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ORIGINAL ARTICLE

The turn-of-the-year effect in mutual fund flows

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Abstract The seasonal regularity in cash flows to mutual funds remains a puzzle. In line with Choi (J Appl Bus Res 31(2):715–726, 2015), who observes the seasonality in cash flows in the U.S. domestic mutual fund industry, we find that the month of January is characterized by the highest net flows, and December, the lowest. Considering that mutual fund traders usually implement their investment decisions during the turn-of-the-year period, this study investigates the potential causes of this seasonal regularity. The seasonal component of investors' asset-allocation decisions is not associated with the seasonal variations in personal income growth and consumption growth. Instead, the tax treatment of the distribution from mutual funds is likely to drive this seasonal pattern. We also find strong evidence that past performance affects the seasonality in the cash flows of equity funds. The "January effect" in the inflow to mutual funds is stronger for the funds with higher past performance. Interestingly, investors are not sensitive to the past performance when they buy style funds, but they sell the funds with poorly performed styles at the turn of the year.

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Introduction

A considerable amount of empirical research identifies different seasonal patterns in capital markets, including the stock, bond, and derivatives markets.[1] According to the efficient market hypothesis, these anomalies appear to be puzzles, as asset prices reflect all the available information but past returns cannot predict future returns (Malkiel and Fama 1970). If the seasonal patterns in asset returns are nontrivial, then active mutual fund managers would be willing to utilize this regularity to obtain abnormal returns. Gallagher and Pinnuck (2006) report empirical evidence that the performance of Australian mutual funds surpasses the norm in December. Matallín-Saez (2006) examines the Spanish mutual fund industry and shows positive abnormal seasonal returns at the end of the year as well as the month, and especially at the beginning of July.

The seasonal regularity in mutual fund returns would also lead investors to exploit the anomalies by timing their entry and exit points into and from active mutual funds, respectively. Choi (2015) analyzes fund-level flows for U.S. domestic equity funds and finds that net shareholder flows are higher in January than in December. Interestingly, this seasonality in flows is persistent even after controlling the fund and stock market performance, which would suggest that anomalies in fund returns cannot be the only cause for the flow seasonality. Kamstra et al. (2017) show increased aggregate net investor flows to the U.S. money market and government bond mutual funds in the autumn and equity funds in the spring. They also find similar evidence for Canadian mutual fund flows and inflows for Australian funds. They suggest the seasonal regularity of fund flows is related with the seasonality in investor risk aversion.

Not only the fund flow but also the risk exposure is affected by the performance of mutual funds. Brown et al. (1996) and Chevalier and Ellison (1997) show that past performance and changes in risk are negatively related due to managerial incentive gaming. Koski and Pontiff (1999) show that change in risk is significantly related to prior performance, and that these changes are consistently less severe for derivative users. As new cash flows come into a fund following strong performance, fund risk would decrease until managers fully invest the cash. On the other hand, after poor performance, investors redeem shares, and fund risk increases as managers borrow to meet redemptions. Thus, understanding the seasonal regularity of fund flows is critical to manage risk for mutual funds.

Although the recent empirical evidence observes seasonality in mutual fund flows, not many studies explain the reason behind the same. In this paper, we identify the possible sources of seasonality in mutual fund cash flows. We examine

[1] See, for example, Choi (2014a, 2014c), De Bondt and Thaler (1986), Fridson (2000), Jordan and Jordan (1991), Shim et al. (2015), and Sørensen (2002).

the linkage between the seasonal pattern and various factors, such as the seasonal component in personal income and consumption, the tax treatment of distributions from mutual funds, style objectives of funds, and past performance of funds. We find that the seasonal component of their asset-allocation decisions is not associated with the seasonal variations in personal income and consumption growth. Unlike the seasonal patterns in fund returns, which are extensively studied in the literature, the seasonal patterns in fund flows are indifferent to style objectives.[2] The tax treatment of the distribution from mutual funds, however, drives this seasonal pattern such that investors delay buying mutual funds until January. Past performance also influences the seasonality in the cash flows of equity funds. The "January effect" in the inflow to mutual funds is stronger for funds with higher past performance. We find that investors are not sensitive to past performance when they buy style funds. However, they sell the funds with poor past performance in the turn-of-the-year period.

The rest of this paper is organized as follows. "Cash flows to mutual funds" section describes the sample and presents the preliminary analysis. "Turn-of-the-year effect in cash flows to mutual funds" section reports the empirical results of the seasonality test of the cash flows to the U.S. domestic mutual funds. "What causes the seasonal patterns in mutual fund flows?" section offers possible explanations for the seasonality. Finally, "Concluding remarks" section concludes with a discussion on findings of this paper.

Cash flows to mutual funds

Data

This study examines the seasonal patterns in net flows, inflows, and outflows for U.S. domestic equity mutual funds over the 21-year period beginning in January 1994 and ending in December 2014. Our sample is based on information compiled by the high-quality and long-period Center for Research in Security Prices Survivor-Bias-Free Mutual Fund Database (CRSP database) and mutual funds' N-SAR filings with the U.S. Securities and Exchange Commission (SEC).

The CRSP database provides the class-level information of fund shares on monthly total net assets (TNAs), monthly returns, asset classes (equity versus bond fund), style objectives, and names for all open-end mutual funds. Our sample period is between January 1994 and December 2014. We include 31,124 U.S. domestic equity fund classes into this study.[3] Since the reported returns of the small funds can be biased upward (Elton et al. (2001) and Chen et al. (2004)), we eliminate the funds with less than 15 million dollars in assets under management. In doing so, we refer to 18,793 equity fund classes reported in the CRSP database.

All mutual funds are required to file N-SARs with the SEC every 6 months based on their fiscal year. N-SAR filings contain information on the dollar amount of new

[2] See, for example, Branch (1977), Dyl (1977), Keim (1983), Reinganum (1983), Roll (1983), and Ritter (1988).

[3] We exclude international funds, natural resources funds, and index funds from our final sample.

sales, reinvestment of dividends and distributions, other sales, and redemptions for each month covered by the filing. N-SAR filings also identify the TNAs of mutual funds at the end of the period covered by the filing. Because of data availability, we collect all N-SARs pertaining to the calendar years 1994 through 2014 from the SEC's Edgar website.[4] We then match a fund's N-SAR filing with the CRSP database based on the fund and family names.

N-SARs report the monthly dollar flows inflows and outflows at the fund level, but the CRSP mutual fund database reports the values at the fund share classes as different entities. Choi (2014b) shows that the estimated fund flows based on CRSP database would be underestimated relative to the reported flows from N-SAR filings. Following his approach, we manually identify the share classes of a fund according to fund names, and calculate TNA values and monthly fund returns at the fund level to match them to the N-SAR filings. Through these process, we get matched mutual fund-level data containing 3099 domestic equity funds over the period from January 1994 to December 2014.

Table 1 reports the descriptive statistics of the matched and unmatched equity mutual fund classes reported in the CRSP database. Out of 18,793 fund classes, the matched sample consists of 17,581 fund classes between the CRSP database and the N-SAR filings with the SEC. On average, assets managed by matched funds are greater than by unmatched funds, and the matched funds yield greater returns and make more distributions. The characteristics between matched and unmatched sample funds are not significantly different. The median of each statistic also reveals similar characteristics between the matched and unmatched funds.

Net flows, inflows, and outflows

Since the CRSP database does not directly report the flows, most previous studies infer net flows from fund returns and TNAs reported by the CRSP. In this study, however, we collect the information of monthly sales and redemptions from the N-SAR filings for each mutual fund. Using the combined information from the CRSP and N-SAR filings allows us to identify monthly cash inflows to and outflows from the mutual funds separately. Inflows is defined as

$$Inflows_{i,t} = \frac{Sales_{i,t}}{TNA_{i,t-1}} \tag{1}$$

where $Sales_{i,t}$ denotes the amount of new money invested in a fund over a month. Outflows is defined as

$$Outflows_{i,t} = \frac{Redemptions_{i,t}}{TNA_{i,t-1}} \tag{2}$$

where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over a month. We also define the net flows for a matched fund, Net Flows, as

[4] http://www.sec.gov/edgar.shtml.

