VILNIUS TECH
Vilnius Gediminas
Technical University

JOURNAL of BUSINESS ECONOMICS & MANAGEMENT

DOES ONLINE MEDIA ATTENTION IMPROVE CHINA'S GREEN FUND PERFORMANCE?

Yaping XIAO[1], Haishu QIAO[2✉], Ting XIE[3]

[1]School of Economics, Central South University of Forestry and Technology, Changsha 410004, China
[2, 3]School of Finance and Statistics, Hunan University, Changsha 410006, China

Abstract. This study investigates the relationship between online media attention and the performance of China's green funds. The results show that increased media attention can boost the performance of green funds in the short term, however, this effect is short-lived. The mechanism of short-term positive effects may be due to increased media attention leading to larger purchases, which may undermine funds' long-term performance. In particular, online media attention has a greater impact on larger and older funds. Moreover, it indicates that media attention reduces the returns of individual investor-dominated funds, but has little effect on institutional investor-dominated funds.

1. Introduction

Green funds are specialized investment funds that aim to promote energy-saving emission-reduction strategies, low-carbon economic development, environment optimization, and transformation programs. At the end of 2013, China established its Green Finance System to promote the development of green funds. Since then, green funds have developed steadily and become an important investment tool in China. In August 2016, the Ministry of Finance launched social capital through public–private partnerships (PPP), supporting the establishment of green development funds and implementing market-based operations. By 2018, there were 63 green funds with total net assets of 139.5 billion RMB.

The booming of green funds has increasingly attracted media attention, and researchers are paying more attention to funds in sustainable energy industries (Hartzmark & Sussman, 2019; Marti-Ballester, 2019). Many studies have focused on the influence of news media on the performance of securities and investor behaviors (Barber & Odean, 2000; Barber et al., 2009a; Ben-David et al., 2021; Engelberg & Parsons, 2011; Fang & Peress, 2009; Fang et al., 2014). However, the empirical findings are mixed. On the one hand, some researchers found that increasing media attention tended to raise stock prices and improve stock returns, because media can act as an external monitor, which improves corporate governance and brings higher returns to companies. Occasionally, media platforms expose corporate malpractices.

Therefore, companies need to improve their corporate governance to avoid reputational damage (Ben-David et al., 2021; Dyck et al., 2008). On the other hand, some found that increasing media coverage negatively affects the performance of underlying securities (Fang & Peress, 2009). The reduction in performance may be resulted by large purchases of securities at higher prices (Barber et al., 2009a; Fan et al., 2020; Ge et al., 2020; Zhang et al., 2021). The over-attention hypothesis and over-confidence hypothesis, proposed by Ball-Rokeach and DeFleur (1976), argue that media attention-based buying can lead to huge speculative buying and consequently raise the prices of securities.[1]

Studies that focused on the financial market of the United States generally found that buying larger volumes at higher prices increases trading losses, transaction taxes, commissions, and market timing losses, resulting in significant losses on such securities (Barber et al., 2009a; Fang & Peress, 2009; Seasholes & Wu, 2007; Shiller, 1999). Given that the US financial market is dominated by institutional investors, the above mechanism is expected to be magnified in a market dominated by individual investors such as the Chinese stock market. The negative impact of large purchase on fund performance may be more severe because individual investors tend to rely more on media reports, which leads to more buying of securities at high prices (Kaniel et al., 2008). Since the rapid development of China's green funds has attracted wide media attention, it is worth investigating whether the increased media interest in China's green funds has negatively affected their performance or has boosted their performance by improving the quality of internal corporate governance.

Examining the performance of 63 green funds over the period of 12 quarters, this paper empirically investigates the relationship between media attention and green funds' performance. New items are used to cover every green fund per quarter as the proxy for media attention. This method of text analysis has been widely applied in financial and economic studies (Da et al., 2015; Dimpfl & Jank, 2016; Drake et al., 2012). Following Da et al. (2015), this study enters the names of funds in *Baidu* (the most widely used search engine in China) to collect the number of news items.

The findings of this study are threefold. First, it shows that media attention indeed reduces the returns on green funds in the long term, although it can increase fund performance in the short term. Second, it verifies that media attention has a negative positive impact on the performance of larger and older funds, which is in line with "investor recognition hypothesis" by Merton (1987) stating that investors of small and young securities suffer greater information risk as these securities receive less media attention and their information has lower exposure. Increased media attention of these securities can provide investors access to necessary information and reduce their search costs, inducing higher returns. Third, it finds that media attention negatively influences the performance of funds dominated by individual investors, as they have less access to information and tend to react more irrationally to media portrayal than institutional investors. This is consistent with Barber et al. (2009a) that individual investors are overconfident and tend to overact to media attention.

This paper contributes to the recent research on media attention in multiple ways. First, previous studies focus on developed countries, while this study is based on the evidence from a large developing country. China's financial market is dominated by individual investors, who

---

[1] The over-attention hypothesis states that increased visibility of securities may attract undue investor attention and lead to irrational buying of many of these securities in a short period, while securities with less media attention are ignored. The over-confidence hypothesis indicates that investors mainly depend on media reports due to lack of access to internal information and experience. The information generated through media coverage may strengthen their confidence to purchase. Thus, increased media exposure leads to larger speculative buying and raises the prices of securities further.

are prone to overconfidence and overreaction to media attention. Thus, the evidence from China is highly correlated with over-attention hypothesis and over-confidence hypothesis. Second, this study considers that the impacts of media attention on fund performance may vary depending on the characteristics of fund, including size, age, and proportion of individual investors. A more negative influence of media attention is found on larger and older funds, as well as funds with a higher proportion of individual investors, which supports the investor recognition hypothesis.

The remainder of the paper is organized as follows. Section 2 discusses related research and proposes hypotheses. Section 3 describes data and methodology. Section 4 presents empirical results. Section 5 discusses the results, and Section 6 concludes the study.

