36)		
9	1.232***	0.043	0.051	-0.010	-0.018	4.155	0.218
	(3.99)	(0.77)	(0.65)	(-0.19)	(-0.39)		
High	1.201***	0.062	-0.082	-0.011	-0.010	4.272	0.205
	(3.60)	(0.90)	(-0.95)	(-0.19)	(-0.22)		
LMH	-0.245	-0.105	0.052	0.011	0.019	2.110	-0.116
	(-1.36)	(-0.94)	(0.60)	(0.11)	(0.28)		

Table 4: Overpricing and Mutual Fund Performance

This table presents the results of the following quarterly panel regressions with quarter and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,

$$Perf_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-1} + \beta_2 Sentiment_{q-1} + \beta_3 Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q},$$

where $Perf_{f,q}$ is the average monthly performance of fund f in quarter q, $Overpricing_{f,q-1}$ is the overpricing level, $Sentiment_{q-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, and the vector M stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Lag(Fund Return), Lag(Fund Flow), Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age), Log(Manager Tenure) and Log(Stock Illiquidity). $Overpricing_{f,q-1}$ can be further replaced with two dummy variables, $Dummy(Underpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the bottom decile across all funds in that quarter and zero otherwise) and $Dummy(Overpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the top decile across all funds in that quarter and zero otherwise). The dependent variable $Perf_{f,q}$ is measured by raw return (Panel A, Models 1 to 5) and further adjusted by the Daniel, Grinblatt, Titman and Wermers (1997) model (Panel A, Models 6 to 10), the benchmark return of funds (Panel B, Models 1 to 5), as well as the benchmark return and Fama-French-Carhart (FFC) model (Panel B, Models 6 to 10). Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Table 4—Continued

Panel A: Fund Performance (in %) Regressed on Lagged Overpricing										
	Return					DGTW-adjusted Return				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Intercept	2.336***	3.037***	1.062***	1.364***	0.165	0.575***	0.705***	0.197	0.353*	0.176
	(10.46)	(11.35)	(4.25)	(5.42)	(0.69)	(3.62)	(3.50)	(1.02)	(1.87)	(0.96)
Overpricing	-4.961***	-5.110***		-3.693***		-1.535***	-1.448***		-0.557**	
	(-16.88)	(-15.84)		(-11.56)		(-7.43)	(-6.22)		(-2.40)	
Dummy (Underpricing)			0.157***		0.092***			0.063***		0.028*
			(6.33)		(3.92)			(3.68)		(1.70)
Dummy (Overpricing)			-0.260***		-0.166***			-0.110***		-0.050*
			(-6.74)		(-4.72)			(-3.81)		(-1.81)
Sentiment				3.641***	1.298***				1.521***	0.021
				(19.56)	(21.27)				(11.85)	(0.34)
Overpricing × Sentiment				-5.339***					-3.461***	
				(-13.53)					(-13.14)	
Dummy (Underpricing) × Sentiment					0.313***					0.172***
					(8.08)					(6.65)
Dummy (Overpricing) × Sentiment					-0.544***					-0.366***
					(-8.62)					(-9.19)
Active Share		0.509***	0.291**	0.527***	0.313***		-0.047	-0.102	-0.037	-0.087
		(4.25)	(2.43)	(4.53)	(2.70)		(-0.60)	(-1.33)	(-0.49)	(-1.15)
TR^2		-0.044***	-0.051***	-0.031***	-0.041***		-0.025***	-0.026***	-0.016***	-0.020***
		(-5.32)	(-6.03)	(-3.94)	(-5.04)		(-4.19)	(-4.45)	(-2.90)	(-3.44)
ICI		0.380	0.162	0.521	0.308		0.077	0.034	0.165	0.125
		(1.05)	(0.45)	(1.48)	(0.88)		(0.30)	(0.14)	(0.67)	(0.51)
Return Gap		-0.052***	-0.058***	-0.044**	-0.051***		-0.045***	-0.046***	-0.039***	-0.042***
		(-2.96)	(-3.31)	(-2.48)	(-2.91)		(-3.27)	(-3.36)	(-2.88)	(-3.04)
Tracking Error		-0.009	-0.008	-0.001	-0.002		-0.002	-0.002	0.003	0.002
		(-1.03)	(-0.89)	(-0.07)	(-0.18)		(-0.38)	(-0.27)	(0.49)	(0.38)
Lag (Fund Flow)	-0.006***	-0.007***	-0.006***	-0.007***	-0.006***	0.001	0.001	0.001	0.000	0.001
	(-3.61)	(-3.33)	(-3.01)	(-3.41)	(-3.06)	(0.55)	(0.36)	(0.48)	(0.31)	(0.46)
Log (Fund TNA)	-0.238***	-0.249***	-0.267***	-0.246***	-0.262***	-0.117***	-0.121***	-0.125***	-0.118***	-0.122***
	(-20.70)	(-19.12)	(-20.16)	(-19.29)	(-20.36)	(-16.07)	(-14.23)	(-14.91)	(-14.25)	(-14.90)
Expense Ratio	-0.067*	-0.070*	-0.063	-0.079*	-0.067	0.032	0.030	0.032	0.024	0.030
	(-1.82)	(-1.69)	(-1.51)	(-1.93)	(-1.63)	(1.26)	(1.04)	(1.09)	(0.84)	(1.05)
Turnover	0.039**	0.042**	0.037**	0.051***	0.043**	0.035***	0.037***	0.035***	0.043***	0.039***
	(2.38)	(2.26)	(2.00)	(2.81)	(2.36)	(3.17)	(2.97)	(2.89)	(3.49)	(3.20)
Log (Fund Age)	0.072**	0.112***	0.098***	0.090***	0.086**	0.035*	0.050**	0.046**	0.036	0.039*
	(2.32)	(3.22)	(2.83)	(2.60)	(2.48)	(1.66)	(2.17)	(2.01)	(1.56)	(1.71)
Log (Manager Tenure)	0.004	0.004	0.008	0.004	0.006	-0.001	-0.001	-0.000	-0.001	-0.001
	(0.33)	(0.35)	(0.63)	(0.30)	(0.48)	(-0.14)	(-0.10)	(-0.01)	(-0.14)	(-0.17)
Log (Stock Illiquidity)	0.119***	0.103***	0.084***	0.092***	0.077***	0.019***	0.013*	0.009	0.006	0.005
	(12.30)	(9.33)	(7.61)	(8.43)	(7.08)	(2.88)	(1.68)	(1.16)	(0.85)	(0.63)
R-squared	0.812	0.810	0.809	0.811	0.810	0.153	0.161	0.160	0.165	0.164
Obs	74,328	61,180	61,180	61,180	61,180	72,484	60,134	60,134	60,134	60,134

