Is Change of Style Evidence of Skill?

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Abstract

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Keywords: Mutual fund style; Active style change; Skilled managers; Agency conflict; Fund performance; Fund flows

JEL Classification: G11, G02, G23

I. Introduction

As the number of mutual funds increases constantly over time, style classification becomes ever important.[1] By classifying funds based on their investment objectives, it greatly simplifies the fund selection process for investors. More importantly, style classification creates a peer group of funds and helps evaluate the relative performance of fund managers (Brown and Goetzmann, 1997; Chan, Chen, and Lakonishok, 2002; Barberis and Shleifer, 2003; Teo and Woo, 2004). Not surprisingly, fund rating companies, such as Morningstar and Lipper Analytical Services, have devoted considerable amount of resources in categorizing mutual funds to specific styles (Del Guercio and Tkac, 2008). The literature finds that mutual funds overall consistently follow certain investment styles (Chan, Chen, and Lakonishok, 2002; Hunter, Kandel, Kandel, and Wermers, 2014). Nevertheless, one common finding documented in the literature is that funds with poor past performance are more likely to change styles (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997; Chan, Chen, and Lakonishok, 2002; Lynch and Musto, 2003). For instance, Chan, Chen, and Lakonishok (2002) find evidence that poorly performing funds changes styles due to agency and behavioral issues. Lynch and Musto (2003) argue that underperforming funds tend to abandon their existing investment strategies and switch to other styles. In addition, Brown, Harlow, and Starks (1996) and Chevalier and Ellison (1997) document that managers of poorly performing funds tend to increase the level of portfolio risk.

The main research questions of our study are as follows. First, do mutual funds actively change their style by either decreasing portfolio exposure to existing benchmark, i.e., style-attenuating or increasing portfolio exposure to existing benchmark, i.e., style-intensifying? Second, if so, what motivates a fund to actively deviate from their existing style? In particular, what motivates fund

[1] Despite the growth of ETFs over the past decades, mutual fund remains an important investment vehicle for U.S. households. According to Investment Company Institute Fact Book, an estimated 94 million individual investors (44% of all U.S. households) owned mutual funds in 2016 and $4.6 trillion is invested in the actively managed mutual funds.

managers to attenuate their portfolio exposure to existing benchmark or intensify their portfolio exposure to existing benchmark? Specifically, do funds managers actively change their styles because they possess the skill of identifying new investment opportunities outside of the existing benchmark or because of agency related concerns? Third, related to the above competing hypotheses, what are the consequences of active style changes in terms of future fund performance and future fund flows? Finally, we are interested in how funds trade to actively change their style.

The data used in this study includes the CRSP Survivor-Bias-Free U.S. Mutual Fund Database and Thomson-Reuters Mutual Fund Holdings Data. The CRSP database contains information on monthly returns and fund characteristics. The Thomson-Reuters database provides quarterly portfolio holdings for U.S. domestic equity mutual funds. We focus our analysis on actively managed domestic equity mutual funds with reliable holdings data. Our sample period is from 1984 to 2014. We measure fund style change as the change of exposure to certain benchmarks, namely size, value, and momentum, at the end of quarter *t* from the end of quarter *t*-4. As a robustness check, we also measure fund style change as the change of fund exposure to size, value, and momentum at the end of quarter *t* from average style exposure over the previous four quarters and confirm that our results are consistent. Then we decompose style change to passive and active components based on changes of portfolio holdings. This procedure allows us to focus on active change of style for a fund. Moreover, to analyze fund active change of style in multiple dimensions, we construct a composite measure of active style change as the sum of active changes in size, value, and momentum styles.

Our results show that fund managers actively change their styles by decreasing or increasing exposures to existing benchmarks. We refer to funds that decrease style exposure to their existing benchmark as style-attenuating and funds that increase style exposure to their existing benchmark as style-intensifying. In addition, we find that style-changing funds are smaller and have higher expense ratio, turnover, return volatility and flow volatility. Consistent with findings in the literature, we find

that style-changing funds on average have poor past performance. Specifically, the difference in risk-adjusted performance (four-factor alpha) between style-changing funds and those with no significant style change is significantly negative. However, when we differentiate style-changing funds into style-attenuating and style-intensifying funds, we observe significant differences in past performance and flow characteristics between these samples of funds. Specifically, relative to funds with no significant change of existing style, style-attenuating funds have modest past performance and net investor inflows. In sharp contrast, style-intensifying funds are mainly motivated by poor past performance and significant net outflows. These results suggest that the ultimate motivation of active style change could be different between style-attenuating and style-intensifying funds.

We then examine the performance of funds that actively change style. Due to limited investment opportunities and trading costs associated with liquidity or price impact, fund managers, particularly those with net investor inflow, could not optimally invest in the existing stocks holdings in their portfolios (Chen, Hong, Huang, and Kubik, 2004). As a result, skilled managers are likely to actively change their portfolios and expand to investment opportunities in new styles (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013), leading to style-attenuating. On the other hand, facing poor performance and net outflows, managers may also deviate from their existing styles due to agency conflict or other reasons, e.g., litigation risk (Lakonishok, Shleifer, Thaler, and Vishny, 1991; Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997; He, Ng, and Wang, 2004; Ng and Wang, 2004; Agarwal, Gay, and Ling, 2014). In such cases, managers may increase risk exposures of their existing styles, leading to style-intensifying (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997). Consistent with skilled-manager hypothesis, we find that style-attenuating funds subsequently outperform their peers and attract investor flows. On the other hand, consistent with agency-conflict hypothesis, style-intensifying funds subsequently perform poorly and experience net outflow. Specifically, the results based on panel regressions show that for style-attenuating funds, there is a significantly positive relation between active style change measure and subsequent fund performance (i.e., abnormal returns based on the four-factor model of Carhart (1997)). In contrast, this relation is

significantly negative for style-intensifying funds. Moreover, our portfolio analysis shows that style-attenuating funds (style-intensifying funds) significantly outperform (underperform) funds with no significant style change by a quarterly four-factor alpha of 0.54% (0.88%). Similarly, future fund flow is positively (negatively) associated with active style measure for style-attenuating (style-intensifying) funds. Our additional analysis also finds a significant persistence in $\mathrm{ASC}^{\mathrm{SVM}}$ measure over time, particularly stronger over short horizons from one to two quarters after portfolio formation period. In addition, we show that our results are not driven by flow-related trades by mutual fund managers or change in fund managers.

Our study is related to the literature on active fund management (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013). These studies show that find that funds that deviate from their passive benchmarks perform better. The key difference of our study from these studies is that we focus on the deviation of fund portfolio from its existing style, rather than from passive benchmark. In addition, previous literature show that fund managers strategically increase portfolio risk or exposure to systematic risk to attract additional fund flows (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997; Koski and Pontiff, 1999; Basak, Pavlova, and Shapino, 2007; Huang, Sialm, and Zhang, 2008). Our study differs from these studies in that we focus on active change of fund style in size, value, and momentum dimensions, rather than change in portfolio risk or systematic risk exposure. We show that our results are robust to controlling for the effects of active fund management and change in portfolio exposure to systematic risk using measures constructed in the literature (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013; Huang, Sialm, and Zhang; 2011). Moreover, we shed new light on a contentiously debated issue in the mutual fund literature, i.e., whether previous return performance motivates fund managers to change risk-taking behavior. Specifically, Brown, Harlow, and Starks (1996) document that fund managers increase the volatility of their portfolio in the second half of the year when they underperform in the first half. On the hand, a number of studies challenge these findings (Busse, 2001; Kempf, Ruenzi, and Thiele, 2009; Elton, Gruber, Blake, Krasny, and Ozelge, 2010). We further measure active style change as the change of exposure to size, value, and momentum during the

second-half relative to first-half to calendar year and find that underperforming managers during the first-half of the calendar year are more likely increase their risk exposures to their existing benchmarks over the second-half of the year.

Finally, we examine fund transactions, both purchases and sales, to better understand the differences in economic motivation and underlying mechanism for style-attenuating and style-intensifying funds. This analysis reveals significant differences in stock selection skills between these funds. Specifically, relative to funds with no significant change of style, our results show that style-attenuating funds exhibit superior stock picking ability. This finding provides additional support on the skilled-manager hypothesis. On the other hand, we find no stock selection ability for style-intensifying funds. Moreover, we find that style-intensifying funds also exhibit behavioral biases, i.e., the disposition effect. That is, relative to style-attenuating funds and funds with no significant change of style, style-intensifying funds have strong tendency to sell winners in their portfolios. Finally, previous literature shows that due to career concern, low-skilled fund managers are more likely to herd with other funds or mimic the strategies of winning funds (Scharfstein and Stein, 1990; Lakonishok, Shleifer, Thaler, and Vishny, 1991; He, Ng, and Wang, 2004; Ng and Wang, 2004; Agarwal, Gay, and Ling, 2014; Avery and Chevalier, 1999). To sharpen our inference on skilled-manager versus agency-conflict hypotheses, we further investigate ownership characteristics of stocks purchased and sold by style-attenuating and style-intensifying funds. We show that style-attenuating funds sell stocks largely held by their peers, including those winning funds, in the same style. This finding suggests that portfolio holdings of style-attenuating funds also deviate from their peers and the winning funds in the same style. In contrast, style-intensifying funds exhibit tendency to follow the crowd, namely their peer funds and the winning funds of the same style. Specifically, style-intensifying funds tend to buy stocks that are largely held by all funds, their peer as well the winning funds of the same style. These results provide supporting evidence that agency related issues are the main motivation for style-intensifying funds.

Our study contributes to several strands of literature. First, different from existing studies (Chan, Chen, and Lakonishok, 2002; Lynch and Musto, 2003), we distinguish style change due to active

and passive trades by mutual fund managers. We show evidence that mutual funds actively deviate from their existing styles. Second, unlike earlier studies that focus on style change in portfolio holdings (Wermers, 2012; Brown, Harlow, and Zhang, 2015), we separate funds into those that decrease style exposure to their existing style benchmark, i.e., style-attenuating, and those that increase style exposure to their existing style benchmark, i.e., style-intensifying. The literature shows that funds with poor past performance are more likely to change their style (Chan, Chen, and Lakonishok, 2002; Lynch and Musto, 2003; Hunter, Kandel, Kandel, and Wermers, 2014). Our results reveal stark contrast in motivations and consequences for style-attenuating funds and style-intensifying funds. Third, our study is related to the literature on active fund management (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013) and risk shifting of mutual funds (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997; Koski and Pontiff, 1999; Basak, Pavlova, and Shapino, 2007; Huang, Sialm, and Zhang, 2011). Corroborating with the literature on active portfolio management, our results show that skilled fund managers tend to adopt more active strategies by deviating from passive benchmarks. Consistent with the risk-shifting literature, our results show that due to agency related issues, funds with poor past performance are more likely to increase their portfolio exposures to systematic risk factors. Finally, our study adds to the literature on style timing (Barberis and Shleifer, 2003; Wermers, 2012; Frijns, Gilbert, and Zwinkels, 2016). Previous literature also shows the potential benefits of style timing (Grundy and Martin, 2001; Lucas, van Dijk, Kloek, 2002; Chen and De Bondt, 2004). Again, different from the style-timing literature, our study focuses on whether fund managers tilt their portfolios with more or less exposures to existing benchmarks.

The rest of the paper is organized as follows. Section II describes the mutual fund data and active style change measures used in our analysis. Sections III presents main empirical results. Section IV performs robustness checks and further analysis. Section V concludes.

II. Data and Methodology

A. Data

In our empirical analysis, we combine two mutual fund databases; the CRSP mutual fund dataset (hereafter CRSP) and Thomson-Reuters holdings database. The CRSP mutual fund database includes information on monthly returns and fund characteristics such as total net assets, the expense ratio, inception date, and the turnover ratio for all U.S.-based mutual funds. The Thomson database provides quarterly or semiannual information on portfolio holdings for equity mutual funds investing in the U.S. market.[2]

We match funds in the two databases by fund names and ticker symbols, following the procedure in Wermers (2000). We focus our analysis on actively managed domestic equity mutual funds for which the holdings data are most complete and reliable. Therefore we eliminate balanced, bond, money market, international, and index funds.[3] We also exclude funds that in the previous month manage less than $15 million or the total market value of reported holdings is under 80% or over 105% of the total net assets. For funds with multiple share classes, we compute fund-level variables by aggregating across the different share classes. Specifically, we calculate the returns of a multi-class fund as the weighted-average returns across share classes, using total net assets as the weight. All other variables are similarly calculated.

B. Active Style Change Measures

[2] The Thomson database is based on mandatory and voluntary fund holding disclosures. Prior to 2004, mutual funds were required to disclose their holdings semiannually; many funds voluntarily disclosed their holdings quarterly. The SEC increased the mandatory disclosure frequency from semiannual to quarterly effective May 2004.

[3] Following Huang, Sialm, and Zhang (2011), we select funds with the following Lipper objectives: CA, CG, CS, EI, FS, G, GI, H, ID, LCCE, LCGE, LCVE, MC, MCCE, MCGE, MCVE, MLCE, MLGE, MLVE, MR, NR, S, SCCE, SCGE, SCVE, SG, SP, TK, TL, UT. If a fund does not have any of the above objectives, we select funds with the following Strategic Insights objectives: AGG, ENV, FIN, GMC, GRI, GRO, HLT, ING, NTR, SCG, SEC, TEC, UTI, GLD, RLE. If a fund has neither the Lipper nor the SI objective, then we use the Wiesenberger Fund Type Code to select funds with the following objectives: G, G-I, G-S, GCI, IEQ, ENR, FIN, GRI, HLT, LTG, MCG, SCG, TCH, UTL, GPM. If none of these objectives are available and the fund has a CS policy or holds more than 80% of its value in common shares, then the fund will be included. Index funds are identified based on their names. We also manually remove from our sample the index funds that are misclassified as active domestic funds.

In this study we rely on mutual fund portfolio holdings to measure change in mutual fund style for two important reasons. First, in contrast to self-reported investment styles or the return-based measures, holdings-based style measures use only ex ante information on portfolio holdings.[4] Previous studies show that funds' self-reported investment styles (i.e., self-classification) do not necessarily represent actual style based on the current portfolio holdings (Brown and Goetzmann, 1997; Cooper, Gulen, and Rau, 2005; Sensoy, 2009). Chan, Chen, and Lakonishok (2002) find style categorization based on portfolio holdings (i.e., the holdings-based fund classification) more closely matches subsequent fund performance than return-based fund classification that rely on ex post realized return to estimate style change. Second, more importantly, unlike return-based style measures, holding-based approach allows us to differentiate active and passive components of style change in fund portfolio.