2. Literature review and hypotheses

2.1. Literature review

Several prior studies document that media attention increased the purchase of securities in Canada (Barber et al., 2009a; Engelberg & Parsons, 2011; Fang & Peress, 2009; Fang et al., 2014), stock prices in France (Vozlyublennaia, 2014) and the United States (Barber et al., 2009a, 2009b; DellaVigna & Pollet, 2009). Some researchers find that negative news about companies reduces their trade volume and impedes stock prices, especially media exposure to environmentally hostile behaviors in Canada (Cormier et al., 1993). Other studies show that media attention improves companies' performance because increasing public awareness can be a good monitor of corporate governance (Ben-David et al., 2021; El Ouadghiri et al., 2021; Hudson et al., 2009; Kong et al., 2020) and provide investors with more information to reduce the financing costs in the US (Berger & Udell, 2006). However, Fang and Peress (2009) document that media attention can impede stock returns, regardless of whether the news is good or bad. Overall, these studies are mainly conducted in developed countries, which are dominated by institutional investors (Kaniel et al., 2008). A few studies investigate the effect of media coverage on the performance of securities in countries where individual investors dominate the market, who react irrationally to media portrayal. Some hypotheses, which are documented by US data, show that performance declines with increasing media attention. Over-attention and over-confidence hypotheses explain that media attention can induce large purchases and contribute toward increasing a stock's prices (Fang & Peress, 2009), and performance decreases after large purchases are made at higher prices (Barber et al., 2009a; Campbell et al., 1993; Fan et al., 2020). Over-attention hypothesis describes that investors are not exposed to all securities, except for stocks that are prominent, since they have a scarce resource–limited attention (Aboody & Kasznik, 2000; DellaVigna & Pollet, 2009; Engelberg & Gao, 2011; Hirshleifer et al., 2008; Kahneman, 1973; Zhang et al., 2021). Moreover, securities with high media coverage can attract investors' attention, and this in turn induces them to buy more securities and, leads to higher prices (Fang & Peress, 2009; Shiller, 1999). Over-confidence hypothesis argues that investors rely on media coverage because they have less experience and no access to internal information. By disseminating more information to investors, media can make them over-confident and buy more securities, sequentially the prices of securities increase (Ball-Rokeach & DeFleur, 1976; Daniel et al., 1998). Fang and Peress (2009) also confirms that performance is significantly impacted if investors do not have, or have less, first-hand knowledge and experience.

The effects of media attention on the performance of funds may vary depending on age, size, and type of investors. Investor recognition hypothesis posits that investors are not

aware of all securities. Media attention broadens coverage of securities and provides investors additional information; thus, securities with intense media reporting gain higher recognition. However, stocks that receive less recognition from investors have higher information risk characteristics in the US (Duz Tan & Tas, 2021; Fang & Peress, 2009; Sadka, 2006; Vega, 2006). Compared to large and old funds, small and young funds with less recognition suffer from higher information risk in the US (Berger & Udell, 2006; Duz Tan & Tas, 2021). Media coverage can provide information on small and young funds and greatly reduce information risk, which may reduce their financing cost and further improve short-term performance (Easley et al., 2002; Vega, 2006). Besides, investor sentiment toward small and young funds is low because such stocks are likely to receive less investor attention. Thus, the performance of small and young funds will not diminish in the long-term (Fang & Peress, 2009). Large and old funds have less information risk, media premium does not affect their short-term performance (Berger & Udell, 2006), and investors always focus on such stocks, which easily impedes their long-term performance (Fang & Peress, 2009). Prior studies document that institutional investors in the US are more knowledgeable than individual investors (Almazan et al., 2005; Dyakov & Wipplinger, 2020). They capture valid information and react more reasonably to burgeoning information resulting from media propaganda, so they may not irrationally buy funds, as individual investors when media attention increases. Furthermore, institutional investors have access to internal information and knowledge, which means that they rely less on media (Dyakov & Wipplinger, 2020). Media attention does not impede the performance of funds held by institutional investors and even enhances their performance by improving governance (Hudson et al., 2009). Individual investors do not have adequate knowledge and information to make rational decisions, and are easily misled by media coverage. Both over-attention and over-confidence hypotheses illustrate that individual investors, who are always overconfident and tend to overreact to news reports, make large purchases and induce a reverse return of securities.

2.2. Hypotheses

Chinese green development funds have been growing rapidly since they were launched in 2015 and are likely to gain more media attention than others. According to over-attention and over-confidence hypotheses, media coverage attracts more investors, which results in voluminous purchasing and an increase in funds' prices (El Ouadghiri et al., 2021; Fang & Peress, 2009). As mentioned previously, purchasing at higher prices reduces securities' returns due to increased trading losses, transaction taxes, commissions, and market timing losses. Thus, additional purchases will result in a reversal of the returns, even though wider media attention may boost returns within a short time by improving firms' corporate governance. Thus, the following two seemingly contradictory hypotheses are posited.

H1a: Media attention improves a green fund's short-term performance.

H1b: Media attention diminishes a green fund's long-term performance.

The impacts of media attention on fund performance may be heterogeneous due to difference in duration of operation and size. According to the investor recognition hypothesis, investors of small and young funds may face higher information risks because these funds are not easily recognized and their information is less exposed to the public (Duz Tan & Tas, 2021). Therefore, increased media attention can provide these investors more information and reduce their search costs, which may yield higher returns. Thus, the following hypotheses are posited.

H2a: Media attention has a more negative influence on the performance of larger funds than smaller funds.

H2b: Media attention has a more negative influence on the performance of older funds than younger funds.

Considering that the composition structure of fund investors is different, the impact of media attention will also vary across funds. Unlike the developed countries, China's financial markets are dominated by individual investors, whose knowledge and information are considered inadequate to make rational decisions. Their over-confidence and over-attention to media coverage leads to voluminous purchases and in turn reduces fund performance. Thus, the performance of funds with a higher concentration of individual investors will decline relatively. Many prior studies show that institutional investors do not impede fund performance and even improve their performance by acting as an effective monitor (Daniel et al., 2002). Thus, another hypothesis is posited.

H3: Media attention has a more positive influence on the performance of funds with a greater number of institutional investors.

3. Data and methodology

3.1. Data

Panel data regression is applied to examine the hypotheses. The primary data of this study are from the China Stock Market and Accounting Research Database (CSMAR), which classified all green funds into a subset. The number of news items is used and each fund was covered on a quarterly basis to measure the media attention at the fund level. By entering "Name" and "Name+Code" of funds as keywords in *Baidu*, all news items containing the "Name" or "Name+Code" of green funds are collected, and the data set of published news from the first quarter of 2015 to the fourth quarter of 2018 is compiled. Data of other variables were obtained from the CSMAR. As of 2018, there are 63 green funds, and the sample size of the quarterly data (from the first quarter of 2015 to the fourth quarter of 2018) is 660. Excluding the outliers and missing values, the final sample size is 628. Note that the data start from the first quarter of 2015, because green funds are not reported until 2015.