Table 4—Continued

Panel B: Benchmark-adjusted Fund Performance (in %) Regressed on Lagged Overpricing										
	Benchmark-adjusted Return					Benchmark & FFC-adjusted Return				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Intercept	1.580***	1.277***	-0.085	0.750***	0.083	1.004***	0.877***	0.356**	0.600***	0.374**
	(7.67)	(5.08)	(-0.35)	(3.18)	(0.37)	(7.15)	(5.31)	(2.26)	(3.63)	(2.35)
Overpricing	-3.465***	-3.476***		-2.060***		-1.357***	-1.307***		-0.703***	
	(-13.32)	(-11.86)		(-6.96)		(-7.90)	(-6.73)		(-3.64)	
Dummy (Underpricing)			0.132***		0.073***			0.072***		0.044***
			(6.03)		(3.45)			(4.86)		(3.03)
Dummy (Overpricing)			-0.201***		-0.106***			-0.065***		-0.028
			(-5.97)		(-3.45)			(-2.98)		(-1.32)
Sentiment				2.360***	0.035				0.987***	-0.007
				(13.53)	(0.60)				(8.47)	(-0.13)
Overpricing × Sentiment				-5.334***					-2.275***	
				(-14.31)					(-9.39)	
Dummy (Underpricing) × Sentiment					0.287***					0.137***
					(8.07)					(5.77)
Dummy (Overpricing) × Sentiment					-0.553***					-0.216***
					(-9.72)					(-6.39)
Active Share		0.371***	0.229**	0.390***	0.253**		0.218***	0.167**	0.226***	0.176**
		(3.51)	(2.17)	(3.79)	(2.47)		(2.99)	(2.29)	(3.15)	(2.44)
TR^2		-0.024***	-0.028***	-0.011	-0.018**		-0.006	-0.008	-0.001	-0.003
		(-3.13)	(-3.67)	(-1.52)	(-2.46)		(-1.30)	(-1.62)	(-0.14)	(-0.73)
ICI		0.398	0.260	0.538*	0.405		-0.389*	-0.452**	-0.329	-0.393*
		(1.19)	(0.78)	(1.65)	(1.25)		(-1.73)	(-2.02)	(-1.47)	(-1.77)
Return Gap		-0.033**	-0.036**	-0.024	-0.030**		0.001	0.000	0.005	0.003
		(-2.17)	(-2.42)	(-1.62)	(-1.97)		(0.16)	(0.02)	(0.54)	(0.31)
Tracking Error		-0.006	-0.005	0.003	0.002		0.002	0.002	0.005	0.004
		(-0.65)	(-0.53)	(0.35)	(0.21)		(0.30)	(0.34)	(0.96)	(0.81)
Lag (Fund Flow)	-0.003**	-0.003**	-0.003*	-0.004**	-0.003*	-0.000	-0.001	-0.000	-0.001	-0.000
	(-1.99)	(-1.97)	(-1.75)	(-2.05)	(-1.78)	(-0.18)	(-0.46)	(-0.35)	(-0.50)	(-0.37)
Log (Fund TNA)	-0.213***	-0.228***	-0.239***	-0.224***	-0.234***	-0.127***	-0.138***	-0.142***	-0.137***	-0.140***
	(-20.30)	(-19.07)	(-19.89)	(-19.33)	(-20.17)	(-17.27)	(-16.80)	(-17.37)	(-16.88)	(-17.40)
Expense Ratio	-0.060*	-0.051	-0.047	-0.060*	-0.050	-0.052**	-0.062**	-0.061**	-0.066**	-0.063**
	(-1.80)	(-1.37)	(-1.26)	(-1.65)	(-1.39)	(-2.16)	(-2.33)	(-2.30)	(-2.49)	(-2.38)
Turnover	0.036**	0.035**	0.032**	0.045***	0.038**	0.012	0.009	0.008	0.013	0.011
	(2.48)	(2.17)	(2.00)	(2.81)	(2.41)	(1.16)	(0.72)	(0.65)	(1.06)	(0.87)
Log (Fund Age)	0.062**	0.096***	0.086***	0.073**	0.075**	-0.008	0.009	0.005	-0.001	0.000
	(2.24)	(3.03)	(2.73)	(2.29)	(2.32)	(-0.42)	(0.42)	(0.25)	(-0.03)	(0.02)
Log (Manager Tenure)	0.001	0.003	0.005	0.002	0.003	0.001	0.004	0.005	0.004	0.004
	(0.10)	(0.27)	(0.46)	(0.22)	(0.28)	(0.18)	(0.59)	(0.67)	(0.55)	(0.57)
Log (Stock Illiquidity)	0.087***	0.073***	0.061***	0.062***	0.054***	0.029***	0.025***	0.021***	0.020***	0.018***
	(10.01)	(7.24)	(6.09)	(6.27)	(5.51)	(4.96)	(3.56)	(3.00)	(2.95)	(2.62)
R-squared	0.024	0.026	0.023	0.033	0.030	0.017	0.018	0.018	0.022	0.020
Obs	74,328	61,180	61,180	61,180	61,180	74,328	61,180	61,180	61,180	61,180

Table 5: Robustness Checks on Alternative Overpricing Measures and Mutual Fund Performance

Panel A presents the results of the following quarterly panel regressions with quarter and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,

$$Perf_{f,q} = \alpha_0 + \beta_1 BMKadj\ Overpricing_{f,q-1} + \beta_2 Sentiment_{q-1} + \beta_3 BMKadj\ Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q},$$

where $Perf_{f,q}$ refers to the average monthly return of fund f in quarter q, adjusted by the benchmark return of funds or benchmark and Fama-French-Carhart (FFC) model, $BMKadj\ Overpricing_{f,q-1}$ is the benchmark-adjusted overpricing level (adjusted by netting out the benchmark average), $Sentiment_{q-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, and the vector *M* stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Lag(Fund Return), Lag(Fund Flow), Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age), Log(Manager Tenure) and Log(Stock Illiquidity). $BMKadj\ Overpricing_{f,q-1}$ can be further replaced with two dummy variables, $Dummy(BMKadj\ Underpricing)_{f,q-1}$ (takes a value of one if the $BMKadj\ Overpricing_{f,q-1}$ is in the bottom decile across all funds in that quarter and zero otherwise) and $Dummy(BMKadj\ Overpricing)_{f,q-1}$ (takes a value of one if the $BMKadj\ Overpricing_{f,q-1}$ is in the top decile across all funds in that quarter and zero otherwise). Panel B reports similar regression parameters of the following quarterly panel regressions,

$$Perf_{f,q} = \alpha_0 + \beta_1 \Delta Overpricing_{f,q-1} + \beta_2 Overpricing_{f,q-1} + \beta_3 Sentiment_{q-1} + \beta_4 \Delta Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q},$$

where $\Delta Overpricing_{f,q-1}$ is the change in overpricing level of fund f in quarter q, and all other variables are defined as above. Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Table 5—Continued

Panel A: Benchmark-adjusted Fund Performance (in %) Regressed on Lagged Benchmark-adjusted Overpricing										
	Benchmark-adjusted Return					Benchmark & FFC-adjusted Return				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Intercept	-0.115	-0.421*	-0.139	-0.209	0.044	0.336***	0.230	0.331**	0.260	0.354**
	(-0.62)	(-1.75)	(-0.59)	(-0.93)	(0.20)	(2.63)	(1.45)	(2.10)	(1.62)	(2.22)
BMK-adjusted Overpricing	-4.241***	-4.389***		-2.484***		-1.713***	-1.738***		-0.973***	
	(-14.88)	(-13.96)		(-7.96)		(-9.25)	(-8.28)		(-4.65)	
Dummy (BMK-adjusted Underpricing)			0.138***		0.067***			0.070***		0.041**
			(5.64)		(2.91)			(4.07)		(2.52)
Dummy (BMK-adjusted Overpricing)			-0.220***		-0.124***			-0.093***		-0.061***
			(-6.69)		(-4.25)			(-4.71)		(-3.21)
Sentiment				-0.016	0.017				-0.025	-0.016
				(-0.27)	(0.29)				(-0.44)	(-0.28)
BMK-adjusted Overpricing × Sentiment				-6.130***					-2.463***	
				(-14.18)					(-8.58)	
Dummy (BMK-adjusted Underpricing) × Sentiment					0.375***					0.153***
					(10.12)					(6.17)
Dummy (BMK-adjusted Overpricing) × Sentiment					-0.494***					-0.163***
					(-8.68)					(-4.48)
Active Share		0.415***	0.268**	0.413***	0.279***		0.239***	0.184**	0.239***	0.187***
		(3.95)	(2.55)	(4.06)	(2.72)		(3.28)	(2.52)	(3.31)	(2.58)
TR^2		-0.026***	-0.029***	-0.013*	-0.019***		-0.007	-0.008	-0.002	-0.005
		(-3.37)	(-3.76)	(-1.83)	(-2.68)		(-1.41)	(-1.64)	(-0.37)	(-0.95)
ICI		0.428	0.269	0.521	0.350		-0.372*	-0.432*	-0.334	-0.403*
		(1.29)	(0.80)	(1.60)	(1.06)		(-1.67)	(-1.94)	(-1.50)	(-1.81)
Return Gap		-0.032**	-0.036**	-0.024	-0.030**		0.002	0.000	0.005	0.003
		(-2.12)	(-2.43)	(-1.62)	(-1.99)		(0.22)	(0.04)	(0.53)	(0.29)
Tracking Error		-0.003	-0.004	0.001	-0.002		0.003	0.002	0.004	0.003
		(-0.38)	(-0.51)	(0.08)	(-0.21)		(0.47)	(0.40)	(0.76)	(0.55)
Lag (Fund Flow)	-0.003*	-0.003*	-0.003*	-0.003**	-0.003*	-0.000	-0.000	-0.000	-0.001	-0.001
	(-1.80)	(-1.83)	(-1.75)	(-1.99)	(-1.93)	(-0.08)	(-0.39)	(-0.35)	(-0.47)	(-0.44)
Log (Fund TNA)	-0.210***	-0.225***	-0.236***	-0.221***	-0.231***	-0.126***	-0.137***	-0.141***	-0.135***	-0.139***
	(-20.12)	(-18.99)	(-19.76)	(-19.17)	(-19.91)	(-17.12)	(-16.68)	(-17.24)	(-16.70)	(-17.17)
Expense Ratio	-0.065*	-0.056	-0.049	-0.061*	-0.053	-0.054**	-0.064**	-0.062**	-0.066**	-0.064**
	(-1.94)	(-1.50)	(-1.32)	(-1.69)	(-1.49)	(-2.25)	(-2.42)	(-2.32)	(-2.51)	(-2.41)
Turnover	0.038**	0.037**	0.034**	0.042***	0.039**	0.013	0.009	0.008	0.012	0.010
	(2.57)	(2.27)	(2.08)	(2.66)	(2.48)	(1.20)	(0.78)	(0.68)	(0.96)	(0.86)
Log (Fund Age)	0.057**	0.089***	0.084***	0.076**	0.076**	-0.010	0.006	0.004	0.001	0.002
	(1.98)	(2.72)	(2.66)	(2.37)	(2.45)	(-0.53)	(0.30)	(0.21)	(0.06)	(0.07)
Log (Manager Tenure)	0.002	0.003	0.006	0.001	0.005	0.001	0.004	0.005	0.004	0.005
	(0.16)	(0.23)	(0.54)	(0.10)	(0.42)	(0.22)	(0.55)	(0.71)	(0.48)	(0.66)
Log (Stock Illiquidity)	0.092***	0.077***	0.062***	0.065***	0.056***	0.032***	0.027***	0.022***	0.022***	0.019***
	(10.52)	(7.63)	(6.26)	(6.49)	(5.68)	(5.34)	(3.85)	(3.14)	(3.17)	(2.81)
R-squared	0.025	0.027	0.024	0.035	0.030	0.017	0.019	0.018	0.022	0.020
Obs	74,328	61,180	61,180	61,180	61,180	74,328	61,180	61,180	61,180	61,180