Previous studies show that size and value are widely used in the financial industry to classify variety of mutual funds (Brown and Goetzmann, 1997; Chan, Chen, and Lakonishok, 2002; Busse and Tong, 2012). In addition, literature finds that momentum strategies are widespread among fund managers (Grinblatt and Titman, 1989, 1993; Barroso and Santa-Clara, 2015). Following these studies, we measure fund style change as the change of exposure to certain benchmarks, namely size, value, and momentum, at the end of quarter *t* from the end of quarter *t*-4.[5] Specifically, for each stock *i* held in a particular portfolio *p* at the end of the quarter *t*, we estimate the Carhart (1997) four-factor model:

$$r_{i,t} = \alpha_{i,t} + \sum \hat{\beta}^{f}_{i,t} f_t + \varepsilon \qquad (1)$$

[4] Previous studies use portfolio holdings to evaluate fund performance and find that performance measures based on portfolio holdings are more powerful in detecting mutual fund stock selection ability (Grinblatt and Titman, 1989; 1993; Grinblatt, Titman, and Wermers, 1995; Daniel, Grinblatt, Ttman, and Wermers, 1997; Wemers, 1999; 2000; 2004)

[5] As a robustness check, we also measure fund style change as the change of fund exposure to size, value, and momentum at the end of quarter *t* from average style exposure over the previous four quarters and confirm that our results are consistent

where $r_{i,t}$ is the return of stock *i* excess of T-bill rate. $\mathrm{f_t}$ is market return excess of T-bill (MKTRF) and the returns on a zero investment factor mimicking portfolios for size (SMB), book-to-market (HML), and momentum (UMD). $\hat{\beta}^{\mathrm{f}}_{\mathrm{i,t}}$ is estimated beta of stock *i* at the end of quarter *t* (loadings on MKTRF, SMB, HML, and UMD). We estimate the four-factor model from the preceding 36 monthly stock returns with a minimum of 30 monthly return observations. Based on the beta estimates ($\hat{\beta}^{\mathrm{f}}_{\mathrm{i,t}}$) for each style dimension *f* and each stock *i* held by mutual fund portfolio *p*, we compute the portfolio beta as follows;

$$\hat{\beta}^{\mathrm{f,p}}_{\mathrm{t}} = \sum_{\mathrm{i=1}}^{\mathrm{N_t}} \mathrm{w_{i,t}} \hat{\beta}^{\mathrm{f}}_{\mathrm{i,t}} \tag{2}$$

where $w_{i,t}$ is the portfolio weight of stock *i* at the end of quarter *t*. $\hat{\beta}^{\mathrm{f}}_{\mathrm{i,t}}$ is the beta estimate of stock *i* on factor *f*. Finally, we define style change in a particular style *f* ($\mathrm{SC^f}$) as the deviation of fund's current style *f* at the end of quarter *t* from its past style *f* at the end of quarter *t* – 4.

$$\mathrm{SC^f_t} = \hat{\beta}^{\mathrm{f,p}}_{\mathrm{t}} - \hat{\beta}^{\mathrm{f,p}}_{\mathrm{t-4}} = \sum_{\mathrm{i=1}}^{\mathrm{N_t}} \mathrm{w_{i,t}} \hat{\beta}^{\mathrm{f}}_{\mathrm{i,t}} - \sum_{\mathrm{i=1}}^{\mathrm{N_{t-4}}} \mathrm{w_{i,t-4}} \hat{\beta}^{\mathrm{f}}_{\mathrm{i,t-4}} \tag{3}$$

Further decomposing Eq. (3), we are able to identify two main components of style change of a mutual fund in Eq, (4):

$$\mathrm{SC^f_t} = \sum_{\mathrm{i=1}}^{\mathrm{N_{t/t-4}}} (\mathrm{w_{i,t}} - \mathrm{w_{i,t-4}}) \hat{\beta}^{\mathrm{f}}_{\mathrm{i,t}} + \sum_{\mathrm{i=1}}^{\mathrm{N_{t/t-4}}} \mathrm{w_{i,t-4}} (\hat{\beta}^{\mathrm{f}}_{\mathrm{i,t}} - \hat{\beta}^{\mathrm{f}}_{\mathrm{i,t-4}}) \tag{4}$$

The decomposition in Eq. (4) suggests that style change could be due to the change in portfolio weight of stock *i* portfolio holdings and/or the change in stock beta over time. $\mathrm{N_{t/t-4}}$ refers to joint portfolio holdings of a fund in quarter *t* and *t*-4 in Eq. (4). Note that the portfolio weight of stock *i* could also change due to relative change stock price in the portfolio, as a result, it does not necessarily imply

fund manager's active trades. Thus, to disentangle style change measure (SC^f) into active and passive components, we measure the passively implied weight at the end of quarter *t* as:

$$\widetilde{w}_{i,t} = \frac{(1 + R_{i,[t-4,t]})w_{i,t-4}}{\sum_{i=1}^{N^*_{t/t-4}}(1 + R_{i,[t-4,t]})w_{i,t-4}} \quad (5)$$

where $R_{i,[t-\tau,t]}$ be the holding period return of stock *i* over [*t* – 4 , *t*]. Then, $\widetilde{w}_{i,t}$ is the passive portfolio weight of stock *i*, if fund manager simply buy and hold stock *i* from quarter *t*-4 to *t*. As a result, we can further introduce this passive change in portfolio weight in Eq. (4):

$$= \sum_{i=1}^{N_{t/t-4}} (w_{i,t} - w_{i,t-4})\hat{\beta}^f_{i,t} + \sum_{i=1}^{N_{t/t-4}} (w_{i,t} - w_{i,t-4})\hat{\beta}^f_{i,t} + \sum_{i=1}^{N_{t/t-4}} w_{i,t-4}(\hat{\beta}^f_{i,t} - \hat{\beta}^f_{i,t-4}) \quad (6)$$

As shown in Eq. (6), the first term of this decomposition, denoted as ASC^f_t, measures the fund manager's active trades of portfolio holdings in style dimension *f* from quarter *t* – 4 to quarter *t*. On the other hand, second and third term capture, respectively, the passive change in the portfolio weight and the passive change in certain style loading of the existing holdings over time. In this study we investigate the motivation and performance/flow consequences of active style change of mutual funds and use ASC^f_t as our main variables. As a robustness check, we also measure fund style change as the change of fund exposure to size, value, and momentum at the end of quarter *t* from average style exposure over the previous four quarters and confirm that our results are consistent. Active Style Change measure captures a fund to actively deviate from their existing style in three dimensions: size (ASC^S), value (ASC^V), or momentum (ASC^M). Finally, to analyze active change of fund style in multiple dimensions, we construct a composite measure of active style change as the sum of active changes in size, value, and momentum styles as;

$$ASC^{SVM} = ASC^S + ASC^V + ASC^M \quad (7)$$

This approach is similar to one used in Wermers (2012). He uses portfolio holdings and categorize fund into size, value, and momentum based on characterstic benchmarks (a 5x5x5 sorts into size, value, and momentum characteristics) by Daniel, Grinblatt, Titman and Wermers (1997) (DGTW). He further develops a non-parametric fund style drift measure as the absolute difference in funds' style ranking over time and sums these absolute differences across size, value, and momentum style dimensions. Similarly, based on DGTW style characteristics, Brown, Harlow, and Zhang (2015) also assess the volatility of style characteristics over time.

C. Summary Statistics

Table 1 provides the summary statistics of mutual fund characteristics and our active style measures in our sample from 1984 to 2014. In Panel A, for each fund characteristics, we calculate the time series average of cross-sectional mean and median. Our sample includes 3,202 distinct funds with the average number of 905 funds per quarter. The mean portfolio size measured as TNA and fund age measured as the difference in years between current date and the date the fund was first offered are $1,021 million and 17 years, respectively. The average annual expense ratio is 1.22%. The average portfolio turnover is about 84%, implying that the average holding period of a stock is 1.2 years. The mean family size measured as the sum of the TNA under management by the fund family is $45,003. The fund return (net of fees and expenses), on average, is 0.88%. The mean fund return volatility measured as the standard deviation of monthly fund return over the prior twelve-month is 4.89%. The average monthly fund flow measured as $\mathrm{FLOW}_{i,t} = (\mathrm{TNA}_{i,t} - \mathrm{TNA}_{i,t-1} \times (1 + \mathrm{r}_{i,t}))/\mathrm{TNA}_{i,t-1}$ is 0.38%. Since estimated fund flows are very volatile due to mutual fund mergers and splits in CRSP mutual fund database (Elton, Gruber, and Blake, 2001), we winsorize both the top and the bottom tails of the distribution at the 1% level. Finally, the mean fund flow volatility, measured as the standard deviation of monthly fund flow over the prior twelve-month, is 3.89%.

[Table 1 about here]

Panel B reports the summary statistics of our active style change measures. We find that while mutual funds, on average, increase their existing exposure to size and value styles, they decrease their exposure to momentum. Specifically, the average active style change in size and value style is 0.005 and 0.013, respectively. On the other hand, the average active style change in momentum is -0.006. Moreover, the composite active style change measure based on size, value, momentum styles is 0.012. In Panel B we also report the time-series correlation between our active style measures. As shown at right hand side of Panel B, we find a weak correlation between active style measures based on size, value, and momentum. For example, the average correlation between active style change in size and value (momentum) is about 0.065 (-0.127) and value and momentum is 0.047. More importantly, our composite style change measure is highly correlated with each of our active style change measures with strongest (weakest) correlation with value (momentum). Specifically, the correlation coefficient between our composite active style change measure and, respectively, active style change in size, value, and momentum is 0.536, 0.757, and 0.327. This finding suggests that the composite active style change measure captures active style change of fund in each style dimensions.

III. Main Empirical Analyses

A. Active Style Change by Mutual Funds

We begin our empirical analysis by examining whether mutual funds actively change their style. Table 2 reports the time-series averages of cross-sectional means of style change (SC^{f}) and active style change measure ($\mathrm{ASC}^{\mathrm{f}}$) of funds sorted on their past benchmarks in size (β^{S}), value (β^{V}), and momentum (β^{M}) styles in Panel A, B, and C. Panel D reports the results sorted based on past composite style (β^{SVM}). Past style benchmarks of funds are based on the beta estimates for each stock held by each mutual fund as in Eq. (2) at the end of quarter $t-4$. In addition, Table 2 reports the *p*-values of the *F*-

test of the joint hypothesis that style change (SC^f) and active style change (ASC^f) are equal to zero for all quintiles based on size (β^S), value (β^V), momentum (β^M) style dimensions, and past composite style (β^{SVM}).

Table 2 shows that fund managers actively change their styles by decreasing or increasing exposures to existing benchmarks. Specifically, in each style dimensions, we reject the joint hypothesis that style change (SC^f) and active style change (ASC^f) measures on size, value, and momentum equal to zero for all quintiles in Panel A, B, and C. More importantly, we find that fund managers actively change their style by either decreasing or increasing portfolio exposure to existing benchmarks. We refer to funds that decrease style exposure to their existing benchmark as style-attenuating and funds that increase style exposure to their existing benchmark as style-intensifying. Furthermore, active style change is an important component that explains variation in style change of mutual funds, and is particularly stronger for size and value style dimensions. For example, for funds sorted based on their past size style (β^S), the average active style change, ASC^S, is 0.04 (-0.05) relative to the average style change, SC^S, of 0.06 (-0.07) in the bottom (top) quintile. Similarly, for the bottom (top) quintile portfolios sorted on past value style (β^V), active style change, ASC^V, is 0.09 (-0.05) relative to style change, SC^V, of 0.11 (-0.09). Finally, active style change in momentum, ASC^M, is 0.02 relative to style change (SC^M) of 0.09 in the bottom quintile and -0.04 relative to -0.10 in the top quintile based on momentum style (β^M). This finding suggests that relative to change in size and value styles of mutual funds, change in momentum style is mainly driven by passive component of style change.

[Table 2 about here]

Finally, the results based on composite past style (β^{SVM}) in Panel D, measured as sum of past style loadings of size, value, and momentum, confirm that fund managers actively decrease (i.e., style-attenuating) or increase portfolio exposure to existing benchmarks (i.e., style-intensifying). Panel D also reports the difference between future and past R^2 of our sample of funds. Past (Future) R^2 is the proportion of the fund return variance that is explained by the variation in four-factor model of Carhart

(1997) over the previous (following) 12-month at the end of quarter $t-4$ (quarter t). We find decrease in R^2 for style-attenuating funds and increase of R^2 for the style-intensifying funds. While we are unable to reject the joint hypothesis that the difference in future and past R^2 (ΔR^2) equal to zero for all quintiles, these findings suggest that style-attenuating funds are also deviating from the multifactor benchmark model of Carhart (1997) in the future. On the other hand, style-intensifying funds, even they deviate from their existing style exposures, are more closely mimicking the multifactor benchmark model of Carhart (1997) in the future.

B. Active Style Change and Fund Characteristics

In the previous section, we establish that mutual fund managers actively change their existing portfolio style. This section further investigates the underlying motivations why a fund actively deviate from their existing style. In particular, we explore similarities and differences in the motivations for funds that decrease portfolio exposures (style-attenuating) and funds that increase portfolio exposures to their existing benchmark (style-intensifying). Table 3 reports the average characteristics of mutual funds sorted into five quintiles according to their composite active style change measure (ASC^{SVM}).

Panel A presents fund characteristics, described in Section II.C., including; size (Log(TNA)), fund age (Log(Age)), expense ratio, portfolio turnover, monthly fund return and flow volatility (Ret. Vol. and Flow Vol.). As shown in Panel A, relative to style-intensifying funds, style-attenuating funds are younger, belong to larger fund families, have higher expense ratio, and exhibit higher flow volatility. Panel A also highlights that most fund characteristics exhibit a U or inverse-U pattern, which indicates that style-attenuating and style-intensifying funds share similar characteristics. Relative to funds with no significant change of style, funds with smaller in size and younger funds are more likely to actively deviate from their existing style benchmarks. Since smaller funds trade smaller amounts, as a result lower trading costs associated with liquidity or price impact, these funds have more flexibility to actively change their style (Berk and Green, 2004; Chen, Hong, Huang, and Kubik, 2004; Frijns, Gilbert, and Zwinkels, 2016; Pastor, Stambaugh, and Taylor, 2017). Previous literature shows that investors are

willing to pay more for active fund managers (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013, Kacpercyzk, Sialm, and Zheng, 2005). On the other hand, Gil-Bazo and Ruiz-Verdu (2009) find funds with high expenses mainly target unsophisticated investors. Our results show that style-changing funds charge higher expense ratio than funds with no significant style change (i.e., control funds). Not surprisingly, relative to control funds, both style-attenuating and style-intensifying funds exhibit significantly higher portfolio turnover, suggesting that these funds engage in frequent trading. As investors infer unobservable managerial ability from past fund performance, volatile fund returns provide a noisier signal of fund managers' investment skill (Berk and Green, 2004; Huang, Wei, and Yan, 2007). In addition, higher flow volatility can impose a substantial indirect cost on fund investors due to liquidity related trades, and have a negative impact on future fund performance (Edelen, 1999; Rakowski, 2010). We find that style-changing funds exhibit significantly higher fund return volatility and fund flow volatility than funds with no significant change of style. This finding suggests that these undesirable features motivates funds to actively deviate style exposures to their existing benchmark.