3.2. Methodology

The primary regression model to estimate the impacts of media attention on fund performance on a quarterly basis is specified by Model (1), where the dependent variable represents the performance of fund i in quarter t ($Perf_{it}$). *Sharpe ratio* and *Alpha* are used as the primary and alternative performance measures, respectively.[2] The independent variable of main interest is media attention of fund i in quarter t ($Media_{it}$), measured by the number of news items regarding a specific fund in a given quarter. Other covariates include the net total asset of a fund (*Size*), the operating duration of a fund (*Age*), a dummy variable indicating whether

---

[2] To see if the results are sensitive to the measurements of dependent variable, *Alpha* is used as an alternative dependent variable. However, *Alpha* is considered to be more likely to encounter measurement problems when used as a proxy for fund performance (Dyakov & Wipplinger, 2020; Engelberg & Gao, 2011; Fang & Peress, 2009). Therefore, Sharpe ratio is mainly used to measure fund performance in baseline regressions, and present the results using *Alpha* as an alternative dependent variable in robustness checks.

a fund has changed manager to reflect the quality of corporate governance (*Change*), and the amount of cash in a fund to capture the riskiness of a fund (*Cash*). A detailed explanation of all the related variables is presented in Table in the Appendix. The baseline regressions are first estimated by the Ordinary Least Square (OLS). For robustness checks, the random effects model (REM) estimation results are also presented.

$$Perf_{i,t} = \alpha + \beta_1 Media_{i,t-k} + \beta_2 Size_{i,t} + \beta_3 Age_i + \beta_4 Change_{i,t} + \beta_5 Cash_{i,t} + \varepsilon_{i,t}. \tag{1}$$

Following Fang and Peress (2009), we interpret the estimated coefficient on the media attention received during the same quarter ($k = 0$) as short-term effect, and the coefficients on media attention received during previous quarters ($k = 1, 2, 3, 4$) as longer-term effects. Media attention is expected to affect fund performance through mechanisms other than short-term effects, and these mechanisms may take time to manifest. To be more specific, media attention can act as a monitor of corporate governance and improve performance of fund. However, media attention will also increase the purchase of fund, which may in turn increase the trading losses, transaction taxes, commissions, and market timing losses of fund. The latter mechanism tends to impede fund performance in the long term.

Additionally, to examine if funds receiving more media attention witness large purchase volumes, we regress the amount of purchase in quarter t $\left(Inflow_t\right)$ on media attention in past quarters $\left(k = 1, 2, 3, 4\right)$, specified in Model (2). To control for the ability of fund managers, two additional control variables, TM_{it} and $TMtiming_{it}$, are included for selecting security and market timing, respectively. And $Stock_{it}$ is the number of stocks in a fund, as a proxy for the risk of fund.

$$Inflow_{i,t} = \alpha + \beta_1 Media_{i,t-k} + \beta_2 Size_{i,t} + \beta_3 Age_i + \beta_4 Perf_{i,t} + \beta_5 Cash_{i,t} +$$
$$\beta_6 TM_{i,t} + \beta_7 TMtiming_{i,t} + \beta_8 Stock_{i,t} + \varepsilon_{i,t}. \tag{2}$$

4. Empirical results

4.1. Descriptive statistics

Panel A of Table 1 shows the descriptive statistics of main variables used in the models. There are markedly differences in the media attention received by funds: some funds received virtually no news coverage while some had 28 news reports within a quarter. Meanwhile, the performance of green funds measured by Sharpe ratio varies substantially, ranging from −0.283 to 0.470. Similarly, the amount of cash flows (*Inflow*) exhibits large fluctuations. There is also large variation in fund managers' ability (*TMtiming*) across funds. Moreover, Panel B shows that the share of individual investors is over 80 percent, which is a salient feature of emerging markets.

4.2. Correlation matrix

As shown in Table 2, correlation coefficients between the control variables are smaller than 0.5. Meanwhile, the negative coefficients between $Media_{i,t-k}$ ($k = 1, 2, 3, 4$) and $Perf_{it}$, and the positive coefficient between $Media_t$ and $Perf_t$ provides evidence to support the hypotheses. The positive coefficient between $Media_{it}$ and $Inflow_t$ imply a positive relationship between media attention and purchase of funds. Variance inflation factor (VIF) tests are performed and all the results are less than 10, demonstrating that multi-collinearity is not a major issue.

Table 1. Descriptive statistics

Panel A: Statistics description (quarterly)					
Variables	Mean	Obs	SD	Min	Max
Perf	0.022	658	0.129	–0.283	0.470
Alpha	0.105	658	1.446	–0.005	4.709
Media	2.979	658	3.557	0.000	28.000
Size	20.180	658	1.413	16.262	22.948
Age	4.648	658	3.442	–0.277	15.469
Change	0.103	658	0.305	0.000	1.000
Cash	0.149	658	0.130	0.004	0.801
TM	0.049	658	0.188	–0.733	2.087
TMtiming	–0.036	658	6.556	–89.406	81.652
Stocks	16.210	658	1.597	10.868	20.174
Inflow	1.316	658	14.749	0.000	312.100
Panel B: Statistics description (semi-annually)					
Variables	Mean	Obs	SD	Min	Max
Institution Ratio	18.482	324	24.961	0.000	99.950
Individual Ratio	81.799	329	24.873	0.050	100.000

Note: This table shows the description of all variables in Panel A, and the proportion of institutional investors and individual investors in Panel B. All the variables are defined in Table of Appendix.

4.3. Regression results

OLS estimation is performed to Model (1). The regression results are presented in Table 3. It finds that media attention received during the same quarter $(k = 0)$ has a positive effect on fund performance: 1 unit increase in the news items is associated with a 2.4 percent increase in funds' Sharpe ratio, which supports Hypothesis 1a. The estimated coefficient is significant at the 10% level. In contrast, media attention received during previous quarters $(k = 1, 2)$ has a highly significant and negative impact on fund performance, indicating that temporary rise in returns is at the expense of longer-term returns. Moreover, media attention over half a year ago $(k = 3, 4)$ has no effect on fund performance in quarter t. Thus, the results seem to indicate that media attention can only boost the performance of green funds in the short run.

The sample by the size of funds (large vs. small funds), by the duration of funds (older vs. young funds), and by their investor type (institutional- vs. individual-dominated funds), are further divided respectively. Table 4 presents the results. As shown in Panel A, media attention increases the return of small funds in the short run, but has no significant effects in the long run. In contrast, previous media attention has a significant negative impact on the performance of large funds, albeit with an insignificant short-term effect. Taken together, these results suggest that media attention impacts the performance of large funds more negatively, supporting Hypothesis 2a.

