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Winners in the spotlight: Media coverage of fund holdings as a driver of flows[☆]

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ABSTRACT

We show that media coverage of mutual fund holdings affects how investors allocate money across funds. Fund holdings with high past returns attract extra flows, but only if these stocks were recently featured in the media. In contrast, holdings that were not covered in major newspapers do not affect flows. We present evidence that media coverage tends to contribute to investors' chasing of past returns rather than facilitate the processing of useful information in fund portfolios. Our evidence suggests that media coverage can exacerbate investor biases and that it is the primary mechanism that makes fund window dressing effective.

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1. Introduction

The business press plays a key role in disseminating information in financial markets. Yet it is less clear whether media coverage enables investors to make better investment decisions. On the one hand, media coverage could reduce the cost of information acquisition and lessen the information asymmetry between firms and investors (Tetlock, 2010). On the other hand, media coverage could exacerbate investor biases (Barber and Odean, 2008) and create incentives for manipulation (Gurun and Butler, 2012). These two alternatives have very different implications for whether media coverage makes capital allocation more efficient.

This paper investigates the relative importance of these two effects by studying the role of media coverage in

investors' capital allocations to mutual funds. These investment vehicles account for a large part of the financial assets held by the average household and provide rich data on the information environment, capital allocations, and subsequent outcomes. Further, survey evidence indicates that over 40% of investors rely heavily on the information derived from mass media when choosing their mutual fund investments (Securities and Exchange Commission, 2000). In this paper, we study how media coverage of fund holdings affects investors' capital allocations across funds.

Our focus on fund holdings is motivated by several factors. First, portfolio holdings provide perhaps the richest source of public information, which can improve investment outcomes (e.g., Kacperczyk, Sialm, and Zheng, 2008) but can also lead to misinterpretation. For example, holdings' returns can be confused with funds' returns. Second, fund holdings are a subject of regulated disclosure, and it is important to understand how this disclosure affects investors' decisions. In particular, the list of fund holdings, usually available both in print and online, constitutes a large and salient portion of a mutual fund's financial reporting. Finally, investor surveys and industry evidence indicate that investors follow fund holdings, particularly those of well-publicized stocks.¹ However, relatively little is known about how investors evaluate fund holdings and what role media coverage plays in their investment decisions. Our paper seeks to provide evidence in this direction.

Our main finding is that media coverage of fund holdings has a significant effect on investors' capital allocation decisions. In particular, investors' capital flows respond to holdings' past returns, but only if these holdings were covered in widely circulated newspapers in the preceding quarter. Investors allocate significantly more (less) capital to funds holding media-covered stocks with high (low) past returns, after controlling for fund returns and other fund characteristics. In other words, if a fund holds shares in a high-profile failure, such as Enron, it faces greater outflows than an identical fund holding a stock with a similarly low return but without newspaper coverage.

The incremental effect of holdings' media coverage on flows is substantial. A 1 standard deviation increase in market-adjusted returns of media-covered holdings (8.06%) predicts an extra quarterly capital inflow of 1.13% of the fund's assets, over and above the effect of fund returns. This effect is approximately 21.2% as large as the effect of a 1 standard deviation increase in the fund's own

realized returns. In contrast, the returns of holdings that were not covered in major newspapers in the trailing quarter have no relation to future fund flows. To distinguish between the effect of positive and negative media coverage, we rely on holdings' returns and show that their effect on flows is larger in absolute magnitude for holdings with positive returns than for holdings with negative returns. In other words, the effect on flows is driven more by rewarding funds that hold media-covered winners than penalizing funds that hold media-covered losers.

As an additional test that separates the effect of holdings' returns from other fund characteristics, we exploit the difference in timing when various fund data become observable to investors. While many fund characteristics are reported daily [e.g., returns, volatility, total net assets (TNA)], fund holdings are disclosed on a periodic basis. One alternative hypothesis is that holdings themselves have little effect on investors' flows but instead proxy for some information already embedded in the immediately available fund data, such as fund returns or volatility. In this case, the apparent association between holdings' returns and investors' flows can result from the correlation between holdings' returns and these other data. To evaluate this alternative hypothesis, we examine the pattern of flows before and after holdings' disclosure dates. We find that fund flows react to holdings' returns strongly in the periods after disclosure, but not before. This evidence indicates that the effect of media-covered holdings on fund flows is driven by the disclosure of those holdings, and it is incremental to that of other fund characteristics observed immediately.

Next, we show that investors' response to holdings' returns is attributed to their media coverage rather than to other firm characteristics correlated with media coverage. First, we construct the same variables for fund holdings based on the correlates of media coverage, such as size, book-to-market ratio, and analyst coverage. We find that holdings' returns sorted on these variables show no effect on fund flows, and they do not reduce the effect of media-covered holdings. Second, we use temporal variation in media coverage to capture the shift in media attention, while controlling for holdings' characteristics that remain constant in the short term. We find that the effect of holdings' media coverage on fund flows is driven entirely by the news in the latest month in the reporting period. The media effect fades away as news becomes older and disappears after one month, while the vast majority of other firm characteristics remain unchanged.