Table 1 Descriptive statistics for the U.S. domestic equity funds

	Matched	Unmatched	All
Monthly total net asset value ($ million)			
Mean (median)	668.1 (111.2)	645.7 (112.4)	657.8 (111.7)
Monthly return (%)			
Mean (median)	0.76 (1.15)	0.62 (1.04)	0.70 (1.10)
Capital distribution (%)			
Mean (median)	0.62 (0.00)	0.54 (0.00)	0.58 (0.00)
Income distribution (%)			
Mean (median)	0.17 (0.00)	0.16 (0.00)	0.16 (0.00)

This table reports the descriptive statistics (mean and median values) of monthly TNA value, monthly return, capital distribution, income distribution, and number of fund classes of U.S. domestic equity mutual funds. We exclude funds with less than 15 million dollars in assets under management. Out of 18,793 fund classes from the CRSP Survivor-Bias-Free US Mutual Fund Database over the sample period from January 1994 to December 2014, the matched sample consists of 17,581 fund classes between the CRSP database and N-SAR filings with the SEC

$$Net\ Flows_{i,t} = Inflows_{i,t} - Outflows_{i,t} \tag{3}$$

We eliminate some erroneous observations (e.g., data entry errors) from the final sample. Specifically, we exclude observations with Net Flows, Inflows, or Outflows less than −90% or greater than 100%, leaving us with a final sample of 149,521 equity fund–month observations.[5]

Figure 1 shows the value-weighted average net flows to equity funds by month.[6] Net flows to equity funds are turned out to be the highest in January. They normally decrease until December. The net flows become −0.04% in December. Although net flows rebound in April and August, the downward trend in the net flows to equity funds appears to be very strong. Considering the significant growth of mutual fund markets, the negative net flows in December are surprising. Net flows in months other than January and December do not show a systematic pattern. The net flows in the first half of the year are greater than those in the second half of the same year.

Turn-of-the-year effect in cash flows to mutual funds

As reported in Fig. 1, the net flows are the lowest in December relative to those in the other months of the year, and the month of January shows the highest net flows. An analysis of the net flows in April and October, which are higher than those in the prior months, indicates that investors seem to more actively rebalance

[5] We conduct a robustness check by using various cutoffs of flows. However, the qualitative results are the same.

[6] In this study, we report the results using the value-weighted average flows to equity funds. We also rerun all the analyses with the equally weighted average flows and arrive at the same qualitative results.

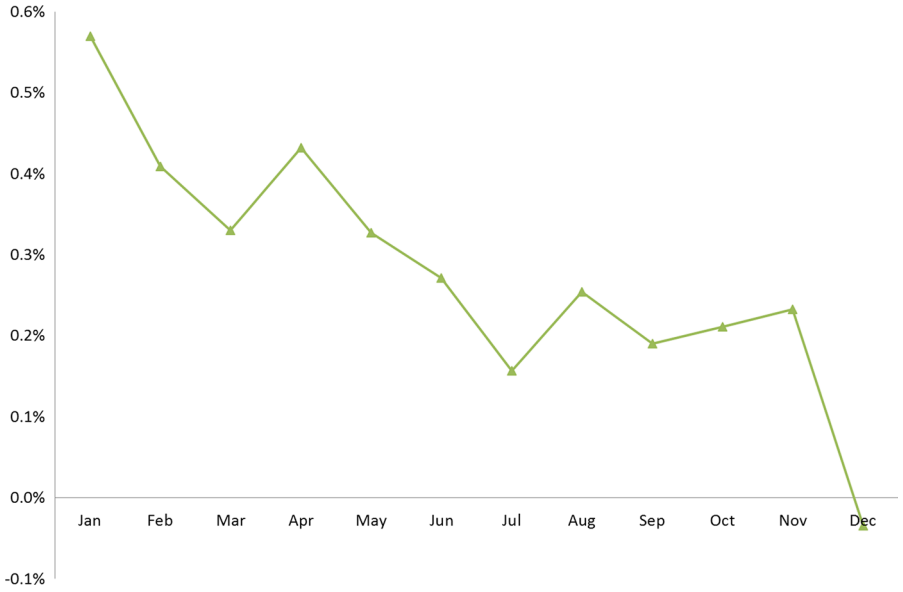

Fig. 1 Net flows to mutual funds by month. This figure plots the means of the value-weighted average net cash flows to U.S. domestic equity mutual funds by month. *Net Flows*$_{i,t}$ = *Inflows*$_{i,t}$ − *Outflows*$_{i,t}$, where *Inflows*, *Outflows*, and *Net flows* are measured for 3099 equity funds from a combination of funds from CRSP Survivor-Bias-Free US Mutual Fund Database and N-SAR filings with the SEC over the period from January 1994 to December 2014. *Inflows* refers to *Sales*$_{i,t}$/*TNA*$_{i,t-1}$, where *Sales*$_{i,t}$ denotes the amount of new money invested into a fund over the month. *Outflows* refers to *Redemptions*$_{i,t}$/*TNA*$_{i,t-1}$, where *Redemptions*$_{i,t}$ is the amount of money withdrawn from a fund over the month. *Net Flows* refers to the difference between *Inflows* and *Outflows*. We exclude observations when the TNA value is less than 15 million dollars or the net flows are less than −90% or greater than 100%

asset allocation at the beginning of the quarter than the rest of the year. In this section, we statistically test whether these turn-of-the-year and the turn-of-the-quarter effects exist in cash flows to equity mutual funds.

Using the value-weighted monthly average cash flows to mutual funds, we estimate the following ordinary least squares (OLS) regression:

$$Flow_t = \alpha + \beta_1 BoY_t + \beta_2 EoY_t + \beta_3 BoQ_t + \beta_4 EoQ_t + \varepsilon_t \quad (4)$$

In this regression, $Flow_t$ refers to the value-weighted monthly average Inflows, Outflows, and Net Flows of U.S. domestic equity funds in our matched sample, as defined in Eqs. (1)–(3). BoY_t is an indicator variable for the beginning of the year, and it takes one if the month at time t is January and zero otherwise. EoY_t, an indicator variable for the end of the year, takes one if the month at time t is December and zero otherwise. BoQ_t is an indicator variable for the beginning of the quarter, and it equals one if the month at time t is April, July, or October, and zero otherwise. EoQ_t is an indicator variable for the end of the quarter, and it equals one if the month at time t is March, June, or September, and zero otherwise. The expected flows to mutual funds in February, May, August, and November are

measured by the intercept (α), while the beta coefficients indicate the differences between the expected flows in these months and the expected flows at the turn-of-the-year and the turn of the quarter, respectively.

Table 2 presents the estimation results of Eq. (4) on the value-weighted average inflows, outflows, and net flows for the equity funds in our matched sample. We report the results for the entire sample period in the first three columns. The estimated coefficients of the beginning-of-the-year variables are significant and positive in inflows and net flows, and those of the end-of-the-year variables are significant and positive in all flow measures. Notably, the inflow is higher in January than other months of the year, leading to higher net flows to equity funds compared with the other months of the year. It is quite interesting that the outflow is higher, not lower, in January. One possible reason for the high outflow in January can be attributed to the investors who move from one fund to another. That is, mutual fund investors rebalance their portfolios more actively in January than during the rest of the year.

Both the inflow and the outflow to the equity funds are statistically significantly higher in December compared with the remaining months. However, the outflow increases more than the inflow, making the net flow significantly lower than the rest of the year. In other words, current investors tend to sell their shares to a greater extent in December, and this effect, combined with the increased inflow in January, results in a decreasing seasonal pattern of net flows in mutual funds, as reported in Fig. 1. Across all the flow variables, the coefficients of the beginning and end of the quarter are not significantly different from those of the other months of the year. Thus, the unique seasonal pattern observed for the cash flows to mutual funds is limited to the turn-of-the-year effect, not to the turn-of-the-quarter effect.

Over the last two decades, we observed booms and busts in the stock market. For example, the S&P 500 increased from 459 in 1994 to 1469 in 1999 and then decreased to 880 in 2002. Since 2002, the S&P 500 has been increasing, except during the 2008 global financial crisis, reaching 2059 in 2014. In order to examine whether the seasonal regularity of mutual fund flows is affected by the market condition, we run the regression analysis in Eq. (4) over two subperiods, 1999–2004 and 2005–2014. As reported in Table 2, January is the month with the highest inflow, and December is the month with the highest outflow in both subperiods. Although the statistical significance seems to be marginal, given the fact that a statistical test for seasonality requires a relatively long sample period, the positive net flows in January and the negative net flows in December are quite intriguing phenomena in the mutual fund industry.

What causes the seasonal patterns in mutual fund flows?