Next, funds are distinguished by their duration (*Age*). Panel B of Table 4 shows that media attention has a positive effect on the short-term returns of older funds, but has an adverse effect on long-term returns. The effect of media attention on younger funds' performance is insignificant. This provides some support for Hypothesis 2b, which says that media attention

Table 2. Correlation matrix

	$Inflow_t$	$Netflow_t$	$Perf_t$	$Alpha_t$	$Media_t$	$Media_{t-1}$	$Media_{t-2}$	$Media_{t-3}$	$Media_{t-4}$	Age	$Cash_t$	TM_t	$TMtiming_t$	$Stocks_t$	$Size_t$	$Change_t$
$Inflow_t$	1															
$Netflow_t$	0.993	1														
$Perf_t$	0.050	0.018	1													
$Alpha_t$	0.118	0.041	0.399	1												
$Media_t$	0.041	0.033	-0.091	-0.365	1											
$Media_{t-1}$	0.205	0.209	-0.081	-0.134	0.454	1										
$Media_{t-2}$	0.032	0.015	-0.139	-0.021	0.210	0.249	1									
$Media_{t-3}$	0.059	0.071	-0.107	-0.061	0.109	0.227	0.286	1								
$Media_{t-4}$	0.022	0.085	0.022	0.026	0.112	0.198	0.258	0.249	1							
Age	-0.060	-0.047	0.014	0.007	0.011	-0.017	-0.024	-0.041	-0.043	1						
$Cash_t$	-0.032	-0.027	-0.011	0.077	-0.025	-0.019	-0.073	-0.039	-0.053	-0.238	1					
TM_t	0.037	0.012	-0.133	0.089	-0.060	-0.006	0.006	-0.043	-0.031	-0.038	-0.082	1				
$TMtiming_t$	-0.060	-0.070	0.021	0.002	-0.040	-0.004	0.002	0.041	-0.039	-0.021	0.016	-0.051	1			
$Stocks_t$	-0.068	-0.073	0.120	0.115	-0.009	-0.054	-0.063	-0.100	-0.107	0.372	-0.268	0.055	0.008	1		
$Size_t$	-0.042	-0.053	0.150	0.334	0.036	0.011	-0.020	-0.036	-0.005	0.347	-0.308	0.147	0.020	0.091	1	
$Change_t$	0.001	-0.011	-0.010	0.014	-0.022	-0.042	0.075	-0.060	-0.005	0.006	-0.004	-0.033	-0.035	-0.058	-0.032	1

has a greater negative impact on the long-term performance of older funds. However, media attention can improve the short-term performance of older fund. One possible explanation is that with the emergence of newer funds, old funds may lose public attention and need media coverage to attract more investor attention in the short term.

Table 3. The effect of media attention on performance

	Short-term	Long-term			
	$k = 0$	$k = 1$	$k = 2$	$k = 3$	$k = 4$
$Media_{t-k}$	0.024*	−0.022***	−0.016**	0.001	0.005
	(2.56)	(−3.25)	(−2.35)	(0.19)	(0.70)
Age	−0.004**	−0.004**	−0.003*	−0.004**	−0.004**
	(−2.31)	(−2.14)	(−1.69)	(−2.46)	(−2.56)
$Size_t$	0.027***	0.025***	0.022***	0.028***	0.027***
	(4.23)	(3.50)	(3.09)	(3.99)	(3.97)
$Change_t$	0.015	0.027	0.009	0.015	0.018
	(0.93)	(1.57)	(0.53)	(0.82)	(1.00)
$Cash_t$	−0.007	−0.004	−0.003	−0.009	−0.007
	(−1.19)	(−0.68)	(−0.52)	(−1.44)	(−1.13)
$\_cons$	−0.489***	−0.362***	−0.329***	−0.348***	−0.387***
	(0.083)	(−4.50)	(−3.97)	(−4.06)	(−4.67)
Obs.	654	514	512	511	511
R^2	0.057	0.071	0.049	0.046	0.052

Note: This table presents the results of OLS of the full sample. T-ratios are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All the variables are defined in Table of Appendix.

Table 4. The effect of media attention on fund performance with different characteristics

$Media_t$	$Media_{t-1}$	$Media_{t-2}$	$Media_t$	$Media_{t-1}$	$Media_{t-2}$
Panel A: by *Size*					
Large			Small		
0.016	−0.037***	−0.029***	0.032***	−0.005	−0.009
(0.019)	(−3.80)	(−2.87)	(4.19)	(−0.59)	(−1.01)
Panel B: by *Age*					
Old			Young		
0.032***	−0.033***	−0.019**	0.012	−0.012	−0.011
(3.15)	(−2.90)	(−2.43)	(0.22)	(−0.47)	(−0.86)
Panel C: by *Investor type*					
Institution			Individual		
0.003	−0.021	−0.008	−0.019	−0.020**	−0.018*
(0.05)	(−0.23)	(−0.90)	(−0.97)	(−2.00)	(−1.89)

Note: This table presents the results of OLS of subsample divided by *Size* (Panel A), *Age* (Panel B), and *type of investors* (Panel C). – ratios are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All the variables are defined in Table of Appendix.

In addition, the funds are separated by dominant investor types. The share of institutional investors are calculated based on the percentage of institutional investors in the total investment of all investors. If institutional investors account for more than 50% of the fund, the fund will be classified as a category dominated by institutional investors; otherwise, it will be classified as a group dominated by individual investors. Panel C, shows that the media attention has a negligible impact on institutional investor-led funds, while it has a negative impact on individual investor-led funds. This is to be expected and supports hypothesis 3, because individual investors are often more susceptible to media news and make buying more irrationally.

4.4. Robustness checks

First, to see whether the results are sensitive to the performance measure *Alpha* instead of the *Sharpe ratio* is used as the dependent variable for robustness check. Tables 5 reports the estimation results based on Model (1). The estimated coefficient on $Media_t$ is positive and significant at the 5% level, confirming an immediate boosting effect of media attention on fund performance. Note that the coefficients on $Media_{t-1}$ and $Media_{t-2}$ turn insignificant, yet remain negative. When $k > 2$, the effects of media attention is positive but insignificant. Overall, these results are qualitatively similar to the baseline results in Table 3, where the Sharpe ratio was used as the dependent variable. It still finds that media attention only has a temporary effect on fund performance.