Table 5—Continued

Panel B: Benchmark-adjusted Fund Performance (in %) Regressed on Change in Overpricing										
	Benchmark-adjusted Return					Benchmark & FFC-adjusted Return				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Intercept	0.070	1.493***	1.239***	0.202	1.276***	0.392***	1.005***	0.908***	0.431***	0.872***
	(0.38)	(7.02)	(4.90)	(0.90)	(5.31)	(2.98)	(6.84)	(5.45)	(2.70)	(5.18)
ΔOverpricing	-1.854***	-3.600***	-3.721***	-1.570***	-3.375***	-0.197	-0.950***	-0.993***	-0.178	-0.918***
	(-5.39)	(-9.88)	(-9.23)	(-4.20)	(-8.35)	(-0.83)	(-3.74)	(-3.46)	(-0.68)	(-3.22)
Overpricing		-3.411***	-3.374***		-3.362***		-1.470***	-1.381***		-1.378***
		(-12.00)	(-10.70)		(-10.68)		(-7.93)	(-6.65)		(-6.64)
Sentiment				-0.012	0.018				-0.020	-0.008
				(-0.20)	(0.31)				(-0.36)	(-0.14)
ΔOverpricing × Sentiment				-1.506*	-1.363*				-0.355	-0.296
				(-1.92)	(-1.74)				(-0.63)	(-0.53)
Active Share			0.371***	0.203*	0.367***			0.220***	0.151**	0.219***
			(3.51)	(1.91)	(3.48)			(3.01)	(2.06)	(3.00)
TR^2			-0.024***	-0.032***	-0.024***			-0.006	-0.009*	-0.006
			(-3.13)	(-4.05)	(-3.18)			(-1.26)	(-1.87)	(-1.27)
ICI			0.409	0.168	0.411			-0.381*	-0.481**	-0.381*
			(1.22)	(0.50)	(1.22)			(-1.70)	(-2.14)	(-1.70)
Return Gap			-0.032**	-0.037**	-0.032**			0.002	-0.000	0.002
			(-2.11)	(-2.48)	(-2.10)			(0.24)	(-0.02)	(0.24)
Tracking Error			-0.006	-0.007	-0.006			0.002	0.001	0.002
			(-0.65)	(-0.75)	(-0.64)			(0.29)	(0.22)	(0.30)
Lag (Fund Flow)	-0.002	-0.003*	-0.003*	-0.003	-0.003*	-0.000	-0.000	-0.001	-0.000	-0.001
	(-1.44)	(-1.85)	(-1.85)	(-1.54)	(-1.85)	(-0.01)	(-0.25)	(-0.48)	(-0.31)	(-0.48)
Log (Fund TNA)	-0.227***	-0.214***	-0.229***	-0.243***	-0.228***	-0.133***	-0.127***	-0.138***	-0.144***	-0.138***
	(-20.77)	(-20.17)	(-19.08)	(-19.89)	(-19.08)	(-17.78)	(-17.09)	(-16.73)	(-17.58)	(-16.74)
Expense Ratio	-0.054	-0.058*	-0.053	-0.045	-0.052	-0.049**	-0.051**	-0.062**	-0.059**	-0.062**
	(-1.60)	(-1.72)	(-1.42)	(-1.22)	(-1.41)	(-2.04)	(-2.12)	(-2.33)	(-2.22)	(-2.33)
Turnover	0.037**	0.038***	0.036**	0.033**	0.036**	0.012	0.013	0.008	0.007	0.008
	(2.51)	(2.59)	(2.21)	(2.01)	(2.21)	(1.11)	(1.17)	(0.69)	(0.57)	(0.69)
Log (Fund Age)	0.057**	0.064**	0.096***	0.085***	0.096***	-0.008	-0.006	0.009	0.004	0.009
	(2.11)	(2.29)	(3.03)	(2.77)	(3.03)	(-0.44)	(-0.29)	(0.40)	(0.19)	(0.40)
Log (Manager Tenure)	0.002	0.001	0.003	0.007	0.003	0.001	0.001	0.004	0.006	0.004
	(0.23)	(0.12)	(0.31)	(0.62)	(0.29)	(0.21)	(0.14)	(0.58)	(0.76)	(0.57)
Log (Stock Illiquidity)	0.063***	0.087***	0.072***	0.052***	0.071***	0.020***	0.030***	0.025***	0.017**	0.025***
	(7.37)	(9.99)	(7.17)	(5.25)	(7.13)	(3.38)	(5.03)	(3.56)	(2.48)	(3.55)
R-squared	0.020	0.024	0.026	0.022	0.026	0.015	0.017	0.018	0.017	0.018
Obs	74,087	74,087	61,128	61,128	61,128	74,087	74,087	61,128	61,128	61,128

Table 6: Mutual Fund Overpricing, Flow and Investment Activity

This table presents the results of the following quarterly logistic regressions with year fixed effects and their corresponding t-statistics with standard errors clustered at the fund-stock level,

$$Mispricing^{+}_{f,i,q} = \alpha_0 + \beta_1 Dummy(Underpricing)_{f,q-1} + \beta_2 Dummy(Overpricing)_{f,q-1} + \beta_3 Dummy(Inflow)_{f,q-1} + \beta_4 Dummy(Underpricing)_{f,q-1} \times Dummy(Inflow)_{f,q-1} + \beta_5 Dummy(Overpricing)_{f,q-1} \times Dummy(Inflow)_{f,q-1} + c_1 M_{f,q-1} + c_2 N_{i,q-1} + e_{f,i,q},$$