In this section, we discuss the possible explanations for the observed seasonal patterns in the cash flows of mutual funds. Specifically, we examine whether the seasonal patterns exist after we control for various factors such as the growth of

Table 2 Seasonality in mutual fund flows

	(1994–2014)			(1994–2004)			(2005–2014)		
	Inflows	Outflows	Net flows	Inflows	Outflows	Net flows	Inflows	Outflows	Net flows
Intercept	4.235*** (39.09)	3.610*** (35.48)	0.624*** (8.06)	4.154*** (36.29)	3.243*** (38.77)	0.911*** (8.86)	4.324*** (22.65)	4.015*** (22.67)	0.309*** (3.11)
Beginning of the year	0.703*** (2.90)	0.371 (1.63)	0.332* (1.92)	0.932*** (3.64)	0.523*** (2.80)	0.409* (1.78)	0.452 (1.06)	0.204 (0.51)	0.248 (1.12)
End of the year	0.408* (1.68)	0.770*** (3.38)	−0.362** (2.09)	0.340 (1.33)	0.651*** (3.48)	−0.310 (−1.35)	0.482 (1.13)	0.901** (2.27)	−0.418* (−1.88)
Beginning of the quarter	0.143 (0.87)	0.124 (0.80)	0.019 (0.16)	0.107 (0.61)	0.160 (1.25)	−0.053 (−0.33)	0.183 (0.63)	0.084 (0.31)	0.099 (0.65)
End of the quarter	0.021 (0.13)	0.129 (0.83)	−0.107 (−0.91)	0.065 (0.37)	0.234* (1.83)	−0.169 (−1.07)	−0.026 (−0.09)	0.014 (0.05)	−0.040 (−0.26)
No. of obs.	252	252	252	132	132	132	120	120	120
Adj. R^2	0.042	0.049	0.044	0.103	0.118	0.058	0.022	0.047	0.056

This table presents the OLS regression results on the value-weighted average inflows, outflows, and net flows of U.S. domestic equity mutual funds. Inflows, Outflows, and Net flows are measured for 3099 equity funds from a combination of funds from the CRSP database and the N-SAR filings with the SEC over the period from January 1994 to December 2014. Inflows refers to $Sales_{i,t}/TNA_{i,t-1}$, where $Sales_{i,t}$ is the amount of new money invested into a fund over the month. Outflows refers to $Redemptions_{i,t}/TNA_{i,t-1}$, where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over the month. Net Flows refers to the difference between *Inflows* and *Outflows*. The dummy variable *Beginning of the year* takes one if the calendar month at time t is January and zero otherwise. The dummy variable End of the year takes one if the calendar month at time t is December and zero otherwise. The dummy variable *Beginning of the quarter* takes one if the calendar month at time t is April, July, or October and zero otherwise. The dummy variable *End of the quarter* takes one if the calendar month at time t is March, June, or September and zero otherwise. We exclude observations when the TNA value is less than 15 million dollars or the flows are less than −90% or greater than 100%. Flows are reported in percentage. The results for the entire sample period are reported in the first three columns and the results for the subperiod are reported in the remaining columns. t statistics are in parentheses

*, **, and *** Significance at the 10, 5, and 1% levels, respectively

personal income and consumption, tax effect on the fund distributions, style objectives, and past performance of funds.[7]

Personal income and consumption

Miron and Beaulieu (1996) show that events such as Christmas or other holidays shift the marginal utility of consumption. In line with this finding, investors would spend money to buy gifts or travel rather than purchase mutual funds in December. On the other hand, because they receive end-of-year bonuses and dividend income from their holdings, investors would be able to buy mutual funds around the turn of the year. These seasonal changes in personal income and consumption can be related to the strong seasonal regularities in fund flows: the high net flows in January and the low net flows in December.

We use the monthly personal consumption expenditures and disposable personal income data from the National Income and Product Accounts (NIPA) to proxy for mutual fund investors' personal income and consumption. In the regression model in Eq. (4), we also include the personal consumption expenditure growth and disposable personal income growth, which are measured by the log difference between the personal consumption expenditure at time t and $t-1$ and the log difference between the disposable personal income at time t and $t-1$, respectively.

Table 3 presents the estimation results of the value-weighted average inflows, outflows, and net flows to equity mutual funds. Albeit statistically insignificant, the consumption growth is positively related to the inflows to equity funds and negatively related to the outflows, resulting in a significantly positive effect on the net flows. In a month with higher consumption growth, we would observe increased net flows to equity mutual funds. The income growth, however, is negatively related with inflows and outflows, and its effect on the net flows is positive but insignificant. The seasonal patterns in the cash flows to equity funds exhibit similar results in Table 2. Although the net flows to equity mutual funds would be affected by the consumption growth, the trading activity of mutual fund investors in January remains strong around the turn of the year even after controlling the growth in consumption and income.

Tax treatment of the distributions

Investors of a mutual fund are entitled to their share of the fund's net income and capital gains. In order to avoid being taxed as a corporation, the fund must pass through its net income and capital gains to investors as distributions, which generate tax liability for taxable investors. Johnson and Poterba (2016) find that some taxable shareholders time their purchases of mutual fund shares to avoid tax increases associated with distributions. Most equity funds distribute their capital gains and dividend incomes in December. If the mutual fund investors have an incentive to

[7] We rerun all the analyses over two subperiods, 1994–2004 and 2005–2014, and arrive at the same qualitative results. To save space, results over the entire sample period are reported in this article, but results over the subperiods are available upon request.

Table 3 Effect of consumption growth and income growth on seasonality in mutual fund flows

	Inflows	Outflows	Net flows
Intercept	3.289*** (27.46)	2.969*** (26.45)	0.320*** (5.24)
Beginning of the year	0.493** (2.13)	0.158 (0.73)	0.336*** (2.85)
End of the year	0.026 (0.11)	0.307 (1.43)	−0.281** (−2.40)
Beginning of the quarter	0.231 (1.47)	0.244* (1.66)	−0.013 (−0.17)
End of the quarter	0.050 (0.32)	0.154 (1.04)	−0.104 (−1.30)
Consumption growth	6.801 (0.48)	−11.844 (−0.89)	18.646** (2.58)
Income growth	−1.902 (−0.24)	−2.589 (−0.35)	0.686 (0.17)
No. of observations	252	252	252
Adj. R^2	0.026	0.019	0.073

This table presents the OLS regression results on the value-weighted average inflows, outflows, and net flows of U.S. domestic equity mutual funds. Inflows, Outflows, and Net flows are measured for 3099 equity funds from a combination of funds from the CRSP Survivor-Bias-Free US Mutual Fund Database and N-SAR filings with the SEC over the period from January 1994 to December 2014. *Inflows* refers to $Sales_{i,t}/TNA_{i,t-1}$, where $Sales_{i,t}$ is the amount of new money invested into a fund over the month. Outflows refers to $Redemptions_{i,t}/TNA_{i,t-1}$, where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over the month. Net Flows refers to the difference between *Inflows* and *Outflows*. The dummy variable *Beginning of the year* takes one if the calendar month at time t is January and zero otherwise. The dummy variable *End of the year* takes one if the calendar month at time t is December and zero otherwise. The dummy variable *Beginning of the quarter* takes one if the calendar month at time t is April, July, or October and zero otherwise. The dummy variable *End of the quarter* takes one if the calendar month at time t is March, June, or September and zero otherwise. $Consumption\ Growth_t$ and $Income\ Growth_t$ are measured by the log difference between the personal consumption expenditure at time t and $_{t-1}$ and the log difference between the disposable personal income at times t and $_{t-1}$, respectively. We exclude observations when the TNA value is less than 15 million dollars or the flows are less than −90% or greater than 100%. t statistics are in parentheses

*, **, and *** Significance at the 10, 5, and 1% levels, respectively

time their purchases, these seasonal patterns of distributions from funds may be related to the high net flows in January and the low net flows in December.

To further investigate this conjecture, we examine the effect of tax treatments of capital gain distribution and income dividend distribution on the seasonality in mutual fund flows separately. First, at the beginning of each year, we rank equity funds based on the proportion of capital gain distribution per share to the reinvestment price in December of the previous year. All capital gain distribution-paying equity funds are classified into five quintiles. We calculate the value-weighted monthly mean inflows, outflows, and net flows for each quintile and nonpaying fund. We run the OLS regression in Eq. (4) for each quintile and nonpaying fund. If investors tend to time their purchases to avoid the capital gain distributions, we would expect a stronger inflow in January to funds making higher capital gain distributions.