Second, to see whether the results are robust to different estimation methods, random effects model (REM) is further performed on baseline Model (1). Hausman test statistics suggest that REM is a more appropriate model to use in this context than fixed effects model (FEM) because the p-value of Hausman test is greater than 0.05. P-value of Hausman test is greater than 0.05, which means that independent variables do not relate to stochastic disturbance term in this context. Table 6 reports the random effects estimation results. Media attention has a positive effect on fund performance in the current quarter, while its effect turns negative and eventually disappear as time elapses. Besides, the estimated coefficient on $Media_t$ becomes larger and more significant when the random effects model is applied. In sum, the results are robust to an alternative estimation model.

Table 5. The effect of media attention on Alpha as the performance measure

	Short-term	Long-term			
	$k = 0$	$k = 1$	$k = 2$	$k = 3$	$k = 4$
$Media_{t-k}$	0.018**	−0.003	−0.010	0.007	0.006
	(1.96)	(−0.43)	(−1.30)	(0.90)	(0.74)
Age_t	−0.004**	−0.004**	−0.003	−0.005**	−0.004**
	(−2.05)	(−2.03)	(−1.35)	(−2.48)	(−2.07)
$Size_t$	0.022***	0.017**	0.015*	0.017**	0.018**
	(2.68)	(2.10)	(1.82)	(2.16)	(2.33)
$Change_t$	0.011	−0.022	−0.002	−0.000	−0.001
	(0.55)	(−1.00)	(−0.09)	(−0.02)	(−0.05)
$Cash_t$	0.001	0.006	0.006	0.005	0.004
	(0.16)	(0.82)	(0.79)	(0.71)	(0.48)

End of Table 5

	Short-term	Long-term			
	$k = 0$	$k = 1$	$k = 2$	$k = 3$	$k = 4$
_cons	−0.413***	−0.414***	−0.349***	−0.384***	−0.397***
	(−4.47)	(−4.40)	(−3.68)	(−3.98)	(−4.16)
Obs.	514	513	512	511	511
R^2	0.036	0.048	0.036	0.040	0.039

Note: T-ratios are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All the variables are defined in Table of Appendix.

Table 6. The effect of media attention on Sharpe ratio applying random effects model

	Short-term	Long-term			
	$k = 0$	$k = 1$	$k = 2$	$k = 3$	$k = 4$
$Media_{t-k}$	0.040***	−0.026***	−0.021*	0.007	0.006
	(3.81)	(−2.19)	(−1.83)	(0.61)	(0.54)
Age_t	−0.008***	−0.008***	−0.006**	−0.009***	−0.008***
	(−2.67)	(−2.79)	(−1.99)	(−3.06)	(−2.84)
$Size_t$	0.048***	0.045***	0.037***	0.048***	0.051***
	(3.93)	(3.56)	(3.17)	(4.15)	(4.45)
$Change_t$	0.018	0.049	0.020	0.037	0.039
	(0.56)	(1.64)	(0.68)	(1.16)	(1.29)
$Cash_t$	−0.015	−0.011	−0.007	−0.015	−0.019*
	(−1.33)	(−0.99)	(−0.67)	(−1.36)	(−1.75)
_cons	−0.640***	−0.625***	−0.554***	−0.648***	−0.654***
	(−4.58)	(−4.45)	(−3.99)	(−4.53)	(−4.71)
Obs.	514	513	512	511	510
R^2	0.051	0.056	0.044	0.054	0.056

Note: T-ratios are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All the variables are defined in Table of Appendix.

5. Discussion

5.1. Media coverage of green funds

Do green funds attract more media attention than non-green funds? The over-attention hypothesis (Ball-Rokeach & DeFleur, 1976) proposes that investors can rely heavily on the media sources of information, leading to a large number of speculative buying, thereby reducing long-term security returns. To examine whether green funds tend to get more media attention, the media coverage of the treatment group (green funds) and the control group (non-green funds) are compared. In addition, considering green funds can be quite different from non-green funds in terms of fund characteristics, we use a Propensity Score Matching (PSM) method commonly used in the literature to select the non-green funds that constitute the control group. Specifically, a logistic regression is firstly run to construct a propensity score based on funds' *size, age, cash, proportion of stocks* (the share of stock value in the

total value of funds as a measure for risk), *standard error of return* (difference between actual and expected return as an additional measure for risk), and *average return.* Then, the nearest neighbor matching method is used to match each green fund with a non-green fund based on the closest propensity score.

The results of balance test in Table 7 show that there is no significant differences between treatment and control groups in the matched sample. The average treatment effect of being a green fund on media attention is presented in Table 8. The results show that the difference in media attention between green funds and non-green funds for the paired sample is 1.02, with a t-ratio of 2.35, indicating that green funds do attract more media attention compared with non-green funds of similar characteristics.

Table 7. Balancing test

	Condition	Mean		%bias	t-test	
		Treated	Control		t	p>t
Size	Unmatched	20.212	20.152	−6.2	−0.49	0.626
	Matched	20.216	20.136	−0.2	−0.01	0.991
Age	Unmatched	3.922	5.490	−46.7	−6.01	0.000
	Matched	5.511	5.571	−1.8	−0.19	0.847
Proportion of stocks	Unmatched	42.993	36.012	43.2	5.49	0.000
	Matched	43.005	45.251	−13.3	−1.75	0.080
Cash	Unmatched	0.149	0.149	−0.1	−0.01	0.992
	Matched	0.150	0.163	−9.2	−0.51	0.610
Stdreturn	Unmatched	1.537	1.474	5.2	0.43	0.671
	Matched	1.555	1.422	10.7	0.63	0.530
Avgreturn	Unmatched	0.009	0.033	10.4	0.85	0.158
	Matched	0.009	0.017	−11.1	0.48	0.628

Note: This table shows the balancing result of PSM method. *%bias* is the difference ratio between treatment group and control group. The treatment group represents green funds, and Control group represents non–green funds.

Table 8. Average Treatment Effect

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Media	Unmatched	3.588	2.908	0.679	0.455	1.49
	ATT	3.611	2.587	1.024	0.435	2.35

Note: This table shows the result of Average Treatment Effect (ATT). S.E is the standard error. Difference is the difference between mean of Media in the treatment and control group.