where $Mispricing^{+}_{f,i,q}$ refers to a dummy variable that equals to one if the mutual fund f increases its holding in underpriced (Models 1 and 3) or overpriced (Models 2 and 4) stock i in quarter q and zero otherwise, $Dummy(Underpricing)_{f,q-1}$ ($Dummy(Overpricing)_{f,q-1}$) refers to a dummy variable that takes a value of one if the fund overpricing is in the bottom (top) decile across all funds in that quarter and zero otherwise, $Dummy(Inflow)_{f,q-1}$ refers to a dummy variable that takes a value of one if average monthly flow is positive in that quarter and zero otherwise, the vector *M* stacks all other fund-level control variables, including the Fund Return, Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age) and Log(Manager Tenure), and vector *N* stacks all stock-level control variables, including the Stock Return, Stock Turnover and Log(Stock Illiquidity). Models 1 to 2 include the entire sample period while Models 3 to 4 only include periods of high sentiment, defined as above median sentiment level over the full sample period. Appendix A provides the detailed definition of each variable. Numbers with "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Mutual Fund Ownership Increase Regressed on Lagged Fund Overpricing and Flow				
	Full Sample		High Sentiment	
Dep. Var. =	Dummy (Underpricing^{+})	Dummy (Overpricing^{+})	Dummy (Underpricing^{+})	Dummy (Overpricing^{+})
	Model 1	Model 2	Model 3	Model 4
Intercept	-4.781***	-1.696***	-3.874***	-3.018***
	(-78.55)	(-23.64)	(-48.20)	(-29.74)
Dummy (Underpricing)	0.271***	-0.611***	0.282***	-0.561***
	(28.49)	(-21.11)	(21.70)	(-14.03)
Dummy (Overpricing)	-0.366***	0.538***	-0.416***	0.581***
	(-25.19)	(39.61)	(-18.78)	(28.67)
Dummy (Underpricing) × Dummy (Inflow)	0.090***	-0.067	0.081***	-0.053
	(6.84)	(-1.55)	(4.45)	(-0.90)
Dummy (Overpricing) × Dummy (Inflow)	-0.077***	0.015	-0.086***	0.065**
	(-3.83)	(0.79)	(-2.68)	(2.35)
Dummy (Inflow)	0.209***	0.228***	0.195***	0.218***
	(39.91)	(27.40)	(27.03)	(18.13)
Fund Return	0.004***	0.023***	0.011***	0.021***
	(2.76)	(10.52)	(6.40)	(8.04)
Log (Fund TNA)	-0.010***	0.046***	-0.010***	0.046***
	(-4.37)	(14.85)	(-3.60)	(10.84)
Expense Ratio	-0.010	0.117***	-0.012	0.125***
	(-1.19)	(9.97)	(-1.00)	(7.51)
Turnover	0.060***	0.055***	0.064***	0.038***
	(15.85)	(10.51)	(11.43)	(4.36)
Log (Fund Age)	-0.009	-0.021***	-0.002	-0.035***
	(-1.62)	(-2.79)	(-0.30)	(-3.32)
Log (Manager Tenure)	0.024***	-0.053***	0.026***	-0.041***
	(5.77)	(-8.97)	(4.69)	(-4.89)
Log (Stock Size)	0.146***	-0.405***	0.164***	-0.281***
	(18.72)	(-48.14)	(15.90)	(-24.66)
Stock Return	0.052***	-0.058***	0.043***	-0.059***
	(170.34)	(-118.24)	(106.53)	(-86.85)
Stock Turnover	-0.013***	0.019***	-0.015***	0.023***
	(-43.91)	(70.95)	(-34.19)	(63.22)
Log (Stock Illiquidity)	-0.141***	-0.144***	-0.120***	-0.089***
	(-20.97)	(-23.05)	(-13.38)	(-10.37)
Obs	5,924,404	5,924,404	2,512,277	2,512,277

Table 7: Overpricing and Mutual Fund Flow

This table presents the results of the following quarterly panel regressions with quarter and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,

$$Flow_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-1} + \beta_2 Sentiment_{q-1} + \beta_3 Overpricing_{f,q-1} \times Sentiment_{q-1} + \beta_4 Perf_{f,q-1} + cM_{f,q-1} + e_{f,q},$$

where $Flow_{f,q}$ refers to the average monthly flow of fund f in quarter q, $Overpricing_{f,q-1}$ is the overpricing level, $Sentiment_{q-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, $Perf_{f,q-1}$ is the average monthly fund return, and the vector M stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age) and Log(Manager Tenure). $Overpricing_{f,q-1}$ can be further replaced with two dummy variables, $Dummy(Underpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the bottom decile across all funds in that quarter and zero otherwise) and $Dummy(Overpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the top decile across all funds in that quarter and zero otherwise). Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Fund Flow (in %) Regressed on Lagged Overpricing						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	5.875***	7.878***	1.901**	3.872***	3.473***	4.876***
	(7.32)	(11.06)	(2.06)	(4.56)	(3.67)	(5.48)
Overpricing	4.181***		4.711***		3.844***	
	(5.26)		(5.41)		(4.30)	
Dummy (Underpricing)		-0.205***		-0.200***		-0.177**
		(-3.29)		(-2.88)		(-2.45)
Dummy (Overpricing)		0.213***		0.258***		0.206**
		(2.66)		(3.02)		(2.38)
Sentiment					0.438	2.080***
					(1.07)	(13.06)
Overpricing × Sentiment					3.817***	
					(4.30)	
Dummy (Underpricing) × Sentiment						-0.122
						(-1.12)
Dummy (Overpricing) × Sentiment						0.327***
						(3.00)
Active Share			0.242	0.484	0.242	0.477
			(0.69)	(1.39)	(0.69)	(1.38)
TR^2			0.044*	0.048**	0.035	0.043*
			(1.91)	(2.10)	(1.55)	(1.87)
ICI			-0.893	-0.709	-0.971	-0.776
			(-1.07)	(-0.85)	(-1.17)	(-0.94)
Return Gap			-0.037	-0.031	-0.043	-0.035
			(-1.35)	(-1.13)	(-1.60)	(-1.28)
Tracking Error			-0.034**	-0.034**	-0.041***	-0.038**
			(-2.21)	(-2.20)	(-2.66)	(-2.48)
Fund Return_{q-1}	0.300***	0.293***	0.311***	0.303***	0.318***	0.307***
	(26.45)	(26.34)	(25.72)	(25.63)	(26.38)	(26.11)
$\text{Fund Return}_{q-4:q-2}$	0.663***	0.654***	0.673***	0.662***	0.681***	0.666***
	(32.28)	(32.32)	(31.46)	(31.48)	(31.85)	(31.63)
Log (Fund TNA)	-0.484***	-0.477***	-0.511***	-0.500***	-0.515***	-0.503***
	(-12.31)	(-12.18)	(-11.73)	(-11.54)	(-11.84)	(-11.60)
Expense Ratio	0.187	0.187	0.223	0.222	0.228	0.222
	(1.30)	(1.31)	(1.37)	(1.37)	(1.40)	(1.37)
Turnover	0.073	0.075	0.023	0.028	0.016	0.024
	(1.39)	(1.42)	(0.43)	(0.50)	(0.29)	(0.44)
Log (Fund Age)	-1.384***	-1.376***	-1.258***	-1.244***	-1.243***	-1.240***
	(-9.95)	(-9.91)	(-8.02)	(-7.95)	(-7.93)	(-7.94)
Log (Manager Tenure)	0.106***	0.106***	0.104***	0.101***	0.105***	0.103***
	(3.14)	(3.14)	(2.86)	(2.78)	(2.89)	(2.82)
R-squared	0.139	0.139	0.144	0.143	0.145	0.144
Obs	74,322	74,322	61,180	61,180	61,180	61,180

Table 8: Robustness Checks on Alternative Overpricing Measures and Mutual Fund Flow

Panel A presents the results of the following quarterly panel regressions with quarter and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,

$$BMKadj\ Flow_{f,q} = \alpha_0 + \beta_1 BMKadj\ Overpricing_{f,q-1} + \beta_2 Sentiment_{q-1} + \beta_3 BMKadj\ Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q},$$

where $BMKadj\ Flow_{f,q}$ refers to the average monthly benchmark-adjusted flow of fund f in quarter q, $BMKadj\ Overpricing_{f,q-1}$ is the benchmark-adjusted overpricing level (adjusted by netting out the benchmark average), $Sentiment_{q-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, and the vector M stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Lag(Fund Return), Lag(Fund Flow), Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age) and Log(Manager Tenure). $BMKadj\ Overpricing_{f,q-1}$ can be further replaced with two dummy variables, $Dummy(BMKadj\ Underpricing)_{f,q-1}$ and $Dummy(BMKadj\ Overpricing)_{f,q-1}$ (defined the same as in Table 5). Panel B reports similar regression parameters of the following quarterly panel regressions,

$$Flow_{f,q} = \alpha_0 + \beta_1 \Delta Overpricing_{f,q-1} + \beta_2 Overpricing_{f,q-1} + \beta_3 Sentiment_{q-1} + \beta_4 \Delta Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q},$$