[Table 3 about here]

Panel B of Table 3 reports past fund return, risk-adjusted performance and flow characteristics of mutual funds sorted on their composite active style measure ($\mathrm{ASC}^{\mathrm{SVM}}$). Past return is the cumulative return over the previous three- (six- or twelve-) month. Risk-adjusted performance ($\mathrm{Past}\ \alpha^{\mathrm{4F}}$) is cumulative abnormal returns (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) over the previous three- (six- or twelve-) month. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from prior 24-month estimation period by regressing each fund's excess return (over the T-bill rate) on the factors returns using the Carhart (1997) multifactor model. $\mathrm{Past\ Flow}^{\mathrm{Style}}$ is style-adjusted fund flow measured as fund flow excess average flow within fund's style for each month. Past Flow is prior three- (six- or twelve-) month normalized net flow into a fund and defined as $\left(\mathrm{TNA}_{i,t} - \mathrm{TNA}_{i,t-m}(1 + R_{t-1,t-m})\right)/\mathrm{TNA}_{i,t-m}$. Following Nanda,

Wang, and Zheng (2004), we classify funds into Small versus Large and Value versus Growth categories based on their past loadings obtained from the four-factor model.[6]

The literature shows that funds with poor past performance are more likely to change styles (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997; Chan, Chen, and Lakonishok, 2002; Lynch and Musto, 2003). Consistent with these studies, our results also show that poorly performing funds tend to deviate from their existing benchmarks. Specifically, Panel B compares past performance and flow characteristics for style-changing funds and funds with no significant style change. The difference in risk-adjusted performance between style-changing funds and funds with no style change is negative and statistically significant for previous six- and twelve-month in Panel B. On the other hand, we find no significant difference in past fund return and fund flow between style-changing funds and funds with no style change. More importantly, when we differentiate style-changing funds into style-attenuating and style-intensifying funds, Panel B highlights significant differences in past performance and flow characteristics between these funds. As reported in Panel B, the difference in past performance or past fund flow are positive and statistically significant between style-attenuating and style-intensifying funds. In addition, relative to funds with no significant change of style, style-attenuating funds realize modest past performance. For example, the difference in past risk-adjusted performance (Past α^{4F}) between these funds are 0.06% (t = 1.79) and 0.10% (t = 1.69) over the past three and six months. We also find that style-attenuating funds experience higher investor flow than funds with no significant change of style in the past. The difference in style-adjusted flow between style-attenuating funds and funds with no significant change of style is 0.32% (t = 2.12) and 0.95% (t = 3.99) over the past three- and six-month horizons. In sharp contrast, relative to funds with no significant style change, style-intensifying funds underperform and experience significant investor outflow. The relative underperformance of style-intensifying funds is particularly stronger for risk-adjusted performance

[6] In particular, each month, we group all funds into two groups based on the median level of SMB and HML loadings. Mutual funds ranked in the top half with the higher SMB (HML) loading are classified as Small- (Value-) Style and those ranked in the bottom half are classified as Large- (Growth-) Style. We then place funds into 2 x 2 Size/Value categories.

(Past α^{4F}), -0.14% (t = -2.18) over past three-month and -0.30% (t = -2.05) over the past six-month horizons. Similarly, the difference in style-adjusted past flow is significantly negative between style-intensifying funds and funds with no significant style change over three-, six-, and twelve-month horizons. These results suggest that the ultimate motivation of active style change could be different between style-attenuating and style-intensifying funds. It is also noteworthy that our results are consistent with literature on mutual fund tournaments. Specifically, Brown, Harlow, and Starks (1996) and Chevalier and Ellison (1997) document that managers of poorly performing funds tend to increase portfolio risk. Similarly, our results also indicate that funds with poor past performance and investor outflow tend to increase portfolio exposure to existing size, value, and momentum benchmarks. In Section IV.C we further investigate the relation between our findings and literature on mutual fund tournaments.

To provide further evidence similarities and differences for style-changing funds, style-attenuating, and style-intensifying funds, we extend our analysis and use the following multivariate logit regression:

$$\begin{aligned}\text{Prob}\left[\text{Style}-\text{Att.}_{i,t}\ \left(\text{Style}-\text{Int}_{I,t}\right)=1\right] = \Lambda(&\text{Intercept}_{I,t-1}+\beta_1\text{Log(TNA)}_{I,t-1}+\\ &\beta_2\text{Log(Age)}_{I,t-1}+\beta_3\text{Expenses}_{I,t-1}+\beta_4\,\text{Log(Fam. Size)}_{I,t-1}+\beta_5\text{Turnover}_{i,t-1}+\\ &\beta_6\text{Return}_{I,t-12:t-1}+\beta_7\text{Return Vol.}_{i,t-1}+\beta_8\alpha^{4F}_{i,t-3:t-1}+\beta_9\,\text{Flow}_{i.t-12:t-1}+\beta_{10}\text{Flow Vol.}_{i,t-1}\,)\end{aligned} \quad (8)$$

where $\text{Style}-\text{Att.}_{i,t}$ ($\text{Style}-\text{Int.}_{i,t}$) is a dummy variable that equals 1 if fund i is in the bottom (top) ASC^{SVM} sorted portfolio and zero if the fund falls into median quintile portfolio. $\Lambda(.)$ denotes the logistic link function. We use a similar set of fund characteristics included in Table 3. All fund characteristics are lagged one month. Time (month) and Style fixed effects are also included. The t – statistics (in parentheses) are derived from clustered standard errors by fund.

[Table 4 about here]

Panel A of Table 4 examines the likelihood that a fund belongs to portfolio of style-changing funds (style-attenuating and style-intensifying) as opposed to portfolio of control funds (funds with no

significant change of style). As reported in columns (1) and (2), the coefficients of fund characteristics are broadly consistent with our univariate analysis presented in Table 3. Specifically, funds with higher expense ratios, greater turnover, higher return volatility and flow volatility are more likely to deviate from their existing styles exposures. More importantly, consistent with previous literature, we find a negative relation past performance measured as either net fund return in column (1) and risk adjusted performance in column (2) and likelihood that funds are actively change their style. Overall, these results confirm that active style change is mainly driven by underperforming funds. In Panel B and C, we further distinguish style-changing funds into style-attenuating and style-intensifying funds, respectively. Once again, Table 4 highlights a clear differences in motivation of active style change between these funds. Specifically, Panel B shows that funds with modest risk-adjusted performance and higher investor inflow are more likely to decrease portfolio exposures to their existing benchmark. In sharp contrast, style-intensifying funds appears to be motivated by poor past performance and investor outflows. Together, these results provide further support on the differences in motivation behind active style change between style-attenuating and style-intensifying funds.

C. Active Style Change and Future Fund Performance

The performance consequences of active style change could be significantly different depending on the motivations of funds that actively change style. Due to trading costs associated with liquidity or price impact, a fund managers, particularly those with net investor inflow, could not optimally invest in the existing stocks holdings in their portfolios (Chen, Hong, Huang, and Kubik, 2004). As a result, manager with investment ability are likely to actively change their portfolios and expand the investment opportunities in new styles (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013), leading to style-attenuating. On the other hand, facing poor performance and net outflows, managers may also deviate from their existing styles. Due to agency conflict or other reasons, e.g., litigation risk (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997; Huang, Sialm, and Zhang; 2011; Lakonishok, Shleifer,

Thaler, and Vishny, 1991; He, Ng, and Wang, 2004; Ng and Wang, 2004; Agarwal, Gay, and Ling, 2014), managers may increase risk exposures of their existing styles, leading to style-intensifying.

If active style change is due to fund managerial skill, then we should expect these funds to exhibit superior future performance and experience net inflows (i.e., skilled-manager hypothesis). Alternatively, if agency conflict is the main motivation, active style change does not guarantee better future performance and net investor inflows (i.e., agency-conflict hypothesis). In this section we examine the relation between active style change and future fund performance to distinguish between skilled-manager and agency-conflict hypotheses. Specifically, we estimate the following multivariate panel regression:

$$\begin{aligned}\alpha^{4F}_{i,t+1:t+3} = {} & \beta_1 \mathrm{ASC}_{i,t-1} + \beta_2 \mathrm{Log(TNA)}_{i,t-1} + \beta_3 \mathrm{Log(Age)}_{i,t-1} + \beta_4 \mathrm{Expenses}_{i,t-1} \\ & + \beta_5 \mathrm{Log(Fam.Size)}_{i,t-1} + \beta_6 \mathrm{Turnover}_{i,t-1} + \beta_7 \alpha^{4F}_{i,t-3:t-1} + \\ & + \beta_9 \mathrm{Flow}_{i,t-12:t-1} + \beta_{10} \mathrm{Flow\ Vol.}_{i,t-1} + \mathrm{Intercept}_{i,t-1},\end{aligned} \tag{9}$$

where $\alpha^{4F}_{t+1,t+3}$ is the abnormal return (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) cumulated over subsequent three months. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from subsequent 12-month estimation period by regressing each fund's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model. The explanatory variable of interest in Eq. (13) is the active style change measure (ASC), which directly assesses a fund's active deviation in style relative to existing style exposures. We use a similar set of fund characteristics included in Table 3 and 4. All fund characteristics are lagged one month. Time (month) and Style fixed effects are also included. The *t* – statistics (in parentheses) are derived from clustered standard errors by time and fund.

[Table 5 about here]

As shown in column (1), we find a significantly negative relation between future fund performance and the composite active style change measure ($\mathrm{ASC}^{\mathrm{SVM}}$). That is, funds that actively increase (decrease) their portfolio exposures to existing styles underperform (outperform). This finding suggests that underlying motivation of funds that actively deviate from their past style is indeed

different. In column (2), we further distinguish between style-intensifying and style-attenuating funds. Specifically, we interact $\mathrm{ASC}^{\mathrm{SVM}}$ with dummy variable D^{+} (D^{-}) that is assigned 1 (-1), if $\mathrm{ASC}^{\mathrm{SVM}} > 0$ or style-intensifying funds ($\mathrm{ASC}^{\mathrm{SVM}} \leq 0$ or style-attenuating funds) and zero otherwise. Column (2) shows that consistent with agency-conflict hypothesis, style intensifying funds perform poorly in the future. In sharp contrast, style-intensifying funds subsequently outperform, providing support of skilled-manager hypothesis. In addition, both style-intensifying and style deviating subsamples contribute to the relation between $\mathrm{ASC}^{\mathrm{SVM}}$ and future fund performance. These results suggest that the motivation, as a result, performance consequences, of active style shifting significantly different between style-intensifying and style-attenuating funds.

In addition to results based on our composite active style change measure ($\mathrm{ASC}^{\mathrm{SVM}}$), in columns (3), (4), and (5), we investigate the relation between active changes, respectively, in size, value, and momentum styles and future fund performance. Results based on size and value style in columns (3) and (4) confirm the findings based on composite active style change measure in column (2). On the other hand, we find no significant relation active change in momentum style and future performance in column (5). These results suggest that the performance consequence of composite active style change measure is mainly driven by funds that actively change their portfolio exposures in size and value styles. Specifically, superior future performance of style-attenuating funds is mainly driven by funds that actively decrease their portfolio exposures in size style. On the other hand, underperformance of style-intensifying funds is mainly due to funds that actively increase their portfolio exposure in value style.

In Table 6 we further employ a portfolio approach to evaluate the performance consequences of active style change ($\mathrm{ASC}^{\mathrm{SVM}}$). Specifically, in each quarter we sort our sample into $\mathrm{ASC}^{\mathrm{SVM}}$ quintiles and evaluate fund performance over subsequent three-, six-, and twelve-month periods. Fund performance is assessed using raw returns, as well as alpha from the Carhart (1997) four-factor model ($\alpha^{4\mathrm{F}}$). The four-factor model is specified as follows:

$$\mathrm{R}_{\mathrm{p,t}} = \alpha_{\mathrm{p}}^{4\mathrm{F}} + \beta_{1,\mathrm{p}}\mathrm{MKT}_{\mathrm{t}} + \beta_{2,\mathrm{p}}\mathrm{SMB}_{\mathrm{t}} + \beta_{3,\mathrm{p}}\mathrm{HML}_{\mathrm{t}} + \beta_{4,\mathrm{p}}\mathrm{UMD}_{\mathrm{t}} + \varepsilon_{\mathrm{p}}, \qquad (10)$$

where $R_{p,t}$ is the monthly portfolio return (after expenses) in excess of the 1-month T-bill rate; MKT is the excess return on a value-weighted market portfolio; SMB, HML and UMD are the returns on the zero-investment factor mimicking portfolios for size, book-to-market, and momentum, respectively. For each performance metrics, we calculate both equal- and total net asset (TNA)-weighted monthly. Panels A and B of Table 6 report the differences in net returns and four-factor alpha as well as their Newey-West (1987) *t* – statistics.

[Table 6 about here]

As shown in Table 6, the relation between funds sorted on ASC^{SVM} and future fund return is monotonically decreasing with ASC^{SVM} quintiles, from Q1 (style-attenuating funds) to Q5 (style-intensifying funds). Panel A shows that the difference in return between style-attenuating funds and style-intensifying-funds is significant for the subsequent three- six-, and twelve-month horizons. For example, for equal-weighted quintiles, the difference in returns between style-attenuating and style-intensifying funds is 1.47% with a *t* – statistic of 4.79 over subsequent three-month, and 1.29% with a *t* – statistic of 1.99 on an annual basis. Panel B reports the difference between the style-attenuating and style-intensifying funds when using the risk-adjusted performance measures (α^{4F}). For equally-weighted portfolios, the difference in α^{4F} between funds in the style-attenuating and style-intensifying quintiles is 0.99% (t = 4.74) over subsequent three-month and 0.93% (t = 1.78) per year. Consistent with our multivariate analysis, Panel A and B shows that while style-attenuating funds outperform funds with stable style in Q3, style-intensifying funds underperform relative to control funds. Although weaker, the results based on TNA-weighted portfolios exhibit similar pattern, suggesting the consequence of active style change is stronger for smaller funds.

Overall, these results highlight the significant differences in performance consequences of active style change among funds that actively deviate from their past style exposures. We find that style-attenuating funds subsequently outperform style-intensifying and funds with stable style, providing

support on skilled-manager hypothesis. In sharp contrast, consistent with agency-conflict hypothesis, style-intensifying funds perform poorly relative to style-attenuating funds and funds with stable style.

D. Active Style Change and Future Fund Flows

Besides generating superior risk-adjusted returns, skilled fund managers are more likely to attract higher money inflows than an unskilled manager (Doshi, Elkamhi, and Simutin, 2015; Berk and van Binsbergen, 2015). In this section we further extend our analysis and examine the relation between active style change and future fund flow. Similar to our performance analysis, we also distinguish between style-attenuating and style-intensifying funds. Specifically, we estimate the following multivariate panel regression:

$$\begin{aligned}\text{Flow}_{i,t+1:t+12} = {} & \beta_1 \text{ASC}_{i,t-1} + \beta_2 \text{Log(TNA)}_{i,t-1} + \beta_3 \text{Log(Age)}_{i,t-1} + \beta_4 \text{Expenses}_{i,t-1} \\ & + \beta_5 \text{Log(Fam. Size)}_{i,t-1} + \beta_6 \text{Turnover}_{i,t-1} + \beta_7 \alpha^{4F}_{i,t-3:t-1} + \beta_8 \text{Return Vol.}_{i,t-1} \\ & + \beta_9 \text{Flow}_{i.t-12:t-1} + \beta_{10} \text{Flow Vol.}_{i,t-1} + \text{Intercept}_{i,t-1},\end{aligned} \tag{11}$$

where $\text{Flow}_{i,t+1:t+12}$ is the future fund flows over twelve-month. Our main explanatory variable is the active style change measure (ASC). We use a similar set of fund characteristics included in Table 5. All fund characteristics are lagged one month. Similar to our earlier analysis we also include Time (month) and Style fixed effects. The *t* – statistics (in parentheses) are derived from clustered standard errors by time and fund.