The regression results presented in Table 4 indicate that the observed relation between the inflow to funds and their capital gain distribution is not consistent with the hypothesis that the investors time their purchases to avoid the capital gain distributions. In general, the mutual funds that did not pay capital gain distributions enjoyed the highest cash inflow as the intercept turned out to be the biggest among

Table 4 Effect of tax treatment of capital gain distribution on seasonality in mutual fund flows

	Non payer	(Low)				(High)
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Panel A: inflows						
Intercept	3.700*** (20.96)	2.962*** (15.14)	3.571*** (17.07)	3.682*** (19.30)	3.256*** (15.18)	2.507*** (14.32)
Beginning of the year	0.213 (0.54)	0.807* (1.84)	1.098** (2.35)	0.771* (1.81)	0.962** (2.01)	0.410 (1.06)
End of the year	−0.169 (−0.43)	0.387 (0.88)	0.360 (0.77)	0.358 (0.84)	0.006 (0.01)	1.270*** (3.28)
Beginning of the quarter	0.353 (1.31)	0.576* (1.93)	0.388 (1.21)	−0.169 (−0.58)	0.003 (0.01)	0.159 (0.59)
End of the quarter	0.059 (0.22)	0.191 (0.64)	0.271 (0.85)	−0.331 (−1.13)	−0.190 (−0.58)	−0.025 (−0.09)
No. of observations	252	252	252	252	252	252
Adj. R^2	0.010	0.023	0.023	0.030	0.022	0.049
Panel B: outflows						
Intercept	3.301*** (19.51)	2.027*** (15.55)	2.740*** (17.30)	3.111*** (16.36)	2.638*** (20.86)	2.195 (12.51)
Beginning of the year	−0.019 (−0.05)	0.345 (1.18)	0.552 (1.56)	0.026 (0.06)	0.535* (1.90)	0.602 (1.55)
End of the year	0.116 (0.31)	0.757** (2.60)	0.549 (1.55)	0.492 (1.16)	0.659** (2.34)	−0.145 (−0.37)
Beginning of the quarter	0.360 (1.39)	0.577*** (2.90)	0.472* (1.95)	−0.219 (−0.76)	0.036 (0.19)	0.322 (1.20)
End of the quarter	0.189 (0.73)	0.356* (1.79)	0.395 (1.63)	−0.240 (−0.82)	−0.084 (−0.43)	0.171 (0.63)
No. of observations	252	252	252	252	252	252
Adj. R^2	0.009	0.046	0.024	0.014	0.041	0.016
Panel C: net flows						
Intercept	0.399*** (6.53)	0.935*** (5.57)	0.831*** (5.65)	0.571*** (3.56)	0.618*** (3.45)	0.312 (1.11)
Beginning of the year	0.232* (1.70)	0.462 (1.23)	0.546* (1.66)	0.745** (2.08)	0.427 (1.07)	−0.192 (−0.31)
End of the year	−0.285** (−2.09)	−0.370 (−0.99)	−0.189 (−0.57)	−0.134 (−0.37)	−0.654 (−1.64)	1.415 (2.27)
Beginning of the quarter	−0.007 (−0.07)	−0.001 (0.00)	−0.084 (−0.37)	0.051 (0.21)	−0.034 (−0.12)	−0.163 (−0.38)
End of the quarter	−0.130 (−1.39)	−0.165 (−0.64)	−0.124 (−0.55)	−0.091 (−0.37)	−0.106 (−0.39)	−0.195 (−0.45)

Table 4 continued

	Non payer	(Low)				(High)
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
No. of observations	252	252	252	252	252	252
Adj. R^2	0.044	0.015	0.018	0.023	0.019	0.029

At the beginning of each year, equity funds are ranked based on the proportion of capital gain distribution per share to the reinvestment price in December of the previous year. All capital gain distribution-paying equity funds are classified into five quintiles. We calculate the value-weighted monthly mean inflows, outflows, and net flows for each quintile and nonpaying fund. This table presents the OLS regression results on the value-weighted average inflows, outflows, and net flows of U.S. domestic equity mutual funds for each quintile and nonpaying fund. *Inflows* (Panel A), *Outflows* (Panel B), and *Net flows* (Panel C) are measured for 3099 equity funds from a combination of funds from CRSP Survivor-Bias-Free US Mutual Fund Database and N-SAR filings with the SEC over the period from January 1994 to December 2014. *Inflows* refers to $Sales_{i,t}/TNA_{i,t-1}$, where $Sales_{i,t}$ is the amount of new money invested into a fund over the month. *Outflows* refers to $Redemptions_{i,t}/TNA_{i,t-1}$, where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over the month. *Net Flows* refers to the difference between *Inflows* and *Outflows*. The dummy variable *Beginning of the year* takes one if the calendar month at time t is January and zero otherwise. The dummy variable *End of the year* takes one if the calendar month at time t is December and zero otherwise. The dummy variable *Beginning of the quarter* takes one if the calendar month at time t is April, July, or October and zero otherwise. The dummy variable *End of the quarter* takes one if the calendar month at time t is March, June, or September and zero otherwise. We exclude observations when the TNA value is less than 15 million dollars or the flows are less than −90% or greater than 100%. t statistics are in parentheses

*, **, and *** Significance at the 10, 5, and 1% levels, respectively

the distribution groups. Also, across the quintiles, the results show that the relation between the inflows and the capital gain distribution tend to be inverted U-shaped as the intercept is the highest for quintile 3 and the lowest for quintile 5. It is noteworthy that this inverted U-shape is observed for coefficients of the beginning-of-the-year variable, which can be interpreted to mean that the strong beginning-of-the-year effect of cash inflows to equity mutual funds is not related with the tax treatment of capital gain distributions. The lack of an increase in the inflow in January to funds paying higher capital gain distributions also indicates that taxable investors may be discouraged from buying the fund's shares, as suggested by Khorana and Servaes (1999).

The turn-of-the-year effect of outflows is not as strong as that of inflows but mutual fund investors tend to leave the fund with low capital gain distributions since the coefficients of the end-of-the-year variable reduce as funds continue to pay out distributions. Combining the effect on inflows and outflows around the turn of the year, the net flows to funds in quintiles 2 and 3 in January are higher than during the rest of the year. However, we observe no December effects of net flows across all quintiles. For nonpaying funds, however, the positive net flows in January and the negative net flows in December are statistically significant. These results suggest that the potential investors do not time their purchases as they consider the tax burden due to the accumulated capital gains in the fund.

Next, we examine the effect of tax treatment of income dividend distributions on the seasonality in mutual fund flows. Investors can react differently to capital gain distributions and income dividend distributions because they can find alternative funds with similar strategies and lower accumulated capital gains. At the beginning of each year, we rank equity funds based on the proportion of income dividend distribution per share to the reinvestment price in December of the previous year. All income dividend distribution-paying equity funds are classified into five quintiles. We calculate the value-weighted monthly mean inflows, outflows, and net flows for each quintile and nonpaying fund. We run the OLS regression in Eq. (4) for each quintile and nonpaying fund. Similar to the expected relation between the fund flows and the capital gain distributions, if investors tend to time their purchases to avoid the income dividend distributions, we would expect a stronger inflow in January to the funds making higher distributions.

The regression results presented in Table 5 indicate that January inflows to funds across all quintiles are higher than the rest of the year. In addition, the magnitude of the coefficient of the beginning-of-the-year variable increases for higher quintiles of income dividend distributions. This coefficient in quintile 5 is the highest across all quintiles, indicating that the increased inflow in January would be driven by the delayed purchases of taxable investors to avoid the tax associated with the income dividend distributions. Equity funds experience significantly increased outflows in January in quintiles 1 and 5, while the outflows increase significantly in December in quintiles 1, 4, and 5. The regression results on the net flows show relatively high net flows to funds in quintiles 3 and 4 in January and low net flows to the nonpaying funds in December. Thus, the trading activity based on the inflows and net flows reported in Table 5 reveal the relatively high trading activity around the turn of the

Table 5 Effect of tax treatment of income dividend distribution on seasonality in mutual fund flows

	Non payer	(Low)				(High)
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Panel A: inflows						
Intercept	3.957*** (19.33)	3.117*** (20.89)	3.002*** (22.68)	2.620*** (21.72)	2.699*** (18.39)	1.968*** (14.53)
Beginning of the year	0.066 (0.14)	0.777** (2.33)	0.532* (1.80)	0.932*** (3.46)	1.092*** (3.33)	1.279*** (4.24)
End of the year	−0.381 (−0.83)	0.264 (0.79)	0.086 (0.29)	0.035 (0.13)	0.401 (1.22)	0.669** (2.22)
Beginning of the quarter	0.186 (0.59)	0.080 (0.35)	0.105 (0.52)	0.057 (0.31)	0.237 (1.06)	0.158 (0.77)
End of the quarter	0.150 (0.48)	0.137 (0.60)	−0.159 (−0.79)	0.025 (0.13)	0.130 (0.58)	0.050 (0.24)
No. of observations	252	252	252	252	252	252
Adj. R^2	0.007	0.023	0.022	0.050	0.045	0.083
Panel B: outflows						
Intercept	3.455*** (8.87)	2.819*** (22.29)	2.737*** (21.83)	2.296*** (21.90)	2.234*** (14.87)	2.491 (13.35)***
Beginning of the year	−0.133 (−0.32)	0.636** (2.25)	0.344 (1.23)	0.254 (1.08)	0.321 (0.96)	1.062** (2.56)
End of the year	0.092 (0.22)	0.543* (1.92)	0.271 (0.97)	0.274 (1.17)	0.867** (2.58)	1.095*** (2.64)
Beginning of the quarter	0.235 (0.84)	0.014 (0.07)	0.098 (0.51)	0.161 (1.00)	0.301 (1.31)	0.189 (0.67)
End of the quarter	0.256 (0.92)	0.201 (1.04)	−0.074 (−0.39)	0.133 (0.83)	0.329 (1.43)	0.168 (0.59)
No. of observations	252	252	252	252	252	252
Adj. R^2	0.007	0.033	0.013	0.010	0.029	0.046
Panel C: net flows						
Intercept	0.502*** (7.34)	0.298*** (3.04)	0.265*** (3.86)	0.324*** (3.71)	0.465*** (3.30)	−0.522 (−3.47)
Beginning of the year	0.199 (1.30)	0.141 (0.64)	0.189 (1.23)	0.678*** (3.48)	0.772** (2.45)	0.216 (0.65)
End of the year	−0.473*** (−3.09)	−0.280 (−1.28)	−0.185 (−1.21)	−0.240 (−1.23)	−0.467 (−1.48)	−0.425 (−1.27)
Beginning of the quarter	−0.049 (−0.47)	0.065 (0.44)	0.008 (0.07)	−0.104 (−0.78)	−0.064 (−0.30)	−0.031 (−0.14)
End of the quarter	−0.106 (−1.01)	−0.064 (−0.42)	−0.085 (−0.81)	−0.109 (−0.82)	−0.199 (−0.92)	−0.118 (−0.52)