where $Flow_{f,q}$ refers to the average monthly flow of fund f in quarter q, $\Delta Overpricing_{f,q-1}$ is the change in overpricing level of fund f in quarter q, and all other variables are defined as above. Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Panel A: Benchmark-adjusted Fund Flow (in %) Regressed on Lagged Benchmark-adjusted Overpricing						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	7.354***	7.363***	3.643***	3.511***	3.833***	3.682***
	(10.73)	(10.72)	(4.43)	(4.28)	(4.41)	(4.25)
BMK-adjusted Overpricing	3.116***		3.540***		2.717***	
	(3.79)		(3.93)		(2.86)	
Dummy (BMK-adjusted Underpricing)		-0.207***		-0.192***		-0.157**
		(-3.36)		(-2.80)		(-2.19)
Dummy (BMK-adjusted Overpricing)		0.144*		0.156**		0.114
		(1.92)		(1.96)		(1.38)
Sentiment					1.934***	1.907***
					(12.90)	(12.71)
BMK-adjusted Overpricing × Sentiment					2.932***	
					(2.90)	
Dummy (BMK-adjusted Underpricing) × Sentiment						-0.196*
						(-1.83)
Dummy (BMK-adjusted Overpricing) × Sentiment						0.230**
						(2.25)
Active Share			0.701*	0.850**	0.714**	0.854**
			(1.96)	(2.39)	(1.99)	(2.40)
TR^2			0.065***	0.067***	0.060***	0.063***
			(2.82)	(2.87)	(2.60)	(2.70)
ICI			-0.353	-0.214	-0.381	-0.238
			(-0.42)	(-0.26)	(-0.46)	(-0.29)
Return Gap			-0.013	-0.009	-0.017	-0.012
			(-0.46)	(-0.32)	(-0.60)	(-0.45)
Tracking Error			-0.049***	-0.047***	-0.052***	-0.049***
			(-3.16)	(-3.03)	(-3.31)	(-3.15)
Fund $Return_{q-1}$	0.259***	0.256***	0.272***	0.268***	0.276***	0.272***
	(22.90)	(22.86)	(22.60)	(22.50)	(22.89)	(22.80)
Fund $Return_{q-4:q-2}$	0.618***	0.615***	0.633***	0.629***	0.639***	0.633***
	(30.55)	(30.61)	(30.22)	(30.27)	(30.37)	(30.30)
Log (Fund TNA)	-0.499***	-0.497***	-0.513***	-0.508***	-0.516***	-0.511***
	(-12.81)	(-12.77)	(-11.85)	(-11.77)	(-11.90)	(-11.82)
Expense Ratio	0.167	0.168	0.207	0.205	0.209	0.207
	(1.16)	(1.16)	(1.27)	(1.26)	(1.29)	(1.27)
Turnover	0.066	0.067	0.027	0.030	0.024	0.027
	(1.24)	(1.26)	(0.49)	(0.54)	(0.43)	(0.48)
Log (Fund Age)	-1.273***	-1.274***	-1.143***	-1.140***	-1.137***	-1.137***
	(-9.67)	(-9.66)	(-7.63)	(-7.59)	(-7.57)	(-7.57)
Log (Manager Tenure)	0.102***	0.103***	0.104***	0.102***	0.105***	0.103***
	(2.99)	(3.00)	(2.78)	(2.74)	(2.81)	(2.76)
R-squared	0.093	0.093	0.099	0.098	0.099	0.099
Obs	74,322	74,322	61,180	61,180	61,180	61,180

Table 8—Continued

Panel B: Fund Flow (in %) Regressed on Change in Overpricing						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	8.315***	5.576***	8.950***	1.671*	8.319***	2.905***
	(17.02)	(6.85)	(12.64)	(1.79)	(11.56)	(3.03)
ΔOverpricing	1.608**	2.519***	1.635**	2.737***	1.988**	2.826***
	(2.31)	(2.86)	(2.21)	(2.88)	(2.46)	(2.86)
Overpricing		4.708***		5.282***		5.286***
		(5.43)		(5.58)		(5.59)
Sentiment					0.200***	2.074***
					(4.85)	(13.22)
ΔOverpricing × Sentiment					-1.910	-0.360
					(-1.62)	(-0.26)
Active Share			-0.678*	0.214	-0.513	0.213
			(-1.95)	(0.61)	(-1.46)	(0.61)
TR^2			-0.101***	0.042*	-0.068***	0.042*
			(-5.13)	(1.84)	(-3.23)	(1.84)
ICI			-3.093***	-0.961	-3.122***	-0.960
			(-3.52)	(-1.16)	(-3.55)	(-1.16)
Return Gap			0.086***	-0.033	0.083***	-0.033
			(3.13)	(-1.22)	(3.00)	(-1.22)
Tracking Error			0.047***	-0.035**	0.030**	-0.035**
			(3.15)	(-2.28)	(2.05)	(-2.28)
Fund $Return_{q-1}$	0.094***	0.299***	0.101***	0.309***	0.107***	0.309***
	(22.20)	(26.30)	(20.53)	(25.38)	(21.39)	(25.40)
Fund $Return_{q-4:q-2}$	0.143***	0.670***	0.162***	0.681***	0.167***	0.681***
	(19.10)	(32.20)	(17.82)	(31.42)	(18.14)	(31.35)
Log (Fund TNA)	-0.386***	-0.485***	-0.443***	-0.512***	-0.445***	-0.512***
	(-10.91)	(-12.29)	(-10.75)	(-11.79)	(-10.62)	(-11.79)
Expense Ratio	0.666***	0.198	0.651***	0.224	0.729***	0.224
	(4.87)	(1.38)	(4.18)	(1.38)	(4.55)	(1.38)
Turnover	0.152***	0.072	0.096	0.021	0.089	0.021
	(2.71)	(1.37)	(1.63)	(0.39)	(1.51)	(0.39)
Log (Fund Age)	-1.403***	-1.379***	-1.270***	-1.257***	-1.201***	-1.257***
	(-16.43)	(-10.08)	(-12.92)	(-8.06)	(-12.19)	(-8.06)
Log (Manager Tenure)	-0.011	0.105***	0.005	0.104***	-0.008	0.103***
	(-0.29)	(3.14)	(0.13)	(2.84)	(-0.22)	(2.84)
R-squared	0.071	0.139	0.073	0.144	0.074	0.144
Obs	74,081	74,081	61,128	61,128	61,128	61,128

Table 9: Overpricing and Lottery-Type Investments

This table presents the results of the following quarterly panel regressions with quarter and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,

$$Flow_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-1} + \beta_2 FundChar_{q-1} + \beta_3 Overpricing_{f,q-1} \times FundChar_{q-1} + \beta_4 Perf_{f,q-1} + cM_{f,q-1} + e_{f,q},$$