[Table 7 about here]

Column (1) shows a significantly negative relation between future fund flows and the composite active style change measure (ASC^{SVM}). That is, funds that actively increase (decrease) their portfolio exposures to existing styles realizes net investor outflows (inflows) relative to peer funds in the same style. However, as shown in column (2), the sensitivity of fund flows to style-intensifying and style-attenuating funds is asymmetric. Specifically, similar to our analysis in Table 5, we interact ASC^{SVM} with dummy variable D^{+} (D^{-}) that is assigned 1 (-1), if $\text{ASC}^{\text{SVM}} > 0$ or style-intensifying funds ($\text{ASC}^{\text{SVM}} \leq$

0 or style-attenuating funds) and zero otherwise. In column (2) we find that the coefficient of style-intensifying mutual funds is -0.015 (t = -1.75). On the other hand, the sensitivity of fund flows to style-attenuating funds is 0.036 (t = 3.22). Consistent with the previous literature (Gruber, 1996; Sirri and Tufano, 1998; Lynch and Musto, 2003), these findings suggest that fund investors do not penalize style-intensifying funds as much as they reward style-attenuating funds.

In columns (3) through (5) we further examine the sensitivity of fund flows to active changes in size, value, and momentum styles respectively. We find a significantly positive (negative) relation between fund flows to style-attenuating (style-intensifying) funds in size and value styles. Similar to results based on the composite active style change measure, for active style change on size and value, the investor inflows to style-attenuating funds is stronger relative to investor outflows from style-intensifying funds. On the other hand, for momentum style dimension, while we find significantly positive relation between fund flows and style-attenuating funds, we find no significant relation for style-intensifying fund sample.

IV. Robustness Checks and Further Analyses

A. Robustness Check: Controlling for Fund Activeness

An increasing body of literature shows that active fund managers have better investment ability (Cremers and Petajisto, 2009; Petajisto, 2013; Amihud and Goyenko, 2013).[7] Specifically, Cremers and Petajisto (2009) and Petajisto (2013) show that fund manager with portfolio holdings that differ from the benchmark index holdings generates better performance. Similarly, Amihud and Goyenko (2013) document that funds with lower R^2, obtained from a regression of fund returns on a multifactor model, outperform funds that closely track passive benchmarks. Accordingly, an alternative explanation of our

[7] Cremers and Petajisto (2009) and Petajisto (2013) show that active fund management, as measured by the share of portfolio holdings that differ from the benchmark index holdings, is positively related to future fund performance. We thank Antti Petajisto for the data on active share of mutual funds (http://www.petajisto.net/data.html). Similarly, Amihud and Goyenko (2013) document that a lower R^2, obtained from a regression of fund returns on a multifactor model, better predicts performance. They argue that this relation exists because a lower R^2 indicates mutual funds with greater stock selectivity.

findings could be that active fund managers also actively deviate from their existing styles, and thus our active style change measures only reflect managerial ability captured by active management. While related, the key distinction of our study from these existing studies is that our active style change measure assesses the deviation of fund style from its existing style, rather than from passive benchmark. We, therefore, conduct additional tests to examine whether the relation between active style change and subsequent fund performance remains significant after controlling for active management proxies. We augment Eq. (13) to include the active share measure (Active Share) measure from Cremers and Petajisto (2009) and the TR^2 measure from Amihud and Goyenko (2013). The former is measured as the share of portfolio holdings that differs from the benchmark index; and the latter (TR^2) is the logistic transformation of R^2 defined as the proportion of the fund return variance explained by the four-factor model of Carhart (1997).[8] A large (small) value of Active Share (TR^2) indicates a high level of active management.

[Table 8 about here]

Table 8 presents the results obtained after further controlling for active fund management. In columns (1) and (2) we find that both AS and TR^2 are strongly related to risk-adjusted fund performance in columns. This is consistent with the findings of Cremers and Petajisto (2009) and Amihud and Goyenko (2013). Importantly, after controlling for these measures of active fund management, the predictability of $\mathbf{ASC^{SVM}}$ remains significant. For example, as shown in column (3) of Panel A, the negative relation between $\mathbf{ASC^{SVM}}$ and future fund performance over subsequent three-month is fully retained and the predictive power of $\mathbf{ASC^{SVM}}$ is not subsumed by Active Share measure. Similar results are shown in columns (4) and (5). These results suggest that our study adds a

[8] Amihud and Goyenko (2013) use the logistic transformation of $\mathbf{R^2}$ because the distribution of $\mathbf{R^2}$is negatively skewed with its mass being in the high values that are close to its upper bound of 1. We follow their study and define $\mathbf{TR^2} = \log\left[(\sqrt{R^2})/(1-\sqrt{R^2})\right]$.

new dimension in active fund management, i.e., the active change of mutual style. That is, active style change, particularly for style-attenuating funds, reflects managerial skill beyond what is captured by leading active fund management proxies.

B. Robustness Check: Controlling for Risk Shifting

Previous studies show that the convexity in flow-performance relation creates implicit incentive for fund managers, especially those with lower investment ability, to engage in excessive risk taking to attract additional investor flows (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997; Koski and Pontiff, 1999). These studies find that fund managers with poor past performance tend to increase their portfolio volatility relative to those with better past performance. Similarly, Basak, Pavlova, and Shapino (2007) find that fund managers who moderately behind benchmark tilt the fund's volatility away from the benchmark. Moreover, Huang, Sialm, and Zhang (2008) show that risk shifting behavior is motivated by agency issues. Our study differs from these studies in that we focus on active change of fund style in size, value, and momentum dimensions. However, alternative explanation of our findings could be that our active style change measure captures fund managers' attempt to increase portfolio risk documented in the previous literature. To rule out this explanation, we compute various risk-shifting measures and examine the robustness of our findings. More specifically, Chevalier and Ellison (1997), Basak, Pavlova, and Shapiro (2007), and Chen and Pennacchi (2009) suggest that if fund managers are evaluated on their performance relative to a benchmark, they have incentive to increase portfolio volatility and/or tracking error volatility. To control for change in portfolio exposure to systematic risk, we first compute a style change measure (SC^{MKTRF}) based on portfolio exposure to market risk in a similar way described in Section II.B. Second, we measure change in tracking error volatility ($\Delta\sigma^{\text{Tracking Error}}$) as the difference in in standard deviation of tracking error of a fund between quarter *t* and *t*-4. Tracking error is measured as standard deviation of residuals ($\varepsilon_{i,t}$) obtained from previous twelve-month estimation period by regressing each fund's monthly excess returns (over the T-bill rate)

on the factors returns, using Carhart (1997) factor model. In addition, Huang, Sialm, and Zhang (2008) find that funds that increase portfolio risk underperform relative to those with stable risk levels over time. Following Huang, Sialm, and Zhang (2008), we measure risk-shifting as the difference between a fund's current holding volatility and volatility of fund's actual return.

[Table 9 about here]

In table 9, we re-run our regression analysis in Eq. (13) while controlling for these measures that capture risk-shifting behavior of mutual fund managers. Overall, in Table 9 we find that change in portfolio exposure to systematic risk (SC^{MKTRF}) in column (1) and Risk Shifting measure of Huang, Sialm, and Zhang (2008) in column (5) is negatively related to future fund performance. Consistent with previous studies, these findings suggest that increase in portfolio risk is motivated by agency issues. On the other hand, increase in tracking error volatility indicates that fund managers exhibit higher stock selectivity over time. Column (3) finds a positive association between $\Delta\sigma^{\text{Tracking Error}}$ and future fund performance, suggesting selectivity enhances mutual fund performance (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013). More importantly, as reported in columns (2), (4), (6), and (7), our results are robust to controlling for the various risk-shifting measures. Altogether these results further substantiates the incremental effect of active style measure in determining fund performance and suggest that active style change measure is distinct from risk-shifting measures documented in the earlier studies.

C. Further Analysis: The Relation between Active Style Change and Mutual Fund Tournaments.

In their seminal work on mutual fund tournament behavior, Brown, Harlow, and Starks (1996) document that fund managers increase the volatility of their portfolio in the second half of the year when they underperform in the first half. They interpret their findings as underperforming managers during the first-half of the calendar year increase their risk levels in an attempt to improve their positions against other managers. Overall, given that Chevalier and Ellison (1997) and Sirri and Tufano (1998)

find that a disproportionate flow are attracted by the top-performing funds each year, these findings provide a rationale of the risk-increasing tournament behavior for compensation-maximizing fund managers. In addition, Schwarz (2012) finds evidence supporting mutual fund tournaments even after correcting sorting bias which is caused by the sorting of first-half risk levels when determining relative mid-year performance. Nevertheless, a number of studies challenge the findings of Brown, Harlow, and Starks (1996). For example, Busse (2001), Kempf, Ruenzi, and Thiele (2009), Elton, Gruber, Blake, Krasny, and Ozelge (2010) use a variety of measures of risk-shifting and empirical techniques to provide contrary evidence.

In this section we extend our analysis and examine the relation between active style change of mutual funds and mutual fund tournaments. To do so, we adjust our active style change measure to reflect fund managers actively change their style exposures to existing benchmarks over a calendar year. That is, we measure active style change as the change of exposure to size, value, and momentum during the second-half relative to first-half to calendar year. Specifically, similar to our methodology described in Section II.B., we first compute active style change measures at the end of the fourth quarter relative to at the end of the second quarter ($\mathrm{ASC}^{\mathrm{SVM-4th\ quarter}}$) and at the end of the third quarter relative to at the end of the first quarter ($\mathrm{ASC}^{\mathrm{SVM-3th\ quarter}}$). We then take the average of $\mathrm{ASC}^{\mathrm{SVM-4th\ quarter}}$ and $\mathrm{ASC}^{\mathrm{SVM-3th\ quarter}}$, denoted as $\mathrm{ASC}^{\mathrm{SVM-2nd\ Half}}$ to assess the active style change of fund managers during the second-half of the calendar year relative first-half of the year.

[Table 10 about here]

Parallel to Table 3, Panel A of Table 10 reports past fund return, risk-adjusted performance and flow characteristics of mutual funds sorted on their composite active style measure based on the second-half of the calendar year ($\mathrm{ASC}^{\mathrm{SVM-2nd\ Half}}$). Once again, our results find that managers of poorly performing funds, funds that experience investor outflows tend to increase style exposure to their existing benchmark. This finding is consistent with our earlier findings poor performance and net outflows are the main motivation for style-intensifying funds. Moreover, we provide further evidence

on the fund tournament literature that first-half underperforming managers are more likely increase their risk exposures to their existing benchmarks in an attempt to improve their positions against other managers. In contrast, we find no evidence that first-half outperforming managers decrease their existing style exposures to preserve their positions. As shown in Panel A, there is no significant difference in past fund performance between style-attenuating funds and funds with no significant change of existing style. This result suggests that the tournament behavior is particularly strong for underperforming funds in the second-half of the calendar year. In Panel B, we also examine the performance consequences of active style change based on the second-half of the calendar year. Similar to our analysis in Table 6, we employ a portfolio approach to evaluate the performance consequences of active style change ($\mathrm{ASC}^{\mathrm{SVM-2nd\ Half}}$). As shown in Panel B, the relation between funds sorted on $\mathrm{ASC}^{\mathrm{SVM-2nd\ Half}}$ and future fund return is monotonically decreasing with $\mathrm{ASC}^{\mathrm{SVM}}$ quintiles, from Q1 (style-attenuating funds) to Q5 (style-intensifying funds). In addition, we find that the difference in return or risk-adjusted performance between style-attenuating funds and style-intensifying-funds is significant for the subsequent three- six-, and twelve-month horizons. One important distinction of this analysis from our earlier portfolio analysis in Table 6 is that the performance difference is mainly driven by underperformance of style-intensifying funds. Overall, our analysis sheds new light on a contentiously debated issue in the mutual fund literature, i.e., whether previous return performance motivates fund managers to change risk-taking behavior.

D. Further Evidence from Mutual Fund Trades

We, so far, find a significant differences in motivation active style change between style-attenuating and style-intensifying funds. Moreover, our results suggest that consistent with skilled-manager hypothesis, style-attenuating funds subsequently outperform and attract additional investor flows. In sharp contrast, style-intensifying funds perform poorly and experience net outflows, providing evidence on agency conflict hypothesis. In this section, to better understand the economic motivation and underlying mechanism behind active style change in mutual funds, we further examine fund

transactions, both purchases and sales in mutual funds. Specifically, we investigate whether funds that actively change style have stock selection skill on stocks bought and sold, how funds actively change style (buying, selling, or both), whether they are momentum traders, and whether these funds copy or deviate from winning funds of the same style. In addition, similar to our earlier analysis, we also discriminate between style-attenuating and style-intensifying funds and compare their trading activities with funds with stable style.

Table 11 reports the time series mean of cross-sectional averages of performance and style characteristics of stocks purchased and sold by mutual funds sorted on $\mathrm{ASC}^{\mathrm{SVM}}$ measure during the most recent quarter *t*. Stock performance ($\alpha^{4F}_{t+1,t+k}$) is the abnormal return (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) cumulated over subsequent *k* months with *k* vary from three to twelve. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from subsequent 24-month estimation period by regressing each stock's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model. Style difference ($\Delta\beta_t^f$) is the difference in the factor loading of each stock based on size, value, and momentum between at the end of the quarter *t* and *t*-1. Each quarter *t* and *t*-1, factor loadings, multiplied by 100, on size, value and momentum are obtained from the previous 24-month estimation period by regressing each stock's monthly excess returns (over the T-bill rate) on the factors returns, using the Carhart (1997) factor model. Panel A and B of Table 11 reports the results in equal-weighted for stocks purchased and sold by mutual funds, separately for style-attenuating, style-intensifying and funds with no significant style.

[Table 11 about here]

To the extent that active style change is motivated by managerial skill, we should expect style-attenuating funds to have better stock selection ability. On the other hand, if funds actively increase style exposures due to agency related issues, as in style-intensifying funds, we should not see significant stock selection ability. Panel A of Table 11 confirms these hypotheses and reveals a differential stock selection ability between style-attenuating and style-intensifying funds. Specifically, style-attenuating

funds exhibit significantly better stock selection ability. As shown in Panel A, stocks purchased by these funds, on average, perform significantly better than stocks they sell and stocks bought by funds with stable style. Consistent with skilled-manager hypothesis, this analysis provide further support on the notion that these funds with net investor flows expand their investment opportunities in new styles. In contrast, we find no evidence that style-intensifying funds exhibit any stock selection ability. Moreover, we find that these funds tend to sell stocks that perform well in the future. We interpret these results as evidence that, due to significant outflows, style-intensifying funds sell their profitable stocks. These results are align with Coval and Stafford (2007), Chen, Hanson, Hong, and Stein (2008), and Zhang (2008) who find that funds that experience investor outflows are forced to liquidate their position. In Panel B of Table 11, for style-attenuating and style-intensifying funds, we find that both stock purchases and sales significantly contribute to style change. Importantly, Panel B shows that relative to funds with no significant style change, the effect of stocks purchased (sold) by style-attenuating (style-intensifying) funds on the existing style is particularly stronger.

We next investigate past performance and ownership characteristics of stocks purchased and sold by style-attenuating, style-intensifying funds, and funds with no significant style change in Table 12. Panel A reports the time series mean of cross-sectional averages of quarterly past return and performance of stocks bought and sold by funds in our sample. $\mathrm{Ret}_{t-1,t-k}$ is the prior *k*-month cumulative stock return with *k* vary from 3 to 12 at the beginning of the quarter *t*. $\alpha^{4F}_{t-1,t-k}$ is the abnormal return (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) cumulated over previous three- to twelve-month. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from previous 24-month estimation period by regressing each stock's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model.