5.2. Effect of media attention on purchase

The investor sentiment model suggests that buying pressure by individual investors influenced by media reports pushes prices up in the short run, which distorts the security prices and could lead to subsequent price reversals (Barber et al., 2009a). Thus, media effect on fund purchase is examined by regressing the amount of cash that flows into a fund (*Inflow$_t$*) on media attention (*Media$_t$*) during the same quarter, controlling for all the other covariates previously specified in Model (2). Following the existing literature, *Inflow$_t$*

is calculated according to the following formula:

$$Inflow_{i,t} = Share\ of\ Purchase_{i,t}\ /\ Total\ Share_{i,t-1} \times NAV_{i,t},\qquad(3)$$

where $NAV_{i.t}$ refers to the net asset value of fund in quarter.

Table 9. The effect of media attention on fund purchase

	(1)	(2)
$Media_t$	0.196**	0.216**
	(2.15)	(2.47)
$Size_t$	0.097***	0.097***
	(4.72)	(4.91)
Age	−0.019***	−0.018***
	(−5.50)	(−5.46)
$Perf_t$	0.098	−0.143
	(0.97)	(−1.39)
$Cash_t$	0.014	0.009
	(1.12)	(0.77)
TM_t	0.094	−0.141
	(0.66)	(−1.00)
$TMtiming_t$	0.000	0.000
	(0.32)	(0.01)
$Stocks_t$	−0.076***	−0.074***
	(−4.59)	(−4.60)
$Media_{t-k} \times Perf_t$		2.473***
		(7.74)
$\_cons$	−0.770***	−0.717***
	(−4.25)	(−4.19)
Obs.	663	663
R^2	0.179	0.241

Note: T-ratios are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All the variables are defined in Table of Appendix.

Results in Column (1) of Table 9 confirm that media attention fuels fund purchases, since media coverage draws investors' attention to specific funds. Furthermore, media attention can influence investors' behavior not only directly but also indirectly via influencing their sensitivity to funds' performance, since extensive media dissemination may make investors more sensitive to changes in their performance. Therefore, it proceeds to add an interaction term $\left(Media_{i,tk} \times Perf_{i,t}\right)$ to Models (2) to examine how the interplay between media attention and fund performance affects investors' buying behaviors. A positive coefficient on the interaction term indicates that media attention makes investors respond more sensitively to fund performance, vice versa. The column (2) of Table 2 shows that the coefficient of the interaction item is positive and significant at the 1% level, indicating that investors have increased their purchases in response to the good fund performance reported by the media. This provides evidence that the indirect channel is also operating.

Table 10. The effect of cash inflows on Sharpe ratio

	$k = 0$	$k = 1$	$k = 2$	$k = 3$	$k = 4$
$Inflow_{t-k}$	0.007**	–0.007**	–0.006*	–0.012***	–0.005
	(2.52)	(–2.30)	(–1.91)	(–4.13)	(–1.56)
Age_t	–0.003*	–0.004**	–0.003*	–0.004**	–0.003*
	(–1.69)	(–2.46)	(–1.67)	(–2.13)	(–1.92)
$Size_t$	0.010**	0.031***	0.026***	0.030***	0.026***
	(1.96)	(5.89)	(4.96)	(5.83)	(4.95)
$Change_t$	0.017	0.014	0.015	0.016	0.027
	(1.05)	(0.85)	(0.89)	(0.93)	(1.47)
$Cash_t$	–0.057	–0.056	–0.051	–0.082*	–0.048
	(–1.41)	(–1.23)	(–1.06)	(–1.73)	(–0.97)
_cons	–0.278***	–0.437***	–0.374***	–0.335***	–0.393***
	(–3.56)	(–5.23)	(–4.33)	(–3.81)	(–4.35)
Obs.	652	577	529	490	452
R^2	0.068	0.087	0.069	0.091	0.081

Note: T-ratios are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All the variables are defined in Table of Appendix.

Barber et al. (2009a) showed that stocks heavily purchased with large trades one week earn poor returns in the subsequent week. Because individuals' buying pressure temporarily pushes up the prices of attention-grabbing stocks, but such pressure subsequently reverses, leading to a reversal in stock returns. To check whether this also explains the patterns found for green funds in this paper, the fund performance (measured by Sharpe ratio) is regressed on the amount of cash flows ($Inflow_{t-k,\ k=0,1,2,3,4}$). Negative coefficients on lagged cash inflows will indicate price reversals, thus reversals in fund performance in subsequent quarters. The results in Table 10 show that funds heavily bought in the past quarters $(t-1, t-2, t-3)$ are associated with poorer performance in the current quarter, suggesting that price reversals have occurred. However, as the influence of media coverage subsides over time, the effect on return becomes insignificant. Again, here the evidence suggests that media effect can affect fund performance in the short run, while it has no significant impacts in the longer run.

5.3. Impact of purchase on the relationship between media attention and long-term performance

The study shows that large purchases induced by media attention can impede the long-term performance of green funds. If the reversal of performance can be largely explained by more purchases, it will be more pronounced for funds with heavier purchases. Many researchers used the average share of fund purchases to distinguish aggressive purchases (Barber et al., 2009a). Thus, green funds are divided into three groups according to their *quarterly* average purchases – the largest quintile (high), three mid-quintiles (medium), and the smallest quintile (low), respectively. then the baseline Model (1) is applied on these three subsamples separately and the results are summarized in Table 11.

Table 11. The effect of media on Sharpe ratio by share of purchase

	High	Medium	Low
	k = 1		
Media_{t–1}	−0.006**	−0.002	−0.002
	(2.03)	(–0.02)	(–0.03)
	k = 2		
Media_{t–2}	−0.064**	−0.022*	−0.003
	(–2.43)	(–1.90)	(–0.12)
	k = 3		
Media_{t–3}	−0.005*	−0.005**	−0.004
	(–1.92)	(–2.69)	(–0.85)
	k = 4		
Media_{t–4}	−0.003	0.001	0.004
	(–0.63)	(0.37)	(1.37)
Controls	Yes	Yes	Yes
Obs.	222	239	199

Note: This table presents the OLS estimates of three subsamples ranked by funds' quarterly shares of purchases. The lagged media attention enters the regression one at a time, along with other controls variables. The covariates are the same as those in Table 3: Age, Size, Change, Cash. T-ratios are shown in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

The results show that past media attention has a negative effect on fund return mainly for funds in the high and medium categories, while it has no effect on the funds in the low category, in terms of funds' quarterly average purchases. The negative effect is most pronounced after half a year $(k = 2)$, and diminishes afterwards. This provides further evidence that price reversals are more likely to occur for heavily traded funds compared with lightly traded funds, confirming that trading volume is a major channel through which media attention boosts the fund performance for a short while, nevertheless followed by a subsequent reversal in performance.