where $Flow_{f,q}$ refers to the average monthly flow of fund f in quarter q, $Overpricing_{f,q-1}$ is the overpricing level, $FundChar_{q-1}$ refers to a list of fund characteristics including Expense Ratio, Marketing Expense, Idiosyncratic Volatility, and Skewness, $Perf_{f,q-1}$ is the average monthly fund return, and the vector M stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Log(Fund TNA), Turnover, Log(Fund Age) and Log(Manager Tenure). Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Fund Flow (in %) Regressed on Lagged Overpricing								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	7.471***	8.270***	7.757***	9.578***	7.868***	7.526***	7.790***	9.797***
	(6.13)	(7.23)	(5.05)	(8.04)	(6.25)	(6.19)	(5.00)	(7.70)
Overpricing	5.672***	5.671***	5.431*	3.148**	4.897***	5.873***	4.988*	2.272
	(5.01)	(5.01)	(1.91)	(2.16)	(3.01)	(5.21)	(1.67)	(1.19)
Overpricing × Expense Ratio			0.301				0.119	
			(0.14)				(0.06)	
Overpricing × Marketing Expense				7.081***				7.184***
				(2.92)				(2.97)
Overpricing × Idiosyncratic					2.440		1.859	2.386
					(0.62)		(0.47)	(0.60)
Overpricing × Skewness						1.928**	1.640*	1.642*
						(1.98)	(1.69)	(1.69)
Active Share	-0.306	-0.310	-0.164	-0.200	-0.287	-0.154	-0.280	-0.312
	(-0.70)	(-0.71)	(-0.38)	(-0.47)	(-0.66)	(-0.36)	(-0.64)	(-0.71)
TR^2	0.057**	0.056**	0.055**	0.053**	0.057**	0.055**	0.057**	0.055**
	(2.10)	(2.08)	(2.05)	(1.98)	(2.12)	(2.04)	(2.11)	(2.03)
ICI	-2.935**	-2.929**	-2.533**	-2.593**	-2.921**	-2.577**	-2.943**	-3.013**
	(-2.47)	(-2.47)	(-2.16)	(-2.21)	(-2.47)	(-2.19)	(-2.49)	(-2.55)
Return Gap	-0.039	-0.040	-0.036	-0.036	-0.038	-0.040	-0.042	-0.043
	(-1.24)	(-1.25)	(-1.14)	(-1.16)	(-1.21)	(-1.28)	(-1.33)	(-1.35)
Tracking Error	-0.043**	-0.044**	-0.033**	-0.033*	-0.045***	-0.034**	-0.045***	-0.045***
	(-2.55)	(-2.56)	(-1.97)	(-1.94)	(-2.61)	(-2.01)	(-2.59)	(-2.58)
Fund $Return_{q-1}$	0.303***	0.304***	0.298***	0.298***	0.301***	0.304***	0.306***	0.307***
	(22.67)	(22.70)	(22.70)	(22.73)	(22.92)	(22.65)	(22.69)	(22.73)
Fund $Return_{q-4:q-2}$	0.591***	0.594***	0.590***	0.591***	0.590***	0.591***	0.591***	0.592***
	(26.65)	(26.76)	(26.71)	(26.83)	(26.73)	(26.65)	(26.59)	(26.70)
Log (Fund TNA)	-0.557***	-0.581***	-0.555***	-0.580***	-0.558***	-0.554***	-0.557***	-0.582***
	(-8.88)	(-9.45)	(-8.84)	(-9.47)	(-8.89)	(-8.83)	(-8.87)	(-9.50)
Expense Ratio	0.399		0.267		0.401	0.401	0.347	
	(1.37)		(0.28)		(1.38)	(1.38)	(0.36)	
Turnover	-0.018	-0.010	-0.016	-0.011	-0.021	-0.015	-0.019	-0.015
	(-0.28)	(-0.16)	(-0.24)	(-0.16)	(-0.32)	(-0.22)	(-0.30)	(-0.22)
Log (Fund Age)	-1.526***	-1.551***	-1.538***	-1.560***	-1.522***	-1.536***	-1.519***	-1.538***
	(-7.06)	(-7.24)	(-7.07)	(-7.36)	(-7.02)	(-7.13)	(-6.94)	(-7.22)
Log (Manager Tenure)	0.111**	0.112**	0.112**	0.117**	0.111**	0.112**	0.111**	0.115**
	(2.41)	(2.44)	(2.43)	(2.54)	(2.41)	(2.42)	(2.41)	(2.52)
Marketing Expense		-0.173		-3.342***				-3.388***
		(-0.38)		(-2.92)				(-2.96)
Idiosyncratic Volatility	0.655*	0.658*			-0.513		-0.267	-0.512
	(1.76)	(1.77)			(-0.27)		(-0.14)	(-0.27)
Skewness	0.143*	0.143*				-0.707	-0.585	-0.589
	(1.69)	(1.68)				(-1.59)	(-1.32)	(-1.33)
R-squared	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118
Obs	44,894	44,894	44,894	44,894	44,894	44,894	44,894	44,894

Table IA1: Summary Statistics

This table presents the summary statistics for the data used in the paper during the 1981–2010 period. We report the mean, median, standard deviation, and the quantile distribution of quarterly fund overpricing, monthly fund return, monthly fund flow, and other quarterly stock and fund characteristics. Appendix A provides the detailed definition of each variable.

Quantile Distribution of Fund Characteristics							
	Mean	Std.Dev.	Quantile Distribution				
			10%	25%	Median	75%	90%
Overpricing (in %)	43.918	4.654	37.930	40.439	43.783	47.163	49.990
Fund Return	0.665	3.339	-3.657	-0.882	0.957	2.545	4.480
BMK-adjusted	0.002	1.319	-1.350	-0.609	-0.008	0.602	1.372
DGTW-adjusted	0.013	1.193	-1.230	-0.543	-0.006	0.541	1.265
BMK & FFC-adjusted	-0.002	0.894	-1.034	-0.479	-0.002	0.473	1.029
Fund Flow	0.214	3.495	-2.555	-1.310	-0.312	1.025	3.368
Active Share	0.800	0.150	0.586	0.702	0.832	0.926	0.969
TR^2	3.704	1.221	2.339	2.899	3.547	4.336	5.278
ICI	0.046	0.051	0.009	0.018	0.033	0.056	0.091
Return Gap	-0.019	0.620	-0.587	-0.242	-0.017	0.204	0.559
Tracking Error	1.505	1.385	0.383	0.663	1.138	1.885	2.969
Log (Fund TNA)	5.843	1.624	3.731	4.613	5.768	6.932	8.037
Expense Ratio	1.186	0.403	0.704	0.931	1.159	1.424	1.730
Turnover	0.797	0.656	0.180	0.330	0.630	1.050	1.620
Log (Fund Age)	4.982	0.724	4.103	4.420	4.875	5.455	6.096
Log (Manager Tenure)	4.284	0.741	3.296	3.929	4.355	4.745	5.142
Log (Stock Illiquidity)	2.730	2.309	-0.062	0.824	2.414	4.293	6.088

Table IA2: The Existence and Persistence of Mutual Fund Overpricing

In this table, Models 1 to 3 present the results of the following quarterly Fama-MacBeth regressions, as well as their corresponding Newey-West adjusted t-statistics,

$$Overpricing_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-1} + cM_{f,q-1} + e_{f,q},$$

where $Overpricing_{f,q}$ is the overpricing level of fund f in quarter q, and the vector M stacks all other control variables, including the Lag(Fund Return), Lag(Fund Flow), Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age), Log(Manager Tenure) and Log(Stock Illiquidity). $Overpricing_{f,q-1}$ can be further replaced with two dummy variables, $Dummy(Underpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the bottom decile across all funds in that quarter and zero otherwise) and $Dummy(Overpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the top decile across all funds in that quarter and zero otherwise). Models 4 to 6 report similar regression parameters of the following quarterly Fama-MacBeth regressions,

$$Overpricing_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-4} + cM_{f,q-1} + e_{f,q},$$

where all variables are defined as above. Appendix A provides detailed definitions for each variable. Numbers with "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Fund Overpricing (in %) Regressed on Lagged Fund Overpricing						
	Quarter $q-1$			Quarter $q-4$		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	4.120***	5.568***	41.610***	11.047***	14.627***	41.018***
	(8.59)	(13.70)	(88.53)	(8.98)	(16.24)	(83.82)
Overpricing	0.906***	0.865***		0.749***	0.635***	
	(91.10)	(110.59)		(29.99)	(38.99)	
Dummy (Underpricing)			-4.011***			-2.954***
			(-38.16)			(-32.51)
Dummy (Overpricing)			5.465***			4.129***
			(30.05)			(26.30)
Lag (Fund Return)		-0.065***	-0.154***		-0.286***	-0.259***
		(-2.86)	(-2.91)		(-6.22)	(-4.24)
Lag (Fund Flow)		0.020***	0.013**		0.031***	0.020**
		(4.74)	(2.06)		(4.38)	(2.58)
Log (Fund TNA)		0.045***	0.225***		0.144***	0.264***
		(5.24)	(9.09)		(6.79)	(9.84)
Expense Ratio		0.107***	0.544***		0.262***	0.623***
		(3.36)	(6.41)		(3.27)	(6.22)
Turnover		0.058***	0.302***		0.183***	0.336***
		(3.33)	(8.61)		(3.98)	(8.32)
Log (Fund Age)		-0.062***	-0.363***		-0.152***	-0.376***
		(-4.00)	(-6.90)		(-4.42)	(-6.84)
Log (Manager Tenure)		-0.028**	-0.085***		-0.067**	-0.095***
		(-2.12)	(-3.39)		(-2.47)	(-3.06)
Log (Stock Illiquidity)		0.118***	0.712***		0.387***	0.810***
		(6.87)	(10.86)		(9.02)	(11.85)
R-squared	0.826	0.846	0.627	0.575	0.649	0.524
Obs	72,030	72,030	72,030	72,030	72,030	72,030

Table IA3: Robustness Checks on Overpricing and Gross-of-Fee Mutual Fund Performance