Table 5 continued

	Non payer	(Low)				(High)
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
No. of observations	252	252	252	252	252	252
Adj. R^2	0.053	0.013	0.018	0.072	0.045	0.011

At the beginning of each year, equity funds are ranked based on the proportion of income dividend distribution per share to the reinvestment price in December of the previous year. All income dividend distribution-paying equity funds are classified into five quintiles. We calculate the value-weighted monthly mean inflows, outflows, and net flows for each quintile and nonpaying fund. This table presents the OLS regression results on the value-weighted average inflows, outflows, and net flows of U.S. domestic equity mutual funds for each quintile and nonpaying fund. *Inflows* (Panel A), *Outflows* (Panel B), and *Net flows* (Panel C) are measured for 3099 equity funds from a combination of funds from CRSP Survivor-Bias-Free US Mutual Fund Database and N-SAR filings with the SEC over the period from January 1994 to December 2014. *Inflows* refers to $Sales_{i,t}/TNA_{i,t-1}$, where $Sales_{i,t}$ is the amount of new money invested into a fund over the month. *Outflows* refers to $Redemptions_{i,t}/TNA_{i,t-1}$, where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over the month. *Net Flows* refers to the difference between *Inflows* and *Outflows*. The dummy variable *Beginning of the year* takes one if the calendar month at time t is January and zero otherwise. The dummy variable *End of the year* takes one if the calendar month at time t is December and zero otherwise. The dummy variable *Beginning of the quarter* takes one if the calendar month at time t is April, July, or October and zero otherwise. The dummy variable *End of the quarter* takes one if the calendar month at time t is March, June, or September and zero otherwise. We exclude observations when the TNA value is less than 15 million dollars or the flows are less than −90% or greater than 100%. t statistics are in parentheses

*, **, and *** Significance at the 10, 5, and 1% levels, respectively

year, but there is no strong association between the increased fund flows and the income dividend distributions made by the funds.

Style objectives of funds

The strongest seasonal pattern in the mutual fund flows pertains to the high inflow and outflow in January. As the literature on the January effect in stock returns suggests that small stocks or stocks with high book-to-market ratio perform better, the high fund flows can be confined to funds with certain types of style objectives. To see if this is the case, we examine the turn-of-the-year effect in flows to equity funds with various style objectives.

We classify funds into six styles following the Lipper Classification: Small-Cap, Mid-Cap, Large-Cap, Growth, Core, and Value. We use the value-weighted monthly average cash flows to mutual funds in each style group to estimate the OLS regression in Eq. (4). We also test whether the seasonal patterns in flows to Small-Cap funds and Large-Cap funds (Value funds and Growth funds, respectively) are different. Table 6 reports the estimation results of Eq. (4) on inflows, outflows, and net flows for the mutual funds in each style group. The results show that January is characterized by the highest cash inflow to equity mutual funds across all style objectives. The coefficients of the beginning-of-the-year variable are significant at the 10% level or higher in all style objectives except Small-Cap and Mid-Cap funds. Notably, the incremental inflows to the Small-Cap funds (Value funds) in January are lower than those to the Large-Cap funds (Growth funds), although the difference is not significant. Even though the returns of stocks held by Small-Cap funds are expected to be high in January, as reported in the previous literature, investors do not buy more of these funds relative to the other style funds. Other than January, cash inflows to each style fund are not significantly different across all calendar months.

As for the outflows, all style funds experience the increased outflow in January relative to the other months of the year, but the significance is marginal. It is intriguing that investors in style funds do not sell their shares in January and December indifferently between Small-Cap and Large-Cap funds. Since the January effect of stock market returns is usually driven by Small-Cap stocks and it is known to be strong in the first week of the month, the current investors of Small-Cap funds would have had enough time to sell their shares in January after taking advantage of the January effect. Also, potential investors would have the opportunity to buy the Small-Cap funds in December to enjoy the January effect of the stock market. Overall, the season affects mutual fund investors' decision to sell their shares in some style funds, but the effect appears to be marginal. Although the net flows to each style fund in January are higher than the other months of the year, only the Large-Cap funds and the Core funds have statistically significantly increased net flows in January. We do not observe any other significant seasonal patterns in net flows to funds in each style. Thus, the seasonal effect on net flows to equity funds is not consistent with the relative performance among style funds either.

Table 6 Effect of style objective on seasonality in mutual fund flows

	Small-Cap	Mid-Cap	Large-Cap	Growth	Core	Value	Small − large	Value − growth
Panel A: inflows								
Intercept	4.019*** (11.84)	3.188*** (25.33)	2.630*** (21.47)	3.077*** (17.30)	2.803*** (18.68)	2.030*** (29.93)	1.389*** (3.85)	−1.047*** (−5.50)
Beginning of the year	0.479 (0.63)	0.423 (1.50)	0.659** (2.41)	0.659* (1.66)	0.782** (2.33)	0.596*** (3.93)	−0.180 (−0.22)	−0.063 (−0.15)
End of the year	0.452 (0.60)	0.410 (1.46)	0.123 (0.45)	0.094 (0.24)	0.279 (0.83)	0.016 (0.11)	0.329 (0.41)	−0.077 (−0.18)
Beginning of the quarter	0.187 (0.36)	0.083 (0.43)	0.090 (0.48)	0.402 (1.48)	0.084 (0.37)	0.134 (1.29)	0.097 (0.18)	−0.268 (−0.92)
End of the quarter	0.103 (0.20)	−0.114 (−0.59)	−0.029 (−0.15)	0.033 (0.12)	0.006 (0.03)	0.088 (0.85)	0.132 (0.24)	0.056 (0.19)
No. of observations	252	252	252	252	252	252		
Adj. R^2	0.003	0.023	0.026	0.018	0.025	0.061		
Panel B: outflows								
Intercept	3.935*** (13.29)	2.864*** (26.14)	2.499*** (18.70)	2.864*** (25.46)	2.602*** (15.12)	1.908*** (27.13)	1.436*** (4.42)	−0.956 (−7.21)
Beginning of the year	0.331 (0.50)	0.334 (1.36)	0.323 (1.08)	0.428* (1.70)	0.377 (0.98)	0.295* (1.88)	0.008 (0.01)	−0.133 (−0.45)
End of the year	0.273 (0.41)	0.622** (2.54)	0.456 (1.53)	0.459* (1.82)	0.506 (1.31)	0.278* (1.77)	−0.183 (−0.25)	−0.181 (−0.61)
Beginning of the quarter	0.268 (0.59)	0.147 (0.88)	0.082 (0.40)	0.411** (2.39)	0.078 (0.30)	0.170 (1.58)	0.186 (0.38)	−0.241 (−1.19)
End of the quarter	0.067 (0.15)	0.050 (0.30)	0.067 (0.33)	0.191 (1.11)	0.129 (0.49)	0.183* (1.70)	0.0004 (0.00)	−0.0078 (−0.04)
No. of observations	252	252	252	252	252	252		
Adj. R^2	0.002	0.030	0.012	0.031	0.009	0.026		