6. Conclusions

This study finds that undue media attention has a negative influence on long-term performance of a green fund, whereas it has a positive influence on its short-term performance. The reverse of performance may be resulted by large purchases of securities at higher prices. The over-attention and over-confidence hypotheses explain that media attention-based buying can lead to large purchase and consequently raise the prices of securities. Large purchase with high prices increases trading losses, transaction taxes, commissions, and market timing losses of green funds, resulting in significant losses on these funds in the long run. Moreover, such media attention influences the performance of larger and older funds, as well as the funds that are more dominated by individual investors. Although there are previous studies which support that excess media attention may lead to poor performance, they are mainly based on developed countries. This study is mainly based on the effects of media attention on China's financial market as an example of developing countries. It is found that the side effects of media attention in China, a developing country is significant, where investors are

likely to be overconfident and react more irrationally to media coverage, which better supports over-confidence hypothesis and over-attention hypothesis. The findings also indicate that fund companies should be more cautious in advertising by media coverage in China, since over-confidence and over-reaction to media coverage are more apparent in Chinese investors.

Instead of traditional media, such as newspapers, this study mainly investigates online media. In addition, panel data is applied to analyze the relationship between online media attention and fund performance. Media attention is measured by the number of news items covering a green fund in a specific time period, and fund performance is measured by Sharpe ratio. The relationship between media attention in $t - k\left(k = 1, 2, 3, 4\right)$ quarter and performance in quarter t indicates the influence of media attention on long-term performance, while the nexus between media attention and performance in the same quarter shows the influence of media attention on short-term performance.

Theoretically, media reflects and shapes the expectations of both investors and fund managers, which influence the demand and supply of funds and funds' policies. The influence of social media on purchasing intention indicates that there is a challenge in how green funds in China can design media advertising programs to effectively attract potential investors. Individual investors should be careful with the information posted on media platforms. Moreover, the government must regulate information that is targeted to potential investors. In practice, potential investors place a premium on information quality, while green funds tend to be over-advertised to attract a greater number of investors.

The study has some limitations. By simply counting advertisements on Baidu, it is not able to distinguish the fraud phenomenon in online marketing. This is the case when advertising websites create virtual views or refresh themselves after a certain period. Then, some other independent variables can be added to the empirical model in a future study, such as financial risks, especially cultural factors, because the Chinese market typically represents Asian culture. One more research gap is to examine the behavior of fund managers in optimizing advertising rates to avoid the so-called "advertising traps." Thus, there is sufficient space for further study in the future to make subsequent research more valuable.

Funding

Author contributions

Y.P. X conceived the study and was responsible for the design and development of the data analysis. Y.P. X and T. X were responsible for data collection and analysis. Y.P. X and T. X were responsible for data interpretation. Y.P. X wrote the first draft of the article. H.S. Q reviewed and edited the article.

Disclosure statement

This research does not have any competing financial, professional, or personal interests from other parties.

References

Aboody, D., & Kasznik, R. (2000). CEO stock option awards and the timing of corporate voluntary disclosures. *Journal of Accounting and Economics*, *29*(1), 73–100. https://doi.org/10.1016/S0165-4101(00)00014-8

Almazan, A., Hartzell, J. C., & Starks, L. T. (2005). Active institutional shareholders and costs of monitoring: Evidence from executive compensation. *Financial Management*, *34*(4), 5–34. https://doi.org/10.1111/j.1755-053X.2005.tb00116.x

Ball-Rokeach, S. J., & DeFleur, M. L. (1976). A dependency model of mass-media effects. *Communication Research*, *3*(1), 3–21. https://doi.org/10.1177/009365027600300101

Barber, B. M., & Odean, T. (2000). Trading is hazardous to your wealth: The common stock investment performance of individual investors. *The Journal of Finance*, *55*(2), 773–806. https://doi.org/10.1111/0022-1082.00226

Barber, B. M., Odean, T., & Zhu, N. (2009a). Do retail trades move markets? *The Review of Financial Studies*, *22*(1), 151–186. https://doi.org/10.1093/rfs/hhn035

Barber, B. M., Odean, T., & Zhu, N. (2009b). Systematic noise. *Journal of Financial Markets*, *12*(4), 547–569. https://doi.org/10.1016/j.finmar.2009.03.003

Ben-David, I., Franzoni, F., Kim, B., & Moussawi, R. (2021). *Competition for attention in the ETF space* (Working Paper 28369). National Bureau of Economic Research. https://doi.org/10.3386/w28369

Berger, A. N., & Udell, G. F. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance*, *30*(11), 2945–2966. https://doi.org/10.1016/j.jbankfin.2006.05.008

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of performance. In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in organizations* (pp. 35–70). Jossey-Bass Publishers.

Cormier, D., Magnan, M., & Morard, B. (1993). The impact of corporate pollution on market valuation: Some empirical evidence. *Ecological Economics*, *8*(2), 135–155. https://doi.org/10.1016/0921-8009(93)90041-4

Da, Z., Engelberg, J., & Gao, P. (2015). The sum of all FEARS investor sentiment and asset prices. *The Review of Financial Studies*, *28*(1), 1–32. https://doi.org/10.1093/rfs/hhu072

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under- and overreactions. *The Journal of Finance*, *53*(6), 1839–1885. https://doi.org/10.1111/0022-1082.00077

Daniel, K., Hirshleifer, D., & Teoh, S. H. (2002). Investor psychology in capital markets: Evidence and policy implications. *Journal of Monetary Economics*, *49*(1), 139–209. https://doi.org/10.1016/S0304-3932(01)00091-5

DellaVigna, S., & Pollet, J. M. (2009). Investor inattention and Friday earnings announcements. *The Journal of Finance*, *64*(2), 709–749. https://doi.org/10.1111/j.1540-6261.2009.01447.x

Dimpfl, T., & Jank, S. (2016). Can internet search queries help to predict stock market volatility? *European Financial Management*, *22*(2), 171–192. https://doi.org/10.1111/eufm.12058

Drake, M. S., Roulstone, D. T., & Thornock, J. R. (2012). Investor information demand: Evidence from Google searches around earnings announcements. *Journal of Accounting Research*, *50*(4), 1001–1040. https://doi.org/10.1111/j.1475-679X.2012.00443.x

Duz Tan, S., & Tas, O. (2021). Social media sentiment in international stock returns and trading activity. *Journal of Behavioral Finance*, *22*(2), 221–234. https://doi.org/10.1080/15427560.2020.1772261