This table presents the results of the following quarterly panel regressions with quarter and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,

$$Perf_{f,q} = \alpha_0 + \beta_1 Overpricing_{f,q-1} + \beta_2 Sentiment_{q-1} + \beta_3 Overpricing_{f,q-1} \times Sentiment_{q-1} + cM_{f,q-1} + e_{f,q},$$

where $Perf_{f,q}$ refers to the average monthly gross-of-fee return of fund f in quarter q, adjusted by the benchmark return of funds or benchmark and Fama-French-Carhart (FFC) model, $Overpricing_{f,q-1}$ is the overpricing level, $Sentiment_{q-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, and the vector M stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Lag(Fund Return), Lag(Fund Flow), Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age), Log(Manager Tenure) and Log(Stock Illiquidity). Gross-of-fee fund return refers to the fund total return plus one-twelfth of the annualized expense ratio. $Overpricing_{f,q-1}$ can be further replaced with two dummy variables, $Dummy(Underpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the bottom decile across all funds in that quarter and zero otherwise) and $Dummy(Overpricing)_{f,q-1}$ (takes a value of one if the $Overpricing_{f,q-1}$ is in the top decile across all funds in that quarter and zero otherwise). Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Table IA3—Continued

Gross-of-Fee Fund Performance (in %) Regressed on Lagged Overpricing										
	Gross-of-Fee Benchmark-adjusted Return					Gross-of-Fee Benchmark & FFC-adjusted Return				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Intercept	1.531***	1.177***	-0.208	0.687***	-0.007	0.952***	0.788***	0.256	0.545***	0.307*
	(7.39)	(4.66)	(-0.87)	(2.91)	(-0.03)	(6.77)	(4.75)	(1.62)	(3.31)	(1.94)
Overpricing	-3.518***	-3.541***		-2.143***		-1.384***	-1.340***		-0.737***	
	(-13.51)	(-12.07)		(-7.23)		(-8.04)	(-6.89)		(-3.83)	
Dummy (Underpricing)			0.133***		0.074***			0.073***		0.045***
			(6.06)		(3.50)			(4.92)		(3.09)
Dummy (Overpricing)			-0.202***		-0.107***			-0.065***		-0.028
			(-5.98)		(-3.49)			(-2.95)		(-1.30)
Sentiment				2.320***	0.030				0.975***	-0.014
				(13.32)	(0.51)				(8.34)	(-0.26)
Overpricing × Sentiment				-5.253***					-2.262***	
				(-14.12)					(-9.32)	
Dummy (Underpricing) × Sentiment					0.285***					0.138***
					(7.99)					(5.80)
Dummy (Overpricing) × Sentiment					-0.548***					-0.215***
					(-9.67)					(-6.35)
Active Share		0.395***	0.250**	0.414***	0.274***		0.235***	0.182**	0.243***	0.190***
		(3.74)	(2.36)	(4.03)	(2.67)		(3.21)	(2.49)	(3.37)	(2.63)
TR^2		-0.023***	-0.027***	-0.009	-0.016**		-0.005	-0.007	0.000	-0.003
		(-2.93)	(-3.49)	(-1.32)	(-2.26)		(-1.13)	(-1.46)	(0.04)	(-0.56)
ICI		0.384	0.241	0.522	0.385		-0.389*	-0.456**	-0.330	-0.397*
		(1.15)	(0.73)	(1.61)	(1.19)		(-1.73)	(-2.03)	(-1.47)	(-1.78)
Return Gap		-0.032**	-0.036**	-0.024	-0.029*		0.002	0.000	0.005	0.003
		(-2.12)	(-2.38)	(-1.58)	(-1.94)		(0.18)	(0.03)	(0.55)	(0.32)
Tracking Error		-0.005	-0.004	0.004	0.003		0.001	0.001	0.005	0.004
		(-0.56)	(-0.44)	(0.42)	(0.30)		(0.19)	(0.23)	(0.85)	(0.70)
Lag (Fund Flow)	-0.003*	-0.003*	-0.003	-0.003*	-0.003*	-0.000	-0.001	-0.000	-0.001	-0.000
	(-1.93)	(-1.85)	(-1.62)	(-1.93)	(-1.65)	(-0.26)	(-0.46)	(-0.34)	(-0.49)	(-0.36)
Log (Fund TNA)	-0.213***	-0.228***	-0.240***	-0.224***	-0.235***	-0.129***	-0.140***	-0.143***	-0.138***	-0.142***
	(-20.32)	(-19.09)	(-19.93)	(-19.37)	(-20.22)	(-17.41)	(-16.91)	(-17.49)	(-17.00)	(-17.54)
Expense Ratio	0.016	0.023	0.028	0.014	0.024	0.020	0.009	0.010	0.005	0.008
	(0.47)	(0.63)	(0.75)	(0.38)	(0.67)	(0.82)	(0.33)	(0.36)	(0.17)	(0.30)
Turnover	0.037**	0.035**	0.032**	0.044***	0.038**	0.013	0.009	0.008	0.013	0.011
	(2.54)	(2.16)	(1.99)	(2.79)	(2.39)	(1.17)	(0.74)	(0.67)	(1.08)	(0.89)
Log (Fund Age)	0.061**	0.094***	0.084***	0.072**	0.073**	-0.010	0.006	0.003	-0.003	-0.002
	(2.18)	(2.97)	(2.66)	(2.24)	(2.26)	(-0.52)	(0.30)	(0.13)	(-0.15)	(-0.10)
Log (Manager Tenure)	0.001	0.003	0.005	0.002	0.003	0.001	0.004	0.005	0.004	0.004
	(0.13)	(0.26)	(0.46)	(0.22)	(0.28)	(0.18)	(0.54)	(0.63)	(0.51)	(0.53)
Log (Stock Illiquidity)	0.087***	0.072***	0.060***	0.062***	0.053***	0.030***	0.025***	0.021***	0.020***	0.018**
	(10.01)	(7.21)	(6.02)	(6.26)	(5.46)	(5.00)	(3.54)	(2.95)	(2.94)	(2.58)
R-squared	0.024	0.026	0.024	0.034	0.030	0.017	0.019	0.018	0.022	0.021
Obs	74,091	60,982	60,982	60,982	60,982	74,091	60,982	60,982	60,982	60,982

Table IA4: Robustness Checks on Overpricing and Mutual Fund Performance (Annual)

This table presents the results of the following annual panel regressions with year and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,

$$Perf_{f,t} = \alpha_0 + \beta_1 Overpricing_{f,t-1} + \beta_2 Sentiment_{t-1} + \beta_3 Overpricing_{f,t-1} \times Sentiment_{t-1} + cM_{f,t-1} + e_{f,t},$$

where $Perf_{f,t}$ refers to the average monthly return of fund f in year t, adjusted by the benchmark return of funds or benchmark and Fama-French-Carhart (FFC) model, $Overpricing_{f,t-1}$ is the average quarterly overpricing level, $Sentiment_{t-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, and the vector *M* stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Lag(Fund Return), Lag(Fund Flow), Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age), Log(Manager Tenure) and Log(Stock Illiquidity). $Overpricing_{f,t-1}$ can be further replaced with two dummy variables, $Dummy(Underpricing)_{f,t-1}$ (takes a value of one if the $Overpricing_{f,t-1}$ is in the bottom decile across all funds in that year and zero otherwise) and $Dummy(Overpricing)_{f,t-1}$ (takes a value of one if the $Overpricing_{f,t-1}$ is in the top decile across all funds in that year and zero otherwise). Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Table IA4—Continued