Table 6 continued

	Small-Cap	Mid-Cap	Large-Cap	Growth	Core	Value	Small − large	Value − growth
Panel C: net flows								
Intercept	0.084 (0.44)	0.325*** (2.69)	0.131* (1.92)	0.213* (1.87)	0.201*** (2.81)	0.122 (1.37)	−0.047 (−0.23)	−0.091 (−0.63)
Beginning of the year	0.148 (0.35)	0.089 (0.33)	0.337** (2.21)	0.231 (0.91)	0.405** (2.54)	0.301 (1.52)	−0.188 (−0.42)	0.070 (0.22)
End of the year	0.179 (0.42)	−0.212 (−0.79)	−0.333** (−2.18)	−0.365 (−1.44)	−0.227 (−1.42)	−0.262 (−1.32)	0.511 (1.13)	0.103 (0.32)
Beginning of the quarter	−0.081 (−0.28)	−0.064 (−0.35)	0.008 (0.08)	−0.009 (−0.05)	0.006 (0.06)	−0.036 (−0.26)	−0.089 (−0.29)	−0.027 (−0.12)
End of the quarter	0.036 (0.12)	−0.164 (−0.89)	−0.096 (−0.92)	−0.158 (−0.91)	−0.123 (−1.13)	−0.095 (−0.70)	0.131 (0.42)	0.063 (0.29)
No. of observations	252	252	252	252	252	252		
Adj. R^2	0.002	0.006	0.051	0.018	0.049	0.023		

This table presents the OLS regression results on the value-weighted average inflows, outflows, and net flows of U.S. domestic equity mutual funds across various style objectives. Funds are classified into various styles following the Lipper Classification. *Inflows* (Panel A), *Outflows* (Panel B), and *Net flows* (Panel C) are measured for 3099 equity funds from a combination of funds from CRSP Survivor-Bias-Free US Mutual Fund Database and N-SAR filings with the SEC over the period from January 1994 to December 2014. *Inflows* refers to $Sales_{i,t}/TNA_{i,t-1}$, where $Sales_{i,t}$ is the amount of new money invested into a fund over the month. *Outflows* refers to $Redemptions_{i,t}/TNA_{i,t-1}$, where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over the month. *Net Flows* refers to the difference between *Inflows* and *Outflows*. The dummy variable *Beginning of the year* takes one if the calendar month at time t is January and zero otherwise. The dummy variable *End of the year* takes one if the calendar month at time t is December and zero otherwise. The dummy variable *Beginning of the quarter* takes one if the calendar month at time t is April, July, or October and zero otherwise. The dummy variable *End of the quarter* takes one if the calendar month at time t is March, June, or September and zero otherwise. The last two columns present the results of the difference in coefficients test between Small-Cap and Large-Cap funds (Value and Growth funds, respectively). We exclude observations when the TNA value is less than 15 million dollars or the flows are less than −90% or greater than 100%. Flows are reported in percentage. t statistics are in parentheses

*, **, and *** Significance at the 10, 5, and 1% level, respectively

Past performance of funds

Cash flows to mutual funds are related to fund performance, as documented by an extensive part of the literature. For example, Spitz (1970) finds a positive correlation between mutual fund performance and cash inflows. Ippolito (1992) and Sirri and Tufano (1998) find that the performance–flow relationship is actually nonlinear. That is, mutual fund investors pursue but are not sensitive to poor performance. However, Barber et al. (2000) show that not only do the mutual fund investors buy the funds with strong past performance, they also sell those with strong past performance. In this section, we test whether the increased inflow and outflow in January are driven by the funds with strong past performance.

First, we calculate the Carhart (1997) four-factor-adjusted returns for each equity mutual fund in each month based on the returns over the prior 36 months. Specifically, we use the following regression models to estimate the factor loadings and the intercept:

$$R_{i,t} - RF_t = \alpha_i + \beta_{i,RMRF} RMRF_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \beta_{i,MOM} MOM_t + \varepsilon_{i,t} \quad (5)$$

where R_{it} is the rate of return of equity fund i, RF is the one-month T-bill rate, $RMRF$ is the excess market return, SMB denotes the return on the mimicking portfolio for the size factor in stock returns, HML refers to the return on the mimicking portfolio for the book-to-market factor in stock returns, MOM is the return on the mimicking portfolio for the momentum factor in stock returns, α refers to the excess return of the corresponding factor model, and the βs are the factor loadings of the corresponding factors.[8]

At the beginning of each month, all funds are divided into five quintiles based on their abnormal returns. Funds with the lowest abnormal returns are included in quintile 1, and the funds with the highest abnormal returns, in quintile 5. We use the value-weighted monthly average cash flows to mutual funds in each quintile to estimate the OLS regression in Eq. (4). We also test whether the seasonal patterns in flows to the funds with the highest past performance differ from the patterns in flows to the funds with the worst or medium past performance.

We report the estimation results of Eq. (4) on inflows, outflows, and net flows for mutual funds in each past performance quintile in Table 7. As the results suggest, investors buy more funds having the strongest past performance compared to the other funds. On average, the monthly inflow to funds in quintile 5 is 5.65% of their TNAs, which is much higher than the inflows to the funds in quintile 3 (3.83%) and quintile 1 (3.83%). On the other hand, while investors sell the funds with strong past performance, they sell more of those with the poorest past performance. The monthly outflow to funds in quintile 5 is 0.38% higher than in quintile 3 but 0.55% less than in quintile 1. This relation between the past performance and inflows and

[8] We thank Kenneth French for making these data available. Data on the Fama–French three factors and the momentum factors were downloaded from the website of Professor K. French (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html). For further detailed calculations of factor returns, see Fama and French (1993) and Carhart (1997).

Table 7 Effect of past performance on seasonality in mutual fund flows

	(Low)				(High)		
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Q5 − Q1	Q5 − Q3
Panel A: inflows							
Intercept	3.828*** (19.98)	3.393*** (26.01)	3.828*** (25.83)	3.856*** (25.63)	5.652*** (25.02)	1.824*** (6.16)	1.824*** (6.75)
Beginning of the year	0.256 (0.60)	0.573* (1.97)	0.873*** (2.64)	0.629* (1.87)	0.919* (1.82)	0.663 (1.00)	0.046 (0.08)
End of the year	0.236 (0.55)	0.136 (0.47)	0.362 (1.09)	0.831** (2.47)	0.357 (0.71)	0.121 (0.18)	−0.005 (−0.01)
Beginning of the quarter	0.126 (0.43)	0.267 (1.34)	0.241 (1.06)	0.406* (1.77)	−0.365 (−1.06)	−0.491 (−1.09)	−0.606 (−1.47)
End of the quarter	0.152 (0.52)	0.153 (0.77)	0.067 (0.30)	−0.080 (−0.35)	−0.193 (−0.56)	−0.345 (−0.76)	−0.260 (−0.63)
No. of observations	252	252	252	252	252		
Adj. R^2	0.003	0.018	0.031	0.047	0.028		
Panel B: outflows							
Intercept	4.414*** (26.36)	3.448*** (26.54)	3.488*** (23.01)	3.256*** (22.68)	3.867*** (22.26)	−0.547** (−2.27)	0.379 (1.64)
Beginning of the year	0.160 (0.43)	0.419 (1.44)	0.330 (0.97)	0.153 (0.48)	0.358 (0.92)	0.198 (0.37)	0.028 (0.05)
End of the year	0.854** (2.28)	0.328 (1.13)	0.750** (2.21)	1.086*** (3.38)	0.824** (2.12)	−0.029 (−0.05)	0.074 (0.14)
Beginning of the quarter	0.077 (0.30)	0.384* (1.93)	0.137 (0.59)	0.347 (1.58)	−0.037 (−0.14)	−0.114 (−0.31)	−0.174 (−0.49)
End of the quarter	0.289 (1.13)	0.279 (1.41)	0.142 (0.61)	−0.051 (−0.23)	0.093 (0.35)	−0.1959 (−0.53)	−0.0488 (−0.14)
No. of observations	252	252	252	252	252		
Adj. R^2	0.023	0.020	0.021	0.055	0.023		
Panel C: net flows							
Intercept	−0.586*** (−4.68)	−0.055 (−0.59)	0.339*** (3.78)	0.600*** (6.12)	1.785*** (11.44)	2.371*** (11.85)	0.339*** (2.67)
Beginning of the year	0.096 (0.34)	0.155 (0.74)	0.543*** (2.71)	0.476** (2.17)	0.561 (1.61)	0.465 (1.04)	0.543* (1.91)
End of the year	−0.618** (−2.20)	−0.192 (−0.92)	−0.388* (−1.94)	−0.254 (−1.16)	−0.467 (−1.34)	0.150 (0.34)	−0.388 (−1.36)
Beginning of the quarter	0.049 (0.26)	−0.117 (−0.82)	0.104 (0.76)	0.059 (0.39)	−0.329 (−1.38)	−0.377 (−1.23)	0.104 (0.53)
End of the quarter	−0.138 (−0.72)	−0.126 (−0.89)	−0.075 (−0.55)	−0.028 (−0.19)	−0.286 (−1.20)	−0.149 (−0.49)	−0.075 (−0.39)