Once again, Panel A of Table 12 highlights significant differences in trading behavior between style-attenuating and style-intensifying funds. Specifically, relative to funds with no significant style change, style-attenuating funds are more likely to buy stocks with high performance. In sharp contrast, style-intensifying funds buy (sell) stocks with lower (higher) past performance. Overall, our findings suggest that style-attenuating funds exhibit momentum traders, while style-intensifying funds exhibit

contrarian behavior. In addition, the recent study by Cici (2012) shows that mutual funds that experience investor outflows are more likely to show propensity to realize gains more readily than losses (i.e., disposition effect). To further investigate this behavior, we further ranks stocks sold by each mutual fund and quarter, into five quintiles based on their past twelve-month return. Panel B reports the time-series averages of cross sectional mean of average rank of stocks sold by mutual funds in our sample. We find that, relative to funds with no significant style change, style-intensifying funds have strong tendency to sell winning investment. This finding indicates style-intensifying funds also exhibit a behavioral biases as disposition effect.

[Table 12 about here]

Finally, previous literature shows that due to the reputational risk, low-skilled fund managers are more likely to herd with other funds or mimic the strategies of winning funds (Scharfstein and Stein, 1990; Frank, Poterba, Shackelford, and Shoven, 2004; Phillips, Pukthuanthong, and Rau, 2014; Lakonishok, Shleifer, Thaler, and Vishny, 1991; He, Ng, and Wang, 2004; Ng and Wang, 2004; Agarwal, Gay, and Ling, 2014). To sharpen our inference between skilled-manager versus agency-conflict hypotheses, in Panel C of Table 12 we examine ownership characteristics of stocks purchased and sold by style-attenuating and style-intensifying funds as well as by all funds, funds with the same style, and winner funds in the same style. Funds are categorized into their respective style as described in Section II.B. Each quarter and style, we rank mutual funds based on previous twelve-month return into five groups. Funds with the top quintile (the highest past twelve-month return) are assigned to winning funds for their corresponding style. As reported in Panel C, we find that style-attenuating funds also deviate from all funds, their peers and the winning funds in the same style. Specifically, they sell stocks largely held by their peers including those winning funds in the same style. In contrast, style-intensifying funds exhibit tendency to follow the crowd, namely their peer funds and the winning funds of the same style. Specifically, style-intensifying funds tend to buy stocks that are largely held by all funds, their peer as well the winning funds of the same style. These results provide supporting evidence that agency related issues are the main motivation for style-intensifying funds.

E. Additional Analysis: Persistence of Active Style Change, Effect of Past Flow, and Change in Fund Manager

In this section we perform a number of additional analysis to ensure the robustness of our main findings. First, we examine the persistence of active style change measure over time. Second, we extent our portfolio analysis and examine whether the positive relation between fund performance and active style change is driven by past fund flows. Third, we investigate what extent active style change of mutual funds is related to fund manager turnover. For brevity, the results of these additional tests are presented in the Appendix.

To assess the persistence of $\mathrm{ASC}^{\mathrm{SVM}}$ over time, in Table A.1 we report the transition probabilities for fund sorted into five quintiles according to $\mathrm{ASC}^{\mathrm{SVM}}$ over one-, two-, four-, and eight-quarters after portfolio formation period. We find significant persistence at short time horizons. Specifically, around 40% to 60% of funds in quintile one (i.e., style-attenuating funds) and in quintile five (i.e., style-intensifying funds) remain these quintiles over one- and two-quarter after portfolio formation. Similarly, over longer horizons from four to eight quarters following portfolio formation period, funds in the extreme active style change quintiles are more likely to stay in extreme $\mathrm{ASC}^{\mathrm{SVM}}$ quintiles. However, the transition probabilities reduces to 25%-40%, suggesting that it would be difficult for mutual funds to increase or decrease risk exposures to existing styles over an extended period of time.

In Section III.B we find that relative to style-intensifying funds and funds with no significant change of existing style, style attenuating funds experience high past investor flows. Previous studies argue that fund performance owes more to flow-related trades than to managers' skill (Wermers, 2003; Lou, 2012). Specifically, Lou (2012) finds that better performing funds attract relatively higher flows, which are then reinvested by fund managers into their existing positions. This, in turn, drives up the fund's own performance. Similarly, mutual funds with poor performance tend to liquidate existing holdings to meet redemption. Price pressure from liquidation of recent losers drives down the

performance of mutual funds. To examine the effect of past fund flow on the relation between fund performance and active style change of fund, we re-examine our portfolio results conditioned on past fund flow. Specifically, similar to our analysis in Section III.C, each quarter, we first sort our sample into $\mathrm{ASC}^{\mathrm{SVM}}$ quintiles. Within each $\mathrm{ASC}^{\mathrm{SVM}}$ quintile, we then divide funds into low and high flow sub-samples based on the previous 12-month past flow, and evaluate fund performance over subsequent three-, six-, and twelve-month periods. As reported in Table A2, style-attenuating funds (style-intensifying funds) significantly outperform (underperform) funds with no significant style change. These results suggest that outperformance (underperformance) of style-attenuating funds are not solely driven by past fund flow.

Finally, we investigate the effect of fund manager turnover on active style change of funds. Specifically, Khorana (1996), Lynch and Musto (2003), and Chevalier and Ellison (1999) argue that manager turnover are more likely to be an intentional attempt of the investment advisor to adopt a new strategy for poorly performing fund, as a result, change the future fund performance.[9] Consistent with this notion, they find that fund managers with poor past performance are more likely to be replaced. To examine the relation between fund manager change and active style change, we follow Lynch and Musto (2003) and obtain the name of current portfolio managers and history of date that current manager took control from CRSP mutual fund data set. We then manually identify funds with manager change across three different sub-periods, 1999/Q2-2000/Q4 when a higher dispersion in $\mathrm{ASC}^{\mathrm{SVM}}$ measure between style-attenuating and style intensifying funds, 2007/Q2-2008/Q4 when the dispersion in $\mathrm{ASC}^{\mathrm{SVM}}$ measure between style-attenuating and style intensifying funds is about median over sample period, and 2013/Q2-2014/Q4, at the end of our sample period. Consistent with Khorana (1996), Lynch and Musto (2003), and Chevalier and Ellison (1999), Panel A of Table A.3 shows that manager change is more likely to occur for style-intensifying funds that are more likely to exhibit poor past performance than style-intensifying funds. For example, for the period between 1999/Q2 and

[9] Manager change also occurs after good performance and could reflect promotion or retirement.

2000/Q4, we find 7.77% of style-intensifying funds experience manager change relative to 5.57% of style-attenuating funds. We find similar pattern for 2007/Q2-2008/Q4 and 2013/Q2-2014/Q4 sub-periods. We next examine difference in active style change measure between funds with and without manager change across these sub-periods in Panel B of Table A.3. Within each ASC^{SVM} quintile sorted funds, we find no significant difference in ASC^{SVM} measure between funds with and without change of manager. Overall, these results provide evidence that while active style change is related to fund manager turnover, it is not entirely driven by change of fund manager with poor past performance.

V. Conclusion

In this research we find that fund managers actively deviate from their existing benchmarks by decreasing style exposures; i.e., style attenuating, or increasing style exposures; style-intensifying. In addition, we show that underlying motivation in active style change could be different between style-attenuating and style-intensifying funds. Relative to funds with stable style, style-attenuating funds experience modest past performance and net investor inflows. Consistent with skilled-manager hypothesis, we find that style-attenuating funds subsequently outperform and attract investor flows. That is, skilled managers are likely to actively change their portfolios and expand the investment opportunities in new styles. In sharp contrast, style-intensifying funds perform poorly and experience net outflow in the future. This results suggests agency-related issues plays an important role for style-intensifying funds. Moreover, we find our results are robust to active fund management measures and change in portfolio exposure to systematic risk. These results suggest a new dimension in active fund management literature and literature on style shifting behavior in delegated portfolio management. In addition, we examine fund transactions, both purchases and sales, to better understand the differences in economic motivation and underlying mechanism between style-attenuating and style-intensifying funds. Relative to funds with stable style and style-intensifying funds, we show that style-attenuating funds have greater stock picking ability. This finding provides additional support on the skilled-

manager hypothesis. Moreover, we find that style-intensifying funds also exhibit a behavioral biases (i.e., disposition effect). That is, relative to style-attenuating funds and funds with stable style, style-intensifying funds have strong tendency to sell their winning investments, as well as strong tendency to follow the crowd; i.e. peer funds and the winning funds of the same style. These results provide a supporting evidence that agency related issues are the main motivation for style-intensifying funds.

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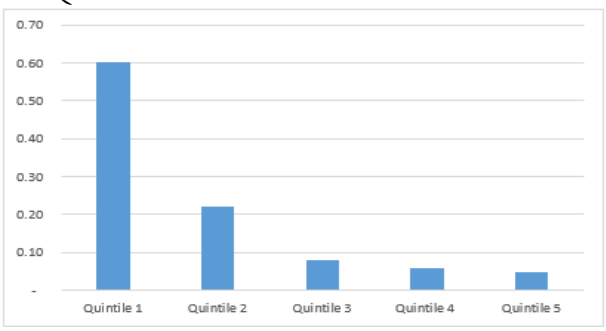
Appendix

Table A1. Transition Probabilities for Style-Attenuating and Style-Intensifying Funds

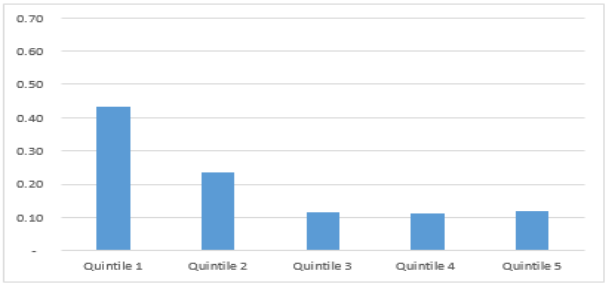
Each quarter, mutual funds are sorted according to Active Style Change measure (ASC^{SVM}). Style-attenuating (style-intensifying) funds are defined as those that actively decrease (increase) exposures to their existing benchmark in Quintile 1 (Quintile 5). For style-attenuating (style-intensifying) funds, Panel A (Panel B) reports the transition probabilities for one-, two-, four-, and eight-quarter after portfolio formation period. The sample period is from 1984 to 2014.

Panel A. Style-Attenuating Funds (Quintile 1)

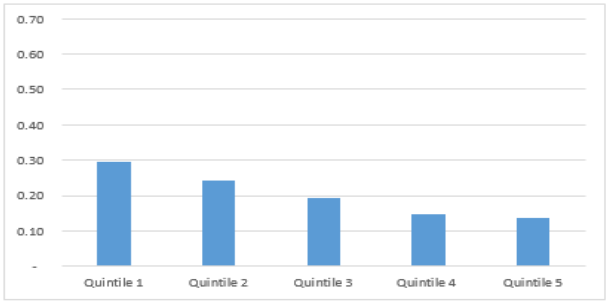
One Quarter after Portfolio Formation



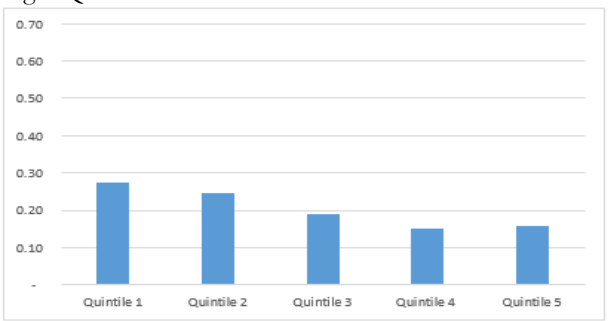
Two Quarters after Portfolio Formation



Four Quarters after Portfolio Formation

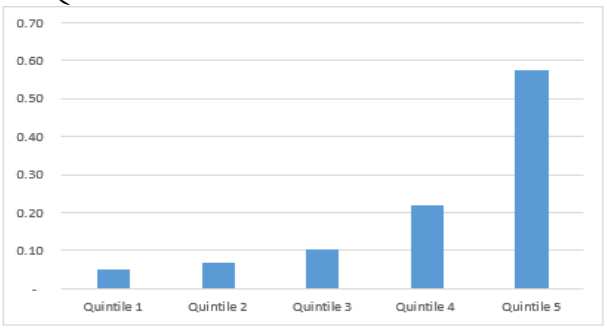


Eight Quarters after Portfolio Formation

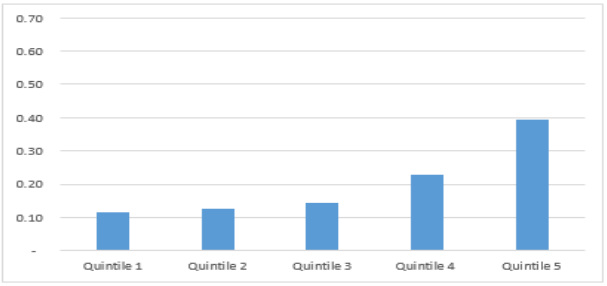


Panel B. Style-Intensifying Funds (Quintile 5)

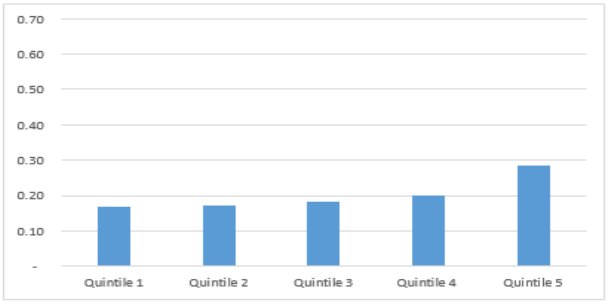
One Quarter after Portfolio Formation



Two Quarters after Portfolio Formation



Four Quarters after Portfolio Formation



Eight Quarters after Portfolio Formation

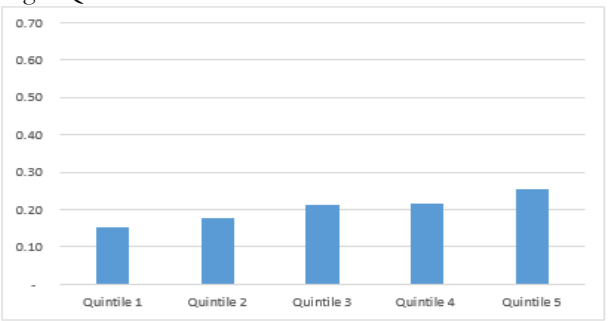


Table A2. The Effect of Fund Flows on Fund Performance

Each month, mutual funds are sorted into five quintiles according to Active Style Change measure (ASC^{SVM}). Funds in each ASC^{SVM} Quintile is further divided into two groups based on past 12-month fund flows. In each ASC^{SVM} Quintile and month, funds with past 12-month flow lower (higher) than median past 12-month flow are assigned in Low (High) Fund Flow in Panel A (Panel B). Panel A (Panel B) reports the future returns of mutual funds in High (Low) Fund Flow. $R_{t+1,t+3}$ ($R_{t+1,t+6}$, $R_{t+1,t+12}$) is subsequent three- (six- and 12-) month cumulative net return of ASC^{SVM} sorted portfolios. This table presents the result based on equal- and TNA-weighted portfolios. The differences in net returns and four-factor alpha as well as their Newey-West (1987) *t* – statistics (in parentheses) are also reported. ***, **, * denote statistical significance at the 1%, 5%, or 10% levels, respectively. The sample period is from 1984 to 2014.