Dyakov, T., & Wipplinger, E. (2020). Institutional ownership and future stock returns: An international perspective. *International Review of Finance*, *20*(1), 235–245. https://doi.org/10.1111/irfi.12203

Dyck, I. J. A., Volchkova, N., & Zingales, L. (2008). The corporate governance role of the media: Evidence from Russia. *Journal of Finance*, *63*(3), 1093–1135. https://doi.org/10.1111/j.1540-6261.2008.01353.x

Easley, D., Hvidkjaer, S., & O'hara, M. (2002). Is information risk a determinant of asset returns? *The Journal of Finance*, *57*(5), 2185–2221. https://doi.org/10.1111/1540-6261.00493

El Ouadghiri, I., Guesmi, K., Peillex, J., & Ziegler, A. (2021). Public attention to environmental issues and stock market returns. *Ecological Economics*, *180*, Article 106836. https://doi.org/10.1016/j.ecolecon.2020.106836

Engelberg, J., & Gao, P. (2011). In search of attention. *The Journal of Finance*, *66*(5), 1461–1499. https://doi.org/10.1111/j.1540-6261.2011.01679.x

Engelberg, J. E., & Parsons, C. A. (2011). The causal impact of media in financial markets. *The Journal of Finance*, *66*(1), 67–97. https://doi.org/10.1111/j.1540-6261.2010.01626.x

Fan, R., Talavera, O., & Tran, V. (2020). Social media, political uncertainty, and stock markets. *Review of Quantitative Finance and Accounting*, *55*(3), 1137–1153. https://doi.org/10.1007/s11156-020-00870-4

Fang, L., & Peress, J. (2009). Media coverage and the cross-section of stock returns. *The Journal of Finance*, *64*(5), 2023–2052. https://doi.org/10.1111/j.1540-6261.2009.01493.x

Fang, L. H., Peress, J., & Zheng, L. (2014). Does media coverage of stocks affect mutual funds' trading and performance? *The Review of Financial Studies*, *27*(12), 3441– 3466. https://doi.org/10.1093/rfs/hhu056

Ge, Y., Qiu, J., Liu, Z., Gu, W., & Xu, L. (2020). Beyond negative and positive: Exploring the effects of emotions in social media during the stock market crash. *Information Processing* & *Management*, *57*(4), Article 102218. https://doi.org/10.1016/j.ipm.2020.102218

Hartzmark, S. M., & Sussman, A. B. (2019). Do investors value sustainability? A natural experiment examining ranking and fund flows. *Journal of Finance*, *74*(6), 2789–2837. https://doi.org/10.1111/jofi.12841

Hirshleifer, D. A., Myers, J. N., Myers, L. A., & Teoh, S. H. (2008). Do individual investors cause post-earnings announcement drift? Direct evidence from personal trades. *The Accounting Review*, *83*(6), 1521–1550. https://doi.org/10.2308/accr.2008.83.6.1521

Hudson, N. J., Reverter, A., & Dalrymple, B. P. (2009). A differential wiring analysis of expression data correctly identifies the gene containing the causal mutation. *PLoS Computational Biology*, *5*(5), Article e1000382. https://doi.org/10.1371/journal.pcbi.1000382

Kahneman, D. (1973). *Attention and effort*. Citeseer.

Kaniel, R., Saar, G., & Titman, S. (2008). Individual investor trading and stock returns. *The Journal of Finance*, *63*(1), 273–310. https://doi.org/10.1111/j.1540-6261.2008.01316.x

Kong, G., Kong, D., & Wang, M. (2020). Does media attention affect firms' environmental protection efforts? *Evidence from China*. *The Singapore Economic Review*, *65*(03), 577–600. https://doi.org/10.1142/S021759081741003X

Marti-Ballester, C. P. (2019). The role of mutual funds in the sustainable energy sector. *Business Strategy and the Environment*, *28*(6), 1107–1120. https://doi.org/10.1002/bse.2305

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *The Journal of Finance*, *42*(3), 483–510. https://doi.org/10.1111/j.1540-6261.1987.tb04565.x

Sadka, R. (2006). Momentum and post-earnings-announcement drift anomalies: The role of liquidity risk. *Journal of Financial Economics*, *80*(2), 309–349. https://doi.org/10.1016/j.jfineco.2005.04.005

Seasholes, M. S., & Wu, G. (2007). Predictable behavior, profits, and attention. *Journal of Empirical Finance*, *14*(5), 590–610. https://doi.org/10.1016/j.jempfin.2007.03.002

Shiller, R. J. (1999). Human behavior and the efficiency of the financial system. *Handbook of Macroeconomics*, *1*, 1305–1340. https://doi.org/10.1016/S1574-0048(99)10033-8

Vega, C. (2006). Stock price reaction to public and private information. *Journal of Financial Economics*, *82*(1), 103–133. https://doi.org/10.1016/j.jfineco.2005.07.011

Vozlyublennaia, N. (2014). Investor attention, index performance, and return predictability. *Journal of Banking* & *Finance*, *41*, 17–35. https://doi.org/10.1016/j.jbankfin.2013.12.010

Zhang, Y., Chu, G., & Shen, D. (2021). The role of investor attention in predicting stock prices: The long short-term memory networks perspective. *Finance Research Letters*, *38*, Article 101484. https://doi.org/10.1016/j.frl.2020.101484

APPENDIX

Table A1. Explanation of related variables

Variable name	Label	Measurement
Perf	The performance of fund	Sharpe ratio–risk–adjusted return by Sharpe (1966) Alpha–risk adjusted return by Jensen (1968)
Size	Net total asset	The logarithm of net total asset of a fund
Age	Age of fund	A fund's operating duration until 2018
Change	Whether a fund manager has changed	A dummy variable indicating whether a fund has changed manager to capture the quality of corporate governance
Cash	The amount of cash	The amount of cash owned by a fund to capture the risk
TM	Fund manager's ability to select funds	Proposed by TM model – a forecasting model by Treynor & Mazuy (1966)
TMtiming	The market timing ability of fund manager	Also in TM model – a forecasting model by Treynor & Mazuy (1966)
Inflow	Inflow of fund	The amount of cash that flows into the fund
Share of purchase	Share of purchase	The number of shares sold to investors
Stocks	The number of stocks in a fund	The number of stocks owned by funds to capture the risk
Proportion of stocks	Proportion of stocks	The proportion of stock value in total asset value to capture the risk of funds
Stdreturn	Standard deviation of return	Difference between actual return and expected return to capture funds' risk
Avgreturn	The average return of fund	The performance of fund