Table 7 continued

	(Low)				(High)		
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Q5 − Q1	Q5 − Q3
No. of observations	252	252	252	252	252		
Adj. R^2	0.025	0.012	0.058	0.030	0.034		

At the beginning of each month, funds are classified into five quintiles based on the four-factor αs over the last 36 months. We calculate the value-weighted monthly mean inflows, outflows, and net flows in each quintile. This table presents the OLS regression results on the value-weighted average inflows, outflows, and net flows of U.S. domestic equity mutual funds in each quintile. *Inflows* (Panel A), *Outflows* (Panel B), and *Net flows* (Panel C) are measured for 3099 equity funds from a combination of funds from CRSP Survivor-Bias-Free US Mutual Fund Database and N-SAR filings with the SEC over the period from January 1994 to December 2014. *Inflows* refers to $Sales_{i,t}/TNA_{i,t-1}$, where $Sales_{i,t}$ is the amount of new money invested into a fund over the month. *Outflows* refers to $Redemptions_{i,t}/TNA_{i,t-1}$, where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over the month. *Net Flows* refers to the difference between *Inflows* and *Outflows*. The dummy variable *Beginning of the year* takes one if the calendar month at time *t* is January and zero otherwise. The dummy variable *End of the year* takes one if the calendar month at time *t* is December and zero otherwise. The dummy variable *Beginning of the quarter* takes one if the calendar month at time *t* is April, July, or October and zero otherwise. The dummy variable *End of the quarter* takes one if the calendar month at time *t* is March, June, or September and zero otherwise. The last two columns present the results of the difference in the coefficients test between quintile 1 (Q1) and quintile 5 (Q5) and between quintile 3 (Q3) and quintile 5 (Q5). We exclude observations when the TNA value is less than 15 million dollars or the flows are less than −90% or greater than 100%. Flows are reported in percentage. *t* statistics are in parentheses

*, **, and *** Significance at the 10, 5, and 1% level, respectively

outflows to mutual funds results in the highest and lowest net flows to funds with the best and worst past performance, respectively, as reported in Panel C. Thus, mutual fund investors pursue returns and do not tolerate poor performance.

The results reported in Panel A show that January is the month with the highest cash inflow to equity mutual funds in all quintiles. It is notable that the magnitude of the coefficient of the beginning-of-the-year variable is the lowest for quintile 1, and it increases in the higher quintiles. That is, investors buy more mutual funds in January, especially those with better performance. Although the coefficients of end-of-the-year and beginning-of-the-quarter variables are statistically significant in quintile 4, there are no other noticeable seasonal patterns in inflows to equity funds.

The intercepts reported in Panel B reveal the existence of an inverted U-shape relationship between outflows and past performance. The intercept is 4.41% in quintile 1 and 3.87% in quintile 5, but it is only 3.49% in quintile 3. This finding is consistent with the investors' behavior to sell winners too early, which is called the disposition effect. It is also noted that December is characterized by the largest outflows in all performance quintiles except quintile 2. The results on the net flows reported in Panel C show that funds with better performance receive significantly higher net flows in January, and funds with poor performance experience significantly negative net flows in December. Overall, the relation between fund flows and past performance leads us to suggest that when investors buy mutual funds, they prefer funds with better past performance, and this preference becomes more severe in January.

Relative performance among style funds

So far, our results show that January is the month with the highest trading activity among both current and potential investors. Both inflows and outflows to mutual funds are high in January relative to the other months of the year. This increased trading activity is stronger among the best-performing funds, but it is not related to the fund style objectives. Since mutual funds tend to systematically follow their style objectives and the performance of funds employing such styles would be affected by the seasonal variation of the performance of their holdings, investors should take the fund style objectives into account when they allocate their assets. In this section, we test whether the relative performance of the funds with different style objectives is related to the seasonal patterns in the fund flows.

At the beginning of each month, we calculate the four-factor α over the last 36 months for each U.S. domestic equity fund using Eq. (5). Funds are classified into six styles following the Lipper Classification. The cross-sectional value-weighted αs are calculated for each style group. We rank the style groups based on this value-weighted α for each month. We use the value-weighted monthly mean inflows, outflows, and net flows in each rank to estimate the OLS regression in Eq. (4). We also test whether the seasonal patterns in flows to the best-performing style funds are different from those to the worst-performing style funds.

We report the estimation results in Table 8. The magnitudes of the intercepts are similar across all ranks in Panels A and B. That is, the relative performance among

Table 8 Effect of relative performance among style funds on seasonality in mutual fund flows

	(Worst)					(Best)	
	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	R6 − R1
Panel A: inflows							
Intercept	3.206*** (15.97)	3.433*** (20.58)	3.427*** (22.96)	3.528*** (21.94)	3.770*** (17.99)	3.901*** (15.21)	0.564* (1.94)
Beginning of the year	0.767* (1.71)	0.573 (1.54)	0.592* (1.77)	0.408 (1.13)	0.326 (0.69)	0.294 (0.51)	−0.441 (−0.68)
End of the year	0.847* (1.89)	0.117 (0.31)	0.264 (0.79)	0.216 (0.60)	−0.111 (−0.24)	−0.124 (−0.22)	−0.959 (−1.48)
Beginning of the quarter	0.403 (1.31)	−0.003 (−0.01)	0.091 (0.40)	−0.005 (−0.02)	0.088 (0.27)	−0.006 (−0.02)	−0.315 (−0.71)
End of the quarter	0.010 (0.03)	0.128 (0.50)	0.185 (0.81)	−0.102 (−0.42)	−0.159 (−0.50)	0.176 (0.45)	−0.168 (−0.38)
No. of observations	252	252	252	252	252	252	
Adj. R^2	0.027	0.011	0.014	0.009	0.005	0.002	
Panel B: outflows							
Intercept	3.441*** (21.60)	3.328*** (23.06)	3.357*** (23.53)	3.466*** (25.50)	3.363*** (20.15)	3.458*** (15.32)	−0.078 (−0.34)
Beginning of the year	0.345 (0.97)	0.876*** (2.71)	0.215 (0.68)	0.052 (0.17)	0.297 (0.79)	0.206 (0.41)	−0.049 (−0.09)
End of the year	0.711** (2.00)	0.619* (1.92)	0.657** (2.06)	0.223 (0.73)	0.554 (1.48)	0.258 (0.51)	−0.157 (−0.30)
Beginning of the quarter	0.240 (0.98)	0.115 (0.52)	0.037 (0.17)	−0.143 (−0.69)	0.355 (1.39)	−0.013 (−0.04)	0.115 (0.33)
End of the quarter	−0.029 (−0.12)	−0.015 (−0.07)	0.267 (1.23)	−0.099 (−0.48)	−0.189 (−0.74)	0.403 (1.17)	−0.161 (−0.46)
No. of observations	252	252	252	252	252	252	
Adj. R^2	0.022	0.043	0.021	0.007	0.026	0.007	
Panel C: Net Flows							
Intercept	−0.235 (−1.37)	0.105 (0.83)	0.070 (0.53)	0.061 (0.49)	0.406*** (2.94)	0.443** (2.36)	0.642*** (2.91)
Beginning of the year	0.421 (1.09)	−0.303 (−1.07)	0.376 (1.27)	0.356 (1.28)	0.029 (0.09)	0.087 (0.21)	−0.393 (−0.80)
End of the year	0.136 (0.35)	−0.503* (−1.78)	−0.393 (−1.33)	−0.007 (−0.03)	−0.666** (−2.15)	−0.382 (−0.91)	−0.802 (−1.63)
Beginning of the quarter	0.163 (0.62)	−0.118 (−0.61)	0.054 (0.27)	0.138 (0.73)	−0.267 (−1.26)	0.007 (0.02)	−0.430 (−1.28)
End of the quarter	0.039 (0.15)	0.143 (0.74)	−0.082 (−0.41)	−0.004 (−0.02)	0.031 (0.15)	−0.227 (−0.79)	−0.008 (−0.02)

Table 8 continued

	(Worst)					(Best)	
	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	R6 − R1
No. of observations	252	252	252	252	252	252	
Adj. R^2	0.006	0.025	0.018	0.009	0.026	0.007	