	Panel A. Low Past Fund Flow						Panel B. High Past Fund Flow					
	Equal Weighted			TNA Weighted			Equal Weighted			TNA Weighted		
ASC^{SVM} Quintiles	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$
1 (Style-Attenuating)	3.02	5.88	11.99	2.93	5.87	11.90	2.94	5.73	11.08	2.59	5.19	10.14
2	2.68	5.27	10.96	2.60	5.17	10.42	2.59	5.12	10.38	2.60	5.11	10.30
3 (Control)	2.57	5.25	10.91	2.44	4.94	10.30	2.52	5.04	10.49	2.41	4.76	9.63
4	2.48	5.12	10.95	2.30	4.81	10.52	2.53	5.13	10.70	2.20	4.55	9.80
5 (Style-Intensifying)	2.09	4.83	10.05	2.00	4.56	10.02	2.10	4.72	10.50	2.08	4.69	9.54
Differences: Return												
Style-Att. – Style-Int.	0.93***	1.05**	1.94**	0.93***	1.31**	1.89**	0.84***	1.01**	0.58	0.51**	0.50	0.60
	(4.22)	(2.53)	(2.13)	(3.69)	(2.58)	(2.47)	(3.62)	(2.13)	(0.94)	(2.10)	(1.02)	(0.71)
Style-Att. – Control	0.45*	0.63	1.08	0.49*	0.93	1.61*	0.42*	0.70	0.59	0.17	0.43	0.51
	(1.81)	(1.32)	(1.50)	(1.72)	(1.52)	(1.65)	(1.89)	(1.44)	(0.89)	(0.78)	(0.85)	(0.70)
Style-Int. – Control	-0.48***	-0.42	-0.84	-0.44**	-0.38	-0.28	-0.42***	-0.32	0.01	-0.33*	-0.07	-0.09
	(-2.96)	(-1.55)	(-0.68)	(-2.26)	(-1.24)	(-0.96)	(-2.66)	(-1.20)	(0.04)	(-1.89)	(-0.24)	(-0.55)
Differences: Four-Factor Alpha (α^{4F})												
Style-Att. – Style-Int.	0.77***	0.80***	0.64	0.80***	0.91***	0.35	0.76***	0.73**	1.07*	0.62**	0.50*	0.69
	(4.33)	(2.89)	(1.48)	(3.78)	(2.65)	(0.66)	(4.30)	(2.28)	(1.71)	(2.40)	(1.74)	(1.53)
Style-Att. – Control	0.31**	0.12	0.16	0.15	0.26	0.08	0.14	0.13	0.55	0.07	0.13	0.62
	(2.32)	(0.56)	(0.47)	(0.84)	(0.78)	(0.14)	(1.06)	(0.42)	(1.16)	(0.48)	(0.39)	(1.13)
Style-Int. – Control	-0.65***	-0.68***	-0.48	-0.65***	-0.65***	-0.43	-0.63***	-0.60***	-0.52	-0.55***	-0.37	0.07
	(-5.14)	(-3.23)	(-1.21)	(-4.80)	(-2.76)	(-0.83)	(-5.86)	(-2.65)	(-1.43)	(-3.99)	(-1.43)	(0.16)

Table A3. Change of Fund Manager and Active Style Change

Each quarter, mutual funds are sorted into five quintiles according to Active Style Change measure (ASC^{SVM}). Panel A reports the number and percentage of fund manager change in each ASC^{SVM} sorted quintile across three different sub-periods; 1999/Q2-2000/Q4, 2007/Q2-2008/Q4, and 2013/Q2-2014/Q4. Change of fund manager is manually obtained from the CRSP mutual fund database. Panel B reports ASC^{SVM} for funds without fund manager change and those with fund manager change as well as the difference in ASC^{SVM} and *t*-statistics (in parentheses) between funds with and without fund manager change.

Panel A. Relation between Fund Manager Change and Active Style Change

	Manager Change					
Period:	1999/Q2-2000/Q4		2007/Q2-2008/Q4		2013/Q2-2014/Q4	
	No	Pct. (%)	No	Pct. (%)	No	Pct. (%)
1-Style-Attenuating	15.50	5.57%	10.50	3.62%	5.00	1.95%
2	16.50	5.99%	14.00	4.65%	6.50	2.50%
3	15.50	6.77%	14.50	4.87%	7.00	2.68%
4	19.00	7.74%	14.50	4.86%	7.00	2.70%
5-Style-Intensfying	19.00	7.77%	22.00	7.19%	9.00	3.56%

Panel B. Difference in Active Style Change between Funds with and without Manager Change

	ASC^{SVM}								
Period:	1999/Q2-2000/Q4			2007/Q2-2008/Q4			2013/Q2-2014/Q4		
	No-Manager Change	Manager Change	Diff.	No-Manager Change	Manager Change	Diff	No-Manager Change	Manager Change	Diff.
1-Style-Attenuating	-0.361	-0.394	0.032	-0.298	-0.296	-0.002	-0.204	-0.214	0.010
			(0.79)			(-0.05)			(0.57)
2	-0.110	-0.110	0.000	-0.093	-0.093	0.000	-0.046	-0.051	0.005
			(-0.01)			(-0.02)			(0.73)
3	-0.007	-0.006	0.000	-0.007	-0.006	-0.001	0.021	0.023	-0.002
			(-0.04)			(-0.12)			(-0.42)
4	0.102	0.106	-0.004	0.076	0.075	0.001	0.095	0.093	0.001
			(-0.20)			(0.06)			(0.11)
5-Style-Intensfying	0.395	0.377	0.018	0.273	0.279	-0.006	0.273	0.268	0.005
			(0.31)			(-0.22)			(0.21)

Table 1. Summary Statistics

This table reports the descriptive statistics of mutual funds and active style change measures (ASC) in our sample. Panel A presents the time series averages of monthly cross-sectional mean and median mutual funds' characteristics: TNA (Total Net Asset), Age, Expense Ratio, Turnover, Family Size, Monthly Fund Return (Net), Fund Return Volatility (estimated as the standard deviation of monthly fund return over prior twelve-month), Monthly Fund Flow defined as $\left(\mathrm{TNA}_{i,t} - \mathrm{TNA}_{i,t-1}(1+\mathrm{R}_t)\right)/\mathrm{TNA}_{i,t-1}$, and Fund Flow Volatility (estimated as the standard deviation of monthly fund flows over prior twelve-month). Panel B reports the quarterly mean and median and the cross-sectional correlation between of Active Style Change measure for size ($\mathrm{ASC}^{\mathrm{S}}$), value ($\mathrm{ASC}^{\mathrm{V}}$), momentum ($\mathrm{ASC}^{\mathrm{M}}$) dimensions, and composite active style change ($\mathrm{ASC}^{\mathrm{SVM}}$). The construction of Active Style Change measures are described in Section II.B. The sample period is from 1984 to 2014.

Panel A: Portfolio Characteristics

	Mean	Median
Number of Funds	906	
TNA ($ Million)	1,021	262
Age (in Years)	17.22	12.94
Expense Ratio	1.22%	1.17%
Turnover	83.94%	65.04%
Family Size ($ Million)	45,003	8,583
Monthly Fund Return (Ret)	0.88%	0.86%
Fund Return Volatility (Ret. Vol.)	4.89%	4.61%
Monthly Fund Flow (Flow)	0.38%	-0.49%
Fund Flow Volatility (Flow Vol.)	3.89%	2.91%

Panel B: Summary Statistics and Correlation between Active Style Change Measures

	Characteristics		Correlation Table			
	Mean	Median	$\mathrm{ASC}^{\mathrm{S}}$	$\mathrm{ASC}^{\mathrm{V}}$	$\mathrm{ASC}^{\mathrm{M}}$	$\mathrm{ASC}^{\mathrm{SVM}}$
$\mathrm{ASC}^{\mathrm{S}}$	0.005	0.005	1			
$\mathrm{ASC}^{\mathrm{V}}$	0.013	0.003	0.065	1		
$\mathrm{ASC}^{\mathrm{M}}$	-0.006	-0.003	-0.127	0.047	1	
$\mathrm{ASC}^{\mathrm{SVM}}$	0.012	0.007	0.536	0.757	0.327	1

Table 2. Style Change and Active Style Change by Mutual Funds

This table reports the time-series of cross-sectional averages of Style Change, and Active Style Change of the mutual funds sorted on their past style at the end of quarter $t-4$. Each quarter, mutual funds in our sample are sorted quintile portfolios based on their past style loadings; size style (β^{S}) in Panel A, value style (β^{V}) in Panel B, momentum style (β^{M}) in Panel C, and composite style (β^{SVM}) in Panel D. SC^{f} and ASC^{f} are Style Change and Active Style Change measures described in Section II.B. ΔR^2 is the difference between future and past R^2 of the fund. Past (Future) R^2 is the proportion of the fund return variance that is explained by the variation in four-factor model of Carhart (1997) over the previous (following) 12-month at the end of quarter $t-4$ (quarter t). This table also reports the *p*-values of the *F*-test of the joint hypothesis that the Style Change (SC^{f}) or Active Style Change (ASC^{f}) are equal to zero for all quintiles. The sample period is from 1984 to 2014.

	1	2	3	4	5	*p*-value
	Panel A. Sorted based on Past Size Style (β^{S})					
SC^{S}	0.06***	0.02***	0.00	-0.00	-0.07***	*<0.000*
ASC^{S}	0.04***	0.02***	0.01***	0.00	-0.05***	*<0.000*
	Panel B. Sorted based on Past Value Style (β^{V})					
SC^{V}	0.11***	0.02***	-0.01	-0.03***	-0.09***	*<0.000*
ASC^{V}	0.09***	0.03***	-0.00	-0.02***	-0.05***	*<0.000*
	Panel C. Sorted based on Past Momentum Style (β^{M})					
SC^{M}	0.09***	0.03***	0.01	-0.03***	-0.10***	*<0.000*
ASC^{M}	0.02***	0.01***	-0.00	-0.02***	-0.04***	*<0.000*
	Panel D. Sorted based Past Composite Style (β^{SVM})					
SC^{SVM}	0.11***	0.04***	0.00	-0.04***	-0.12***	*<0.000*
ASC^{SVM}	0.03***	0.00	-0.02***	-0.05***	-0.09***	*<0.000*
ΔR^2	0.02	0.01	-0.02	-0.04	-0.03	*0.365*

Table 3. Active Style Change and Fund Characteristics: Univariate Analysis

This table reports the time-series mean of cross-sectional averages of mutual funds' characteristics sorted on Active Style Change ($\mathrm{ASC}^{\mathrm{SVM}}$) measure as described in Section II.B. Log(TNA) is the logarithm of total net asset; Log(Age) is the logarithm of the age of the oldest share class of the mutual fund; Expenses is fund's expense ratio; Turnover is the portfolio turnover; Log(Fam. Size) is the logarithm of the total net assets under a fund family. Ret. Vol. is fund return volatility measured as the standard deviation of monthly fund returns over prior twelve months; Flow Vol. is the fund flows volatility measured as standard deviation of monthly normalized net flows over the prior twelve months. Past return is the cumulative return over the previous three- (six- or twelve-) month. $\mathrm{Past}\ \alpha^{4F}$ is cumulative abnormal returns (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) over the previous three- (six- or twelve-) month. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from prior 24-month estimation period by regressing each fund's excess return (over the T-bill rate) on the factors returns using Carhart (1997) factor model. $\mathrm{Past\ Flow}^{\mathrm{Style}}$ is style-adjusted fund flow measured as Past Flow excess average Past Flow within fund's style for each month. Past Flow is prior three- (six- or twelve-) month normalized net flow into a fund and defined as $\left(\mathrm{TNA}_{i,t} - \mathrm{TNA}_{i,t-m}(1+\mathrm{R}_{t-1,t-m})\right)/\mathrm{TNA}_{i,t-m}$. This table also compares the average portfolio characteristics across different portfolios under the null hypothesis that the averages are identical. The *t* – statistics (in parentheses). ***, **, * denote statistical significance at the 1%, 5%, or 10% level, respectively. The sample period is from 1984 to 2014.

Panel A. Fund Characteristics

$\mathrm{ASC}^{\mathrm{SVM}}$ Quintiles	Mean $\mathrm{ASC}^{\mathrm{SVM}}$	Log(TNA)	Log(Age)	Log(Fam. Size)	Expenses (%)	Turnover (%)	Ret. Vol. (%)	Flow Vol. (%)
1 (Style Attenuating)	-0.46	5.47	4.93	7.99	1.31	103.60	5.34	4.62
2	-0.16	5.70	5.02	7.96	1.19	75.03	4.81	3.94
3 (Control)	-0.01	5.74	5.08	7.96	1.14	63.43	4.60	3.64
4	0.13	5.63	5.06	8.04	1.18	79.03	4.82	3.85
5 (Style Intensifying)	0.37	5.46	4.99	8.02	1.26	109.60	5.27	4.32
Differences								
Style-Att. – Style-Int.	-0.84***	0.00	-0.06**	0.17*	0.05***	-6.00	0.07	0.30***
	(-17.32)	(0.09)	(-2.48)	(1.86)	(3.33)	(-1.32)	(0.62)	(2.94)
Style-Att. – Control	-0.45***	-0.28***	-0.16***	-0.06	0.17***	40.17***	0.75***	0.97***
	(-14.19)	(-7.39)	(-7.12)	(-0.49)	(14.57)	(15.72)	(9.49)	(6.92)
Style-Int. – Control	0.39***	-0.28***	-0.09***	-0.10	0.12***	46.17***	0.67***	0.68***
	(17.98)	(-7.43)	(-6.43)	(-1.42)	(12.80)	(15.74)	(5.27)	(6.62)

Panel B. Past Performance and Flows

	Past Return			Past α^{4F}			Past $\text{Flow}^{\text{Style}}$		
ASC^{SVM} Quintiles	3-month	6-month	12-month	3-month	6-month	12-month	3-month	6-month	12-month
1 (Style-Attenuating)	2.91	5.79	11.33	-0.06	-0.14	-0.34	0.40	0.99	1.39
2	2.77	5.53	11.09	-0.08	-0.17	-0.33	0.30	0.59	1.26
3 (Control)	2.65	5.28	10.52	-0.12	-0.24	-0.45	0.08	0.03	0.41
4	2.59	5.09	10.42	-0.16	-0.32	-0.50	0.00	0.00	-0.08
5 (Style-Intensifying)	2.31	4.60	9.47	-0.26	-0.53	-0.95	-0.24	-0.38	-0.86
				Differences					
Style-Change – Control	-0.04	-0.05	-0.09	-0.03	-0.08*	-0.12*	0.01	0.30	-0.12
	(-0.11)	(-0.16)	(-0.27)	(-1.46)	(-1.68)	(-1.71)	(0.44)	(1.64)	(-0.83)
Style-Att. – Style-Int.	0.61***	1.19***	1.86***	0.20**	0.40**	0.61*	0.63***	1.36***	2.25***
	(2.64)	(3.29)	(3.19)	(2.22)	(2.14)	(1.68)	(3.86)	(3.99)	(3.93)
Style-Att. – Control	0.25	0.53	0.81	0.06*	0.10*	0.11	0.32**	0.95***	0.99**
	(0.93)	(1.28)	(1.53)	(1.79)	(1.69)	(1.61)	(2.12)	(3.41)	(2.35)
Style-Int. – Control	-0.36**	-0.66**	-1.05*	-0.14**	-0.30**	-0.50*	-0.31**	-0.41*	-1.26***
	(-1.99)	(-2.25)	(-1.86)	(-2.18)	(-2.05)	(-1.77)	(-2.53)	(-1.69)	(-3.21)

Table 4. Active Style Change and Fund Characteristics: Logistic Regressions

This table reports the results of the logit regressions to investigate the characteristics of funds that actively decrease (style-attenuating) and increase (style-intensifying) their style exposures. The dependent variable is an indicator variable that equals 1 if fund *i* is in the Quantile 1 or 5, style-changing funds, of ASC^{SVM} sorted portfolios in month *t*, in Panel A, and zero if fund *i* belongs to the Quantile 3, control funds. The dependent variable is an indicator variable that equals 1, if fund *i* is in the Quantile 1, style-attenuating funds in Panel B and in Quintile 5, style-intensifying funds, in Panel C. Sorting procedure and all other fund characteristics are as defined in Table 3. All fund characteristics are lagged one month. Time and Style fixed effects are also included. The *t* – statistics (in parentheses) are derived from clustered standard errors by fund. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively. The sample period is from 1984 to 2014.