Benchmark-adjusted Fund Performance (in %) Regressed on Lagged Overpricing										
	Benchmark-adjusted Return					Benchmark & FFC-adjusted Return				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Intercept	0.480**	0.235	-0.170	0.137	0.234	0.727***	0.803***	0.499***	0.677***	0.604***
	(2.55)	(1.03)	(-0.82)	(0.63)	(1.20)	(5.37)	(5.03)	(3.51)	(4.47)	(4.48)
Overpricing	-1.106***	-0.996***		0.166		-0.857***	-0.763***		-0.256	
	(-3.92)	(-3.00)		(0.49)		(-4.38)	(-3.36)		(-1.11)	
Dummy (Underpricing)			0.086***		0.036*			0.052***		0.029*
			(4.11)		(1.79)			(3.41)		(1.90)
Dummy (Overpricing)			-0.053		0.018			-0.042*		-0.014
			(-1.64)		(0.57)			(-1.83)		(-0.62)
Sentiment				2.061***	-0.111***				0.877***	-0.074***
				(13.51)	(-3.64)				(8.19)	(-3.10)
Overpricing × Sentiment				-5.033***					-2.197***	
				(-14.65)					(-9.08)	
Dummy (Underpricing) × Sentiment					0.251***					0.115***
					(8.14)					(5.29)
Dummy (Overpricing) × Sentiment					-0.439***					-0.178***
					(-8.88)					(-5.24)
Active Share		0.465***	0.431***	0.490***	0.449***		0.117	0.089	0.128*	0.096
		(4.72)	(4.49)	(5.11)	(4.80)		(1.63)	(1.26)	(1.81)	(1.37)
TR^2		-0.016**	-0.017**	-0.000	-0.006		-0.017***	-0.018***	-0.011**	-0.014***
		(-2.04)	(-2.22)	(-0.07)	(-0.79)		(-3.21)	(-3.42)	(-2.03)	(-2.59)
ICI		0.257	0.205	0.327	0.274		-0.393*	-0.429*	-0.362	-0.400*
		(0.80)	(0.63)	(1.05)	(0.88)		(-1.70)	(-1.86)	(-1.59)	(-1.75)
Return Gap		-0.069***	-0.070***	-0.060**	-0.061**		-0.011	-0.013	-0.007	-0.009
		(-2.69)	(-2.74)	(-2.36)	(-2.40)		(-0.60)	(-0.68)	(-0.39)	(-0.47)
Tracking Error		-0.034***	-0.034***	-0.013	-0.021*		-0.023***	-0.023***	-0.014*	-0.017**
		(-2.60)	(-2.60)	(-1.05)	(-1.70)		(-2.96)	(-2.92)	(-1.80)	(-2.28)
Lag (Fund Flow)	-0.022***	-0.024***	-0.024***	-0.025***	-0.024***	-0.007***	-0.008***	-0.008***	-0.009***	-0.008***
	(-11.02)	(-10.71)	(-10.64)	(-10.86)	(-10.72)	(-5.17)	(-5.24)	(-5.17)	(-5.37)	(-5.25)
Log (Fund TNA)	-0.194***	-0.211***	-0.213***	-0.209***	-0.209***	-0.128***	-0.136***	-0.138***	-0.135***	-0.136***
	(-19.69)	(-18.49)	(-18.74)	(-18.88)	(-18.98)	(-16.93)	(-15.81)	(-16.19)	(-15.95)	(-16.21)
Expense Ratio	-0.019	-0.020	-0.021	-0.029	-0.030	-0.022	-0.033	-0.033	-0.037	-0.037
	(-0.56)	(-0.49)	(-0.53)	(-0.73)	(-0.75)	(-0.89)	(-1.14)	(-1.15)	(-1.28)	(-1.29)
Turnover	0.015	0.011	0.011	0.020	0.016	-0.001	-0.003	-0.003	0.001	-0.001
	(1.02)	(0.63)	(0.64)	(1.19)	(0.95)	(-0.10)	(-0.28)	(-0.29)	(0.06)	(-0.11)
Log (Fund Age)	0.032	0.035	0.033	0.014	0.021	0.004	0.008	0.006	-0.002	0.001
	(1.26)	(1.19)	(1.10)	(0.44)	(0.68)	(0.23)	(0.40)	(0.31)	(-0.08)	(0.04)
Log (Manager Tenure)	-0.009	-0.013	-0.013	-0.013	-0.016	-0.014*	-0.016*	-0.016*	-0.016*	-0.017*
	(-0.96)	(-1.18)	(-1.19)	(-1.19)	(-1.41)	(-1.79)	(-1.85)	(-1.85)	(-1.85)	(-1.95)
Log (Stock Illiquidity)	0.086***	0.077***	0.076***	0.067***	0.070***	0.027***	0.027***	0.026***	0.023***	0.023***
	(10.54)	(8.02)	(7.87)	(7.08)	(7.34)	(4.63)	(3.99)	(3.78)	(3.37)	(3.41)
R-squared	0.063	0.071	0.071	0.090	0.085	0.047	0.053	0.053	0.061	0.058
Obs	19,949	16,801	16,801	16,801	16,801	19,949	16,801	16,801	16,801	16,801

Table IA5: Robustness Checks on Overpricing and Mutual Fund Flow (Annual)

This table presents the results of the following annual panel regressions with year and fund fixed effects and their corresponding t-statistics with standard errors clustered at the fund level,
$Flow_{f,t} = \alpha_0 + \beta_1 Overpricing_{f,t-1} + \beta_2 Sentiment_{t-1} + \beta_3 Overpricing_{f,t-1} \times Sentiment_{t-1} + \beta_4 Perf_{t-1} + cM_{f,t-1} + e_{f,t}$, where $Flow_{f,t}$ refers to the average monthly flow of fund f in year t, $Overpricing_{f,t-1}$ is the average quarterly overpricing level, $Sentiment_{t-1}$ is the average monthly Baker and Wurgler (2007) market sentiment index, $Perf_{f,t-1}$ is the average monthly fund return, and the vector M stacks all other control variables, including the Active Share, (logistic transformation of) R-square, Industry Concentration Index, Return Gap, Tracking Error, Log(Fund TNA), Expense Ratio, Turnover, Log(Fund Age) and Log(Manager Tenure). $Overpricing_{f,t-1}$ can be further replaced with two dummy variables, $Dummy(Underpricing)_{f,t-1}$ (takes a value of one if the $Overpricing_{f,t-1}$ is in the bottom decile across all funds in that year and zero otherwise) and $Dummy(Overpricing)_{f,t-1}$ (takes a value of one if the $Overpricing_{f,t-1}$ is in the top decile across all funds in that year and zero otherwise). Appendix A provides detailed definitions for each variable. Numbers with "*", "**", and "***" are significant at the 10%, 5%, and 1% levels, respectively.

Fund Flow (in %) Regressed on Lagged Overpricing						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	3.131***	4.442***	2.235**	3.505***	5.566***	6.939***
	(3.90)	(6.79)	(2.44)	(4.34)	(6.10)	(8.36)
Overpricing	2.783***		3.145***		3.602***	
	(2.83)		(2.87)		(3.24)	
Dummy (Underpricing)		-0.159**		-0.116		-0.194**
		(-2.07)		(-1.41)		(-2.31)
Dummy (Overpricing)		0.086		0.111		0.123
		(0.89)		(1.09)		(1.18)
Sentiment					0.533	-0.465***
					(1.17)	(-4.81)
Overpricing × Sentiment					-2.255**	
					(-2.18)	
Dummy (Underpricing) × Sentiment						0.408***
						(3.39)
Dummy (Overpricing) × Sentiment						-0.094
						(-0.77)
Active Share			0.659*	0.833**	0.660*	0.813**
			(1.68)	(2.17)	(1.69)	(2.11)
TR^2			0.080***	0.085***	0.087***	0.090***
			(2.73)	(2.87)	(2.92)	(3.04)
ICI			-1.249	-1.066	-1.214	-1.020
			(-1.34)	(-1.15)	(-1.30)	(-1.10)
Return Gap			-0.029	-0.016	-0.024	-0.009
			(-0.42)	(-0.23)	(-0.34)	(-0.13)
Tracking Error			-0.016	-0.015	-0.007	-0.011
			(-0.53)	(-0.51)	(-0.22)	(-0.35)
Fund $Return_{t-1}$	0.529***	0.520***	0.574***	0.564***	0.569***	0.558***
	(20.53)	(20.71)	(20.77)	(21.03)	(20.70)	(20.96)
Fund $Return_{t-2}$	0.513***	0.512***	0.526***	0.525***	0.527***	0.524***
	(21.51)	(21.54)	(21.06)	(21.09)	(21.05)	(21.05)
Log (Fund TNA)	-1.060***	-1.057***	-1.106***	-1.098***	-1.105***	-1.096***
	(-22.11)	(-22.12)	(-20.53)	(-20.55)	(-20.51)	(-20.56)
Expense Ratio	-0.064	-0.059	-0.118	-0.117	-0.123	-0.125
	(-0.40)	(-0.37)	(-0.68)	(-0.67)	(-0.70)	(-0.71)
Turnover	0.047	0.048	-0.022	-0.019	-0.018	-0.014
	(0.71)	(0.72)	(-0.34)	(-0.29)	(-0.27)	(-0.21)
Log (Fund Age)	-0.759***	-0.756***	-0.732***	-0.724***	-0.742***	-0.736***
	(-5.96)	(-5.93)	(-5.25)	(-5.19)	(-5.29)	(-5.25)
Log (Manager Tenure)	0.102**	0.103**	0.081*	0.079*	0.081*	0.081*
	(2.39)	(2.42)	(1.80)	(1.77)	(1.80)	(1.80)
R-squared	0.219	0.219	0.239	0.239	0.239	0.239
Obs	19,949	19,949	16,801	16,801	16,801	16,801