At the beginning of each month, we calculate the four-factor αs over the last 36 months for each U.S. domestic equity fund. Funds are classified into six styles following the Lipper Classification. The cross-sectional value-weighted αs are calculated for each style group. We rank the style groups based on this value-weighted α each month. We calculate the value-weighted monthly mean inflows, outflows, and net flows in each rank. This table presents the OLS regression results on the value-weighted average inflows, outflows, and net flows of U.S. domestic equity mutual funds for each rank. *Inflows* (Panel A), *Outflows* (Panel B), and *Net flows* (Panel C) are measured for 3099 equity funds from a combination of funds from CRSP Survivor-Bias-Free US Mutual Fund Database and N-SAR filings with the SEC over the period from January 1994 to December 2014. Inflows refers to $Sales_{i,t}/TNA_{i,t-1}$, where $Sales_{i,t}$ is the amount of new money invested into a fund over the month. Outflows refers to $Redemptions_{i,t}/TNA_{i,t-1}$, where $Redemptions_{i,t}$ is the amount of money withdrawn from a fund over the month. Net flows refers to the difference between *Inflows* and *Outflows*. The dummy variable *Beginning of the year* takes one if the calendar month at time *t* is January and zero otherwise. The dummy variable End of the year takes one if the calendar month at time *t* is December and zero otherwise. The dummy variable *Beginning of the quarter* takes one if the calendar month at time *t* is April, July, or October and zero otherwise. The dummy variable *End of the quarter* takes one if the calendar month at time *t* is March, June, or September and zero otherwise. The last column presents the results of the difference in coefficients test between rank 1 (R1) and rank 6 (R6). We exclude observations when the TNA value is less than 15 million dollars or the flows are less than −90% or greater than 100%. Flows are reported in percentage. *t* statistics are in parentheses

*, **, and *** Significance at the 10, 5, and 1% level, respectively

the styles is not related to the fund flows in general. In January, all style funds receive more inflow than the rest of the year regardless of the performance rank, albeit the coefficients of the beginning-of-the-year variables for the first- and third-ranked style funds are marginally significant. This result leads us to suggest that investors are more likely to rebalance their portfolios in January, but they are not affected by the relative performance among different style funds. During the rest of the year, the inflow to equity funds is not associated with the relative performance among different styles. We note that investors sell their shares to a greater extent in December than the rest of the year if they hold style funds with the worst performance. In Panel B, the coefficients of the end-of-the-year variables in the worst-performing style funds (Ranks 1–3) are statistically positively significant at the 10% level or higher. Overall, the relation between the fund flows and the relative past performance among style funds leads us to suggest that investors are not sensitive to the past performance when they buy style funds, but they sell the funds with the poorly performed styles at the turn of the year.

Concluding remarks

In this paper, we study the seasonality in the cash flows of the U.S. domestic mutual funds and document a number of intriguing findings. We report that the equity funds experience the largest and smallest net cash flows in January and December, respectively. The increased purchases, not the decreased redemptions, induce the large net flows in January. The increased redemptions result in the small net flows in December.

This paper expands our knowledge on the trading behavior of mutual fund traders. The mutual fund traders tend to implement asset allocation decisions more actively around the turn of the year. We find that the investors make asset-allocation decisions more actively around the turn of the year. The seasonal component of their asset-allocation decisions is not associated with the seasonal variations in personal income and consumption growth. Moreover, the seasonal patterns in the cash flows are indifferent across the style objectives of the mutual funds. However, the tax treatment of the distribution from mutual funds would drive this seasonal pattern by encouraging investors to delay the purchase of funds to avoid tax. In addition, past performance has an effect on the seasonality in the cash flows of equity funds. The January effect in the inflows to mutual funds is stronger for the funds with higher past performance. We also find that investors are not sensitive to the past performance when they buy style funds, but they sell the poorly performing style funds at the turn of the year.

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References

Barber, B. M., Odean, T., and Zheng, L. 2000. The behavior of mutual fund investors. Unpublished Working Paper.

Branch, B. 1977. A tax loss trading rule. *Journal of Business* 50 (2): 198–207.

Brown, K.C., W.V. Harlow, and L.T. Starks. 1996. Of tournaments and temptations: An analysis of managerial incentives in the mutual fund industry. *Journal of Finance* 51 (1): 85–110.

Carhart, M.M. 1997. On persistence in mutual fund performance. *Journal of Finance* 52 (1): 57–82.

Chen, J., H. Hong, M. Huang, and J.D. Kubik. 2004. Does fund size erode mutual fund performance? The role of liquidity and organization. *American Economic Review* 94 (5): 1276–1302.

Chevalier, J., and G. Ellison. 1997. Risk taking by mutual funds as a response to incentives. *Journal of Political Economy* 105 (6): 1167–1200.

Choi, H-.S. 2014a. Seasonality based style rotation strategy in major stock markets. *Investment Management and Financial Innovations* 11 (1): 178–188.

Choi, H-.S. 2014b. Handle with care: Distribution effects on the estimated cash flows to equity funds. *Investment Management and Financial Innovations* 11 (4): 313–319.

Choi, H-.S. 2014c. Seasonality in style returns. *Journal of Applied Economic Sciences* 9 (3–29): 348–358.

Choi, H-.S. 2015. Seasonality in mutual fund flows. *Journal of Applied Business Research* 31 (2): 715–726.

De Bondt, W.F.M., and R.H. Thaler. 1987. Further evidence on investor overreaction and stock market seasonality. *Journal of Finance* 42 (3): 557–581.

Dyl, E.A. 1977. Capital gains taxation and the year-end stock market behavior. *Journal of Finance* 32 (1): 165–175.

Elton, E.J., M.J. Gruber, and C.R. Blake. 2001. A first look at the accuracy of the CRSP mutual fund database and a comparison of the CRSP and Morningstar mutual fund databases. *Journal of Finance* 56 (6): 2415–2430.

Fama, E.F., and K.R. French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33 (1): 3–56.

Fridson, M.S. 2000. Semiannual seasonality in high yield bond returns. *Journal of Portfolio Management* 26 (4): 102–111.

Gallagher, D.R., and M. Pinnuck. 2006. Seasonality in fund performance: An examination of the portfolio holdings and trades of investment managers. *Journal of Business Finance & Accounting* 33 (7–8): 1240–1266.

Ippolito, R.A. 1992. Consumer reaction to measures of poor quality: Evidence from the mutual fund industry. *Journal of Law and Economics* 35 (1): 45–70.

Johnson, W.T., and J.M. Poterba. 2016. The effect of taxes on shareholder inflows around mutual fund distribution dates. *Research in Economics* 70 (1): 7–19.

Jordan, S.D., and B.D. Jordan. 1991. Seasonality in daily bond returns. *Journal of Financial and Quantitative Analysis* 26 (2): 269–285.

Kamstra, M.J., L.A. Kramer, M.D. Levi, and R. Wermers. 2017. Seasonal asset allocation: Evidence from mutual fund flows. *Journal of Financial and Quantitative Analysis* 52 (1): 71–109.

Keim, D. 1983. Size related anomalies and the stock return seasonality: Further empirical evidence. *Journal of Financial Economics* 12 (1): 13–32.

Khorana, A., and H. Servaes. 1999. The determinants of mutual fund starts. *Review of Financial Studies* 12 (5): 1043–1074.

Koski, J.L., and J. Pontiff. 1999. How are derivatives used? Evidence from the mutual fund industry. *Journal of Finance* 54 (2): 791–816.

Malkiel, B.G., and E.F. Fama. 1970. Efficient capital markets: A review of theory and empirical work. *Journal of Finance* 25 (2): 383–417.

Matallín-Sáez, J.C. 2006. Seasonality, market timing and performance amongst benchmarks and mutual fund evaluation. *Journal of Business Finance & Accounting* 33 (9–10): 1484–1507.

Miron, J.A., and J.J. Beaulieu. 1996. What have macroeconomists learned about business cycles from the study of seasonal cycles? *Review of Economics and Statistics* 78 (1): 54–66.

Reinganum, M.R. 1983. The anomalous stock market behavior of small firms in January: Empirical tests for tax-loss selling effects. *Journal of Financial Economics* 12 (1): 89–104.

Ritter, J.R. 1988. The buying and selling behavior of individual investors at the turn of the year. *Journal of Finance* 43 (3): 701–717.

Roll, R. 1983. Vas ist das? The turn-of-the-year effect and the return premia of small firms. *Journal of Portfolio Management* 9 (1): 18–28.

Shim, H., H. Kim, J.Y. Kim, and D. Ryu. 2015. Weather and stock market volatility: The case of a leading emerging market. *Applied Economics Letters* 22 (12): 987–992.

Sirri, E.R., and P. Tufano. 1998. Costly search and mutual fund flows. *Journal of Finance* 53 (5): 1589–1622.

Sørensen, C. 2002. Modeling seasonality in agricultural commodity futures. *Journal of Futures Markets* 22 (5): 393–426.

Spitz, A.E. 1970. Mutual fund performance and cash inflows. *Applied Economics* 2 (2): 141–145.