	Panel A. Style-Changing vs. Control		Panel B. Style-Attenuating vs. Control		Panel C. Style-Intensifying vs. Control	
	(1)	(2)	(3)	(4)	(5)	(6)
$Log(TNA)_{t-1}$	-0.03**	-0.03*	-0.02	-0.01	-0.06***	-0.06***
	(-2.29)	(-1.87)	(-1.24)	(-0.63)	(-3.52)	(-3.24)
$Log(Age)_{t-1}$	-0.01	0.00	-0.01	-0.00	-0.00	0.01
	(-0.20)	(0.15)	(-0.40)	(-0.05)	(-0.03)	(0.25)
$Expenses_{t-1}$	0.45***	0.47***	0.47***	0.50***	0.37***	0.40***
	(8.98)	(9.45)	(8.85)	(9.25)	(6.25)	(6.82)
$Log(Fam.\ Size)_{t-1}$	-0.02**	-0.02***	-0.01	-0.01*	-0.02**	-0.02***
	(-2.43)	(-2.76)	(-1.28)	(-1.73)	(-2.54)	(-2.83)
$Turnover_{t-1}$	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	(24.36)	(26.85)	(21.93)	(24.64)	(22.61)	(24.63)
$Return_{t-12,t-1}$	-0.18		0.23**		-0.54***	
	(-1.56)		(2.13)		(-2.91)	
$\alpha^{4F}_{t-3,t-1}$		-0.26*		0.38*		-0.90**
		(-1.77)		(1.88)		(-2.23)
$Return\ Vol_{t-1}$	0.13***	0.13***	0.11***	0.10***	0.15***	0.15***
	(12.55)	(12.47)	(9.62)	(9.28)	(12.50)	(12.80)
$Flow_{t-1,t-12}$	0.08	0.05	0.19***	0.18***	-0.04	-0.14**
	(1.61)	(1.05)	(2.99)	(2.92)	(-0.63)	(-2.04)
$Flow\ Vol_{t-1}$	0.02***	0.04***	0.03***	0.04***	0.01	0.02***
	(4.15)	(6.60)	(4.24)	(6.92)	(1.09)	(2.89)
Intercept	-1.92***	-2.13***	-2.22***	-2.44***	-2.78***	-3.04***
	(-6.17)	(-6.72)	(-6.40)	(-6.76)	(-6.19)	(-6.75)
FE: Time and Style	Y	Y	Y	Y	Y	Y
Cluster: Fund	Y	Y	Y	Y	Y	Y
N	175,012	170,084	139,885	136,016	139,002	135,237
Pseudo R^2	0.11	0.11	0.12	0.12	0.11	0.12

Table 5. Active Style Change and Future Fund Performance

This table reports the results of the panel regressions of future fund performance on Active Style Change Measures (ASC^S, ASC^V, ASC^M, and ASC^{SVM}) and other fund characteristics. $\alpha^{4F}_{t+1,t+3}$ is the abnormal return (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) cumulated over subsequent three months. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from subsequent 12-month estimation period by regressing each fund's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model. D^+ (D^-) is a dummy variable that is assigned 1 (-1), if $ASC^{SVM} > 0$ or style-intensifying funds ($ASC^{SVM} \leq 0$ or style-attenuating funds) and zero otherwise. Fund characteristics are lagged one month, and defined as in Table 3 and 4. Time and Style fixed effects are also included. The *t* – statistics (in parentheses) are derived from double-clustered standard errors by month and fund. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively. The sample period is from 1984 to 2014.

	$\alpha^{4F}_{t+1,t+3}$				
	(1)	(2)	(3)	(4)	(5)
	Composite (ASC^{SVM})		Size (ASC^S)	Value (ASC^V)	Momentum (ASC^M)
ASC	-0.59***				
	(-5.32)				
$ASC \times D^+$		-0.58***	-0.50*	-0.69***	0.33
		(-3.31)	(-1.89)	(-3.18)	(0.38)
$ASC \times D^-$		0.60***	0.77***	0.46*	0.18
		(3.49)	(3.53)	(1.79)	(0.46)
$Log(TNA)_{t-1}$	-0.08***	-0.08***	-0.08***	-0.08***	-0.08***
	(-6.05)	(-6.05)	(-6.02)	(-5.97)	(-6.00)
$Log(Age)_{t-1}$	0.02	0.02	0.02	0.01	0.01
	(0.73)	(0.73)	(0.74)	(0.67)	(0.69)
$Expenses_{t-1}$	-0.14***	-0.14***	-0.15***	-0.14***	-0.14***
	(-3.26)	(-3.29)	(-3.38)	(-3.13)	(-3.32)
$Turnover_{t-1}$	-0.07*	-0.07**	-0.08**	-0.07*	-0.08**
	(-1.92)	(-2.05)	(-2.08)	(-1.90)	(-2.00)
$Log(Fam.\,Size)_{t-1}$	0.04***	0.04***	0.04***	0.04***	0.04***
	(6.23)	(6.24)	(6.24)	(6.24)	(6.21)
$\alpha^{4F}_{t-1,t-3}$	0.50***	0.50***	0.49***	0.49***	0.48***
	(5.95)	(5.92)	(5.86)	(5.84)	(5.82)
$Ret.\,Vol_{t-1}$	-0.08*	-0.08*	-0.08*	-0.08*	-0.09*
	(-1.67)	(-1.68)	(-1.78)	(-1.68)	(-1.82)
$Flow_{t-1,t-12}$	-0.21***	-0.21***	-0.20***	-0.21***	-0.21***
	(-2.73)	(-2.74)	(-2.61)	(-2.74)	(-2.67)
$Flow\ Vol_{t-1}$	-0.00	-0.00	-0.00	0.00	0.00
	(-0.07)	(-0.08)	(-0.09)	(0.11)	(0.04)
$Intercept$	-0.13	-0.13	-0.12	-0.12	-0.10
	(-0.44)	(-0.44)	(-0.43)	(-0.43)	(-0.35)
FE: Time and Style	Y	Y	Y	Y	Y
Clusters: Time and Fund	Y	Y	Y	Y	Y
N	Y	Y	Y	Y	Y
R^2	241,348	241,348	241,348	241,348	241,348
FE: Time and Style	0.098	0.099	0.097	0.098	0.097

Table 6. Fund Performance: Sorting Funds based on Active Style Change

This table reports the future returns of mutual funds sorted according to Active Style Change measure (ASC^{SVM}). $R_{t+1,t+3}$ ($R_{t+1,t+6}$, $R_{t+1,t+12}$) is subsequent three- (six- and 12-) month cumulative net return of ASC^{SVM} sorted portfolios. This table presents the result based on equal- and TNA-weighted portfolios. The differences in net returns and four-factor alpha as well as their Newey-West (1987) t – statistics (in parentheses) are reported in Panel A, and B. ***, **, * denote statistical significance at the 1%, 5%, or 10% levels, respectively. The sample period is from 1984 to 2014.

	Equal-Weighted			TNA-Weighted		
ASC^{SVM} Quintiles	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$
1 (Style-Attenuating)	2.95	5.83	11.57	2.76	5.50	10.81
2	2.64	5.20	10.79	2.66	5.20	10.41
3 (Control)	2.56	5.16	10.70	2.45	4.87	9.90
4	2.51	5.12	10.68	2.21	4.58	9.91
5 (Style-Intensifying)	2.04	4.69	10.41	1.95	4.47	9.87
Panel A. Differences: Return						
Style-Att. – Style-Int.	0.91***	1.14**	1.17**	0.81***	1.03**	0.93
	(4.28)	(2.58)	(2.33)	(3.37)	(2.13)	(1.29)
Style-Att. – Control	0.39**	0.68*	0.87*	0.30*	0.63*	0.90
	(2.32)	(1.90)	(1.74)	(1.77)	(1.69)	(1.55)
Style-Int. – Control	-0.52***	-0.47*	-0.31	-0.50***	-0.40*	-0.03
	(-3.18)	(-1.70)	(-1.15)	(-3.66)	(-1.79)	(-0.13)
Panel B. Differences: Four-Factor Alpha (α^{4F})						
Style-Att. – Style-Int.	0.99***	0.97***	0.93*	0.71***	0.69**	0.48
	(4.74)	(2.90)	(1.78)	(3.67)	(2.22)	(0.51)
Style-Att. – Control	0.29**	0.24	0.32	0.04	0.08	0.14
	(2.11)	(1.57)	(0.82)	(0.27)	(0.31)	(0.07)
Style-Int. – Control	-0.71***	-0.73***	-0.61*	-0.68***	-0.62***	-0.34
	(-6.55)	(-3.69)	(-1.65)	(-5.66)	(-3.31)	(-1.02)

Table 7. Active Style Change and Future Fund Flows

This table reports the results of the panel regressions of future style-adjusted fund flows on Active Style Change Measures (ASC^S, ASC^V, ASC^M, and ASC^{SVM}) and other fund characteristics. $Flow_{t+1,t+12}$ is the normalized fund flows over subsequent twelve months. The construction of Active Style Change measures are described in Section II.B. Fund characteristics are defined as in Table 3 and 4. Time and style fixed effects are also included. The *t* – statistics (in parentheses) derived from double-clustered standard errors by month and fund. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively. The sample period is from 1984 to 2014.

	$Flow_{t+1,t+12}$				
	(1)	(2)	(3)	(4)	(5)
	Composite (ASC^{SVM})		Size (ASC^S)	Value (ASC^V)	Momentum (ASC^M)
ASC	-0.010***				
	(-2.63)				
$ASC \times D^+$		-0.015*	-0.019*	-0.018*	0.023
		(-1.75)	(-1.88)	(-1.74)	(0.99)
$ASC \times D^-$		0.036***	0.047***	0.035**	0.059**
		(3.22)	(2.88)	(2.21)	(2.49)
$Log(TNA)_{t-1}$	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***
	(-4.11)	(-4.25)	(-4.08)	(-4.03)	(-4.07)
$Log(Age)_{t-1}$	-0.002	-0.003	-0.003	-0.003	-0.002
	(-0.52)	(-0.51)	(-0.53)	(-0.55)	(-0.55)
$Expenses_{t-1}$	-0.891*	-0.961**	-0.952**	-0.940**	-0.927*
	(-1.87)	(-2.03)	(-2.00)	(-1.98)	(-1.95)
$Turnover_{t-1}$	0.002	0.000	0.001	0.000	0.001
	(0.66)	(0.09)	(0.28)	(0.14)	(0.20)
$Log(Fam.\,Size)_{t-1}$	0.004***	0.004***	0.004***	0.004***	0.004***
	(3.52)	(4.46)	(4.53)	(4.52)	(3.52)
$\alpha^{4F}_{t-1,t-3}$	0.010***	0.010***	0.010***	0.010***	0.010***
	(4.73)	(4.75)	(4.84)	(4.74)	(4.85)
$Ret.\,Vol_{t-1}$	-0.441***	-0.481***	-0.475***	-0.493***	-0.479***
	(-3.50)	(-3.83)	(-3.77)	(-3.94)	(-3.84)
$Flow_{t-1,t-12}$	0.443***	0.445***	0.443***	0.443***	0.443***
	(4.12)	(3.52)	(4.12)	(4.08)	(4.07)
$Flow\ Vol_{t-1}$	0.100	0.093	0.097	0.095	0.097
	(1.38)	(1.28)	(1.34)	(1.32)	(1.35)
$Intercept$	0.150***	0.172***	0.152***	0.151***	0.153***
	(4.02)	(5.15)	(4.26)	(4.14)	(4.31)
FE: Time and Style	Y	Y	Y	Y	Y
Clusters: Time and Fund	Y	Y	Y	Y	Y
N	227,499	227,499	227,499	227,499	227,499
R^2	0.237	0.237	0.237	0.237	0.237

Table 8. Active Fund Management and Active Style Change

This table reports the results of the panel regressions of future fund performance on Active Style Change Measure (ASC^{SVM}), active fund management measures, and other fund characteristics. Active fund management measures includes: Active Share that represents the share of portfolio holdings that differ from the benchmark index at the month *t* (Cremers and Petajisto, 2009), and TR^2 that is measured as the logistic transformation of R^2 (Amihud and Goyenko, 2013). R^2 is the proportion of the fund return variance that is explained by the variation in four-factor model of Carhart (1997) over the previous 24-month. The construction of Active Style Change measures are described in Section II.B. The other fund characteristics are lagged one month, and defined as in Table 3 and 4. Time and style fixed effects are also included. The *t* –statistics (in parentheses) derived from double-clustered standard errors by month and fund. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively. Data for Active Share measure is obtained from Antti Petajisto and spans from 1984 to 2009. The sample period is from 1984 to 2014.

	$\alpha^{4F}_{t+1,t+3}$				
	(1)	(2)	(3)	(4)	(5)
ASC^{SVM}			-0.61***	-0.60***	-0.61***
			(-4.78)	(-5.43)	(-4.78)
Active Share	0.77***		0.80***		0.37
	(3.47)		(3.68)		(1.62)
TR^2		-0.72***		-0.72***	-0.68***
		(-5.03)		(-5.03)	(-4.29)
$Log(TNA)_{t-1}$	-0.06***	-0.06***	-0.07***	-0.06***	-0.06***
	(-4.46)	(-5.19)	(-4.55)	(-5.24)	(-4.46)
$Log(Age)_{t-1}$	0.02	-0.00	0.02	0.00	0.02
	(0.91)	(-0.02)	(0.99)	(0.03)	(0.81)
$Expenses_{t-1}$	-0.21***	-0.21***	-0.21***	-0.21***	-0.24***
	(-3.92)	(-4.75)	(-3.97)	(-4.82)	(-4.48)
$Turnover_{t-1}$	-0.06	-0.09**	-0.06	-0.09**	-0.08*
	(-1.50)	(-2.31)	(-1.47)	(-2.31)	(-1.87)
$Log(Fam.\ Size)_{t-1}$	0.03***	0.04***	0.04***	0.04***	0.04***
	(4.44)	(6.14)	(4.53)	(6.13)	(5.01)
$\alpha^{4F}_{t-1,t-3}$	0.36***	0.43***	0.39***	0.44***	0.38***
	(4.34)	(5.15)	(4.52)	(5.28)	(4.51)
$Ret.\ Vol_{t-1}$	-0.17***	-0.08*	-0.16***	-0.07	-0.15**
	(-2.81)	(-1.68)	(-2.66)	(-1.55)	(-2.48)
$Flow_{t-1,t-12}$	-0.12	-0.19**	-0.13	-0.20***	-0.14
	(-1.35)	(-2.49)	(-1.50)	(-2.59)	(-1.57)
$Flow\ Vol_{t-1}$	0.01	-0.00	0.01	-0.01	0.00
	(0.93)	(-0.89)	(0.80)	(-1.06)	(0.55)
Intercept	-0.09	0.99***	-0.16	0.97***	1.09**
	(-0.24)	(2.78)	(-0.42)	(2.71)	(2.22)
FE: Time and Style	Y	Y	Y	Y	Y
Clusters: Time and Fund	Y	Y	Y	Y	Y
N	119,828	239,595	119,828	239,595	119,828
R^2	0.129	0.098	0.132	0.100	0.134

Table 9. Active Style Change and Future Fund Performance: Controlling for Risk Shifting

This table reports the results of the panel regressions of future fund performance on Active Style Change Measure (ASC^{SVM}), Style Change (TSC^{MKTRF}) based on market risk, change in tracking error volatility ($\Delta\sigma^{\text{Tracking Error}}$), risk-shifting measure of Huang, Sialm, and Zhang (2008) and other fund characteristics. SC^{MKTRF} is computed in a way similar to the Style Change measure described in Section II.B. $\Delta\sigma^{\text{Tracking Error}}$ is the difference in standard deviation of tracking error of a fund between quarter *t* and *t*-4. Tracking error is measured as standard deviation of residuals ($\varepsilon_{i,t}$) obtained from previous 12-month estimation period by regressing each fund's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model. Risk shifting measure is defined as the difference between a fund's current holding volatility and volatility of fund's actual return. The other fund characteristics are lagged one month and defined as in Table 3 and 4. Time and style fixed effects are also included. The *t* – statistics (in parentheses) derived from double-clustered standard errors by month and fund. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively. The sample period is from 1984 to 2014.

	$\alpha^{4F}_{t+1,t+3}$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ASC^{SVM}		-0.56***		-0.60***		-0.59***	-0.57***
		(-5.44)		(-5.35)		(-5.28)	(-5.21)
SC^{MKTRF}	-0.62***	-0.52**					-0.54**
	(-2.58)	(-2.37)					(-2.12)
$\Delta\sigma^{\text{Tracking Error}}$			0.12**	0.13**			0.12**
			(2.00)	(2.05)			(2.02)
Risk Shifting					-4.89**	-4.84**	-4.49*
					(-2.03)	(-2.02)	(-1.88)
Log(TNA)_{t-1}	-0.08***	-0.08***	-0.07***	-0.07***	-0.07***	-0.07***	-0.07***
	(-5.98)	(-6.04)	(-5.59)	(-5.64)	(-5.59)	(-5.64)	(-5.47)
Log(Age)_{t-1}	0.02	0.02	0.02	0.02	0.01	0.01	0.01
	(0.73)	(0.76)	(0.72)	(0.76)	(0.48)	(0.52)	(0.53)
Expenses_{t-1}	-13.33***	-13.47***	-0.14***	-0.14***	-0.14***	-0.14***	-0.14***
	(-3.07)	(-3.12)	(-3.04)	(-3.07)	(-3.19)	(-3.25)	(-3.15)
Turnover_{t-1}	-0.08**	-0.08**	-0.06*	-0.06*	-0.06	-0.06	-0.05
	(-2.20)	(-2.08)	(-1.69)	(-1.67)	(-1.57)	(-1.57)	(-1.39)
$\text{Log(Fam. Size)}_{t-1}$	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***
	(6.12)	(6.10)	(6.00)	(5.98)	(6.00)	(5.99)	(5.78)
$\alpha^{4F}_{t-1,t-3}$	0.48***	0.49***	0.48***	0.50***	0.46***	0.47***	0.48***
	(5.84)	(5.96)	(5.77)	(5.93)	(5.45)	(5.57)	(5.66)
Ret. Vol_{t-1}	-0.07	-0.06	-0.09**	-0.09*	-0.07	-0.06	-0.06
	(-1.53)	(-1.41)	(-2.01)	(-1.89)	(-1.35)	(-1.23)	(-1.24)
$\text{Flow}_{t-1,t-12}$	-0.18***	-0.19***	-0.23***	-0.24***	-0.20***	-0.21***	-0.22***
	(-2.95)	(-3.10)	(-3.58)	(-3.74)	(-3.18)	(-3.34)	(-3.54)
Flow Vol_{t-1}	0.30	0.24	0.00	0.00	-0.00	-0.00	-0.00
	(0.55)	(0.44)	(0.36)	(0.20)	(-0.02)	(-0.17)	(-0.07)
Intercept	-0.19	-0.21	-0.06	-0.08	0.10	0.08	0.05
	(-0.68)	(-0.74)	(-0.20)	(-0.26)	(0.35)	(0.27)	(0.18)
FE: Time and Style	Y	Y	Y	Y	Y	Y	Y
Clusters: Time and Fund	Y	Y	Y	Y	Y	Y	Y
N	241,348	241,348	241,348	241,348	232,610	232,610	221,233
R^2	0.097	0.097	0.096	0.098	0.097	0.098	0.099

Table 10. Further Analysis: The Relation between Active Style Change and Risk Taking by Mutual Funds

This table reports the past fund characteristics (Panel A) and the future returns of mutual funds sorted according to Active Style Change measure based on second half of a calendar year ($ASC^{SVM-2nd\ Half}$). $ASC^{SVM-2nd\ Half}$ is measured as the average active change of fund's style exposures between at the end of the quarter (fourth quarter) relative to the second quarter of a calendar year and between the third quarter and the first quarter of a calendar year. Past return, $Past\ \alpha^{4F}$, and $Past\ Flow^{Style}$ are defined as in Table 3. The differences in past fund characteristics and future performance as well as their Newey-West (1987) *t* – statistics (in parentheses) are reported in Panel A, and B. ***, **, * denote statistical significance at the 1%, 5%, or 10% levels, respectively. The sample period is from 1984 to 2014.

Panel A. Past Performance and Flows of funds sorted on $ASC^{SVM-2nd\ Half}$

	Past Return			$Past\ \alpha^{4F}$			$Past\ Flow^{Style}$		
$ASC^{SVM-2nd\ Half}$ Quintiles	3-month	6-month	12-month	3-month	6-month	12-month	3-month	6-month	12-month
1 (Style-Attenuating)	2.87	5.58	10.96	-0.09	-0.18	-0.35	0.42	0.91	1.21
2	2.77	5.49	10.92	-0.11	-0.27	-0.58	0.18	0.39	1.10
3 (Control)	2.67	5.29	10.56	-0.11	-0.20	-0.38	0.12	0.36	0.45
4	2.51	5.04	10.33	-0.25	-0.49	-0.79	-0.02	-0.01	-0.01
5 (Style-Intensifying)	2.20	4.51	9.44	-0.35	-0.68	-1.13	-0.28	-0.34	-0.72
				Differences					
Style-Att. – Style-Int.	0.67***	1.07***	1.52**	0.27***	0.50***	0.78***	0.71***	1.26***	1.95***
	(3.00)	(2.69)	(2.02)	(3.27)	(3.15)	(2.61)	(4.74)	(3.99)	(4.02)
Style-Att. – Control	0.20	0.29	0.40	0.03	0.02	0.03	0.31**	0.54**	0.78*
	(0.82)	(0.84)	(0.88)	(0.86)	(0.31)	(0.22)	(2.32)	(-2.15)	(1.88)
Style-Int. – Control	-0.47**	-0.78**	-1.12*	-0.24***	-0.48***	-0.75***	-0.40***	-0.79***	-1.18***
	(-2.44)	(-2.13)	(-1.85)	(-2.87)	(-3.01)	(-2.73)	(-3.72)	(-2.79)	(-3.05)

Panel B. Fund performance: Sorting funds based on $ASC^{SVM-2nd\ Half}$

$ASC^{SVM-2nd\ Half}$ Quintiles	Equal-Weighted			TNA-Weighted		
	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$	$R_{t+1,t+3}$	$R_{t+1,t+6}$	$R_{t+1,t+12}$
1 (Style-Attenuating)	2.57	5.58	11.78	2.59	5.48	11.37
2	2.57	5.18	10.74	2.45	4.97	10.29
3 (Control)	2.56	5.14	10.72	2.45	4.88	10.13
4	2.40	4.86	10.32	2.10	4.32	9.19
5 (Style-Intensifying)	1.81	4.24	10.29	1.68	4.01	9.92
Differences: Return						
Style-Att. – Style-Int.	0.76***	1.33***	1.49**	0.90***	1.47***	1.45**
	(3.21)	(2.88)	(2.11)	(3.71)	(3.03)	(2.01)
Style-Att. – Control	0.01	0.43	1.06	0.14	0.60	1.24
	(0.15)	(0.88)	(1.32)	(0.52)	(1.25)	(1.62)
Style-Int. – Control	-0.75***	-0.90***	-0.43	-0.77***	-0.87***	-0.21
	(-4.43)	(-2.88)	(-0.86)	(-4.14)	(-2.74)	(-0.40)
Differences: Four-Factor Alpha (α^{4F})						
Style-Att. – Style-Int.	0.92***	1.20***	1.00*	0.98***	1.32***	1.02*
	(3.81)	(3.34)	(1.68)	(4.38)	(3.41)	(1.66)
Style-Att. – Control	0.02	0.03	0.11	0.05	0.22	0.17
	(0.22)	(0.12)	(0.59)	(0.32)	(0.82)	(0.34)
Style-Int. – Control	-0.90***	-1.16***	-0.89***	-0.93***	-1.10***	-0.85**
	(-6.84)	(-5.39)	(-2.43)	(-6.88)	(-4.66)	(-2.35)

Table 11. Stocks Traded by Mutual Funds: Future Performance and Style Loading

This table reports the time series mean of cross-sectional averages of quarterly future return and style characteristics of stocks purchased and sold by mutual funds sorted on Active Style Change (ASC^{SVM}) measure during the most recent quarter *t*. $\alpha^{4F}_{t+1,t+k}$ is the abnormal return (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) cumulated over subsequent *k* months with *k* vary from three to 12. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from subsequent 24-month estimation period by regressing each stock's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model. $\Delta\beta_t^S$ ($\Delta\beta_t^V$ and $\Delta\beta_t^M$) is the difference in the factor loading of a stock based on size (value and momentum) between at the end of the quarter *t* and *t*-1. Each quarter *t* and *t*-1, factor loadings, multiplied by 100, on size, value and momentum are obtained from the previous 24-month estimation period by regressing each stock's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model. Panel A and B report the results in equal-weighted for stocks purchased and sold by mutual funds. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively. The sample period is from 1984 to 2014.

	Style-Attenuating (Q1)			Control (Q3)			Style-Intensifying (Q5)			Difference: Style-Att. – Control		Difference: Style-Int. – Control	
	Buy	Sell	Buy-Sell	Buy	Sell	Buy-Sell	Buy	Sell	Buy-Sell	Buy	Sell	Buy	Sell
	Panel A. Future Stock Performance (Equal-Weighted)												
$\alpha^{4F}_{t+1,t+12}$	3.31	2.71	0.60	2.38	2.01	0.37	2.41	3.08	-0.67**	0.93**	0.70*	0.03	1.07**
$\alpha^{4F}_{t+1,t+6}$	1.23	0.91	0.33*	0.86	0.75	0.10	0.79	1.02	-0.23*	0.38*	0.15	-0.07	0.27*
$\alpha^{4F}_{t+1,t+3}$	0.60	0.35	0.25**	0.35	0.32	0.03	0.20	0.39	-0.18*	0.24*	0.03	-0.15	0.06
	Panel B. Change in Loadings (Equal-Weighted)												
$\Delta\beta_t^S$	-1.08	0.37	-1.45***	-0.11	-0.44	0.33	0.22	-1.35	1.57***	-0.97***	0.81***	0.33	-0.90***
$\Delta\beta_t^V$	-1.19	1.23	-2.42***	0.19	0.04	0.15	0.98	-0.95	1.93***	-1.38***	1.19***	0.79**	-0.99***
$\Delta\beta_t^M$	-0.69	0.05	-0.74***	-0.61	-0.48	-0.12	0.25	-1.07	1.32***	-0.08	0.54***	0.86***	-0.58***
$\Delta\beta_t^{SVM}$	-2.96	1.65	-4.61***	-0.53	-0.89	0.36	1.45	-3.37	4.82***	-2.43***	2.54***	1.98***	-2.48***

Table 12. Stocks Traded by Mutual Funds: Past Performance and Mutual Fund Ownership

This table reports the time series mean of cross-sectional averages of quarterly past return and ownership characteristics of stocks purchased and sold by mutual funds sorted on Active Style Change (ASC^{SVM}) measure during the most recent quarter *t*. $Ret_{t-1,t-k}$ is the prior *k*-month cumulative stock return with *k* vary from 3 to 12 at the beginning of the quarter *t*. $\alpha^{4F}_{t-1,t-k}$ is the abnormal return (intercept (α_i^{4F}) plus residual ($\varepsilon_{i,t}$)) cumulated over subsequent *k* months with *k* vary from 3 to 12. Intercept (α_i^{4F}) and residuals ($\varepsilon_{i,t}$) are obtained from previous 24-month estimation period by regressing each stock's monthly excess returns (over the T-bill rate) on the factors returns, using Carhart (1997) factor model. Each fund and quarter, stocks sold by a mutual funds ranked into five quintiles based on their past twelve-month return (a stock with the highest (lowest) past return has rank of 5 (1)). Performance Rank is average rank of stocks sold by mutual funds $\%own_{t-1}$ is the percentage ownership of stocks, separately for all funds, funds with the same style, and winner funds in the same style, at the beginning of the quarter *t*. Δw_t is the change in portfolio weight, separately for all funds, funds with the same style, and winner funds in the same style, during the most recent quarter *t*. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively. The sample period is from 1984 to 2014

	Style-Attenuating (Q1)			Control (Q3)			Style-Intensifying (Q5)			Difference: Style-Att. – Control		Difference: Style-Int. – Control	
	Buy	Sell	Buy-Sell	Buy	Sell	Buy-Sell	Buy	Sell	Buy-Sell	Buy	Sell	Buy	Sell
	Panel A. Past Stock Performance (Equal-Weighted)												
$Ret_{t-1,t-12}$	23.57	20.44	3.13***	21.07	19.01	2.06***	19.22	20.82	-1.60**	2.50**	1.43*	-1.84**	1.81***
$Ret_{t-1,t-6}$	10.21	8.04	2.17***	8.99	7.68	1.31***	7.54	9.01	-1.46***	1.22*	0.36	-1.45***	1.33***
$Ret_{t-1,t-3}$	4.63	3.41	1.21***	4.17	3.30	0.87***	3.31	4.25	-0.95***	0.45*	0.11	-0.87***	0.95***
	Panel B. Performance Rank of Stocks Sold												
Performance Rank		2.97			2.98			3.02			0.01		0.04**
	Panel C. Ownership and Trade Characteristics												
$\%own^{All\ Funds}_{t-1}$	9.44	10.03	-0.58***	9.13	9.44	-0.31***	9.57	9.23	0.34***	0.32***	0.58***	0.44***	-0.22***
$\%own^{Same\ Style}_{t-1}$	4.35	4.77	-0.43***	4.07	4.34	-0.27***	4.33	4.04	0.29***	0.28***	0.43***	0.27***	-0.29***
$\%own^{Winner}_{t-1}$	6.54	7.00	-0.46***	6.45	6.71	-0.26***	6.79	6.51	0.28***	0.09	0.29***	0.34***	-0.20***