We also show that investors' reaction to media-covered holdings is driven by media coverage of stocks, not media coverage of mutual funds. We find that media articles about mutual funds account for only 2% of our sample, and their exclusion has no effect on our results. Finally, we consider the possibility that fund flows and holdings' media coverage are simultaneously driven by time-varying investor sentiment specific to a particular fund category. To control for this effect, we include fund style and investment objective indicators that are specific to each quarter (i.e., style-quarter and objective-quarter fixed effects), thus exploiting the variation in fund flows within each investment category in a given quarter. This research

¹ For example, according to Morningstar, 42% of retail investors would like to have portfolio holdings disclosed more often than quarterly. In the business press, fund managers in interviews acknowledge investors' interest in fund holdings and the pressure to hold hot, widely publicized stocks in fund portfolios (Moeller, 1999; McDonald, 2000). For example, McDonald (2000) quotes fund manager Adrian Brass describing his decision to buy the highly publicized stock of Qualcomm: "We had a lot of shareholders calling up and asking why we didn't hold it." Finally, the academic literature provides indirect evidence that fund holdings influence investors' decisions by showing that fund managers window dress their holdings before reporting them to investors despite incurring transaction costs (e.g., Musto, 1999).

design also enables us to introduce more refined controls for fund performance and capture the effect of both absolute returns and within-category performance on investors' decisions (Ivković and Weisbenner, 2009). Overall, the evidence suggests that investors' reaction to media-covered holdings cannot be easily explained by other firm or fund characteristics.

Next, we study the role of holdings' media coverage in investors' decisions and examine two plausible interpretations. One possibility is that media coverage reduces the cost of gathering information in an analysis of fund holdings by allowing investors to identify skilled managers who anticipate the arrival of important news. Another view is that media coverage increases the salience of certain holdings, thus contributing to investors' return chasing, regardless of whether the stocks were purchased before or after the news arrival.²

To distinguish between these views, we study the following three questions. First, does investors' preference for media-covered holdings vary with measures of holdings' informativeness or with measures of salience and limited attention? Second, do investors increase their subsequent returns by this strategy? Third, do investors respond to holdings' manipulation by fund managers?

In response to the first question, we find a strong positive relation between fund flows and the salience of media-covered holdings but little relation between fund flows and the informativeness of holdings. For example, investors' response to media-covered holdings is significantly larger for articles that feature the firm's name in the headline or lead paragraph, making it more salient to investors. Also, the effect of media-covered holdings is significantly stronger for end-of-year holdings, which appear in the prominent fund disclosure—the annual report. By contrast, the response to holdings is not significantly reduced when the holdings are less informative. For example, we find an equally strong reaction to holdings of funds with a high turnover, despite the fact that these funds' past holdings are less informative of the current investment strategy. Collectively, this evidence suggests that holdings' media coverage generates a temporary increase in their salience to investors instead of providing investors with valuable information about a fund's strategy. Consistent with this more naïve interpretation, we find that the effect of media-covered holdings is stronger for funds that spend more on direct marketing and tend to attract a less sophisticated investor clientele (Bergstresser, Chalmers, and Tufano, 2009).

We provide additional evidence by studying investors' reaction to observed changes in fund holdings. Under the information view, media coverage can help investors identify skilled fund managers who correctly predict the outcomes of future corporate events and revise their holdings in anticipation of these outcomes. Previous work shows that this analysis yields valuable information about managerial skill (e.g., Baker, Litov, Wachter, and Wurgler,

2010). In contrast, under the salience view, media coverage makes holdings' returns more conspicuous but not necessarily more informative.

The evidence supports the salience view. Investors respond to the presence of media-covered winners in fund portfolios, but they do not appear to extract valuable information from changes in fund holdings. In particular, capital flows respond equally strongly to recent winners that were added to the portfolio in the last quarter (i.e., after appreciating in value), although such *ex post* purchases do not reflect managerial skill. This evidence suggests that investors respond weakly to the informational value of the timing of a fund's investments in media-covered stocks, but they react strongly to the salience of media-covered holdings in a fund's portfolio.

Next, we investigate whether investors receive higher returns by investing in funds with media-covered past winners and find little evidence that they do. The returns of media-covered holdings are weakly related to future fund returns due to correlation with momentum strategies, but even this effect disappears after controlling for past fund returns and fund investment style. If fund returns are evaluated relative to a three- or four-factor model, the predictive power of holdings' returns for future fund performance is insignificant and in some specifications has the opposite sign. Therefore, at a minimum, investors do not earn higher returns and likely incur substantial transaction costs from chasing funds with media-covered winners.

Finally, we explore whether investors detect possible portfolio manipulation (or window dressing) by mutual fund managers, a strategy that entails buying stocks with high trailing returns shortly before reporting dates to convey the impression that they were purchased before appreciating in value. While prior work has examined the extent of window-dressing behavior from the perspective of fund managers in pension funds (Lakonishok, Shleifer, Thaler, and Vishny, 1991) and money market funds (Musto, 1999), relatively little is known about how investors respond to window dressing. We provide one of the first pieces of evidence in this direction.

The analysis of investors' reaction to window dressing provides additional evidence on the information and salience views. If media coverage helps investors distinguish successful managers who purchase future winners before the arrival of good news (stock pickers) from managers who purchase these stocks after the arrival of news (window dressers), the information view predicts that window dressing will be ineffective and likely harmful for fund flows, because it will signal lower managerial skill. In contrast, if investors react to the salience of stock returns in a fund's portfolio, a fund's tilt toward media-covered winners at reporting dates should attract flows even if these stocks were purchased after the arrival of good news. Our findings support the salience view. Using measures of window dressing based on the difference between the realized return of the fund and that of its reported holdings, we find that capital flows react equally strongly to media-covered holdings of window-dressing funds, despite the fact that holdings' returns for these funds significantly overstate actual fund performance.

² While this view would reflect a fairly naïve capital allocation process, it appears plausible based on survey evidence that shows a lack of financial sophistication among a large fraction of mutual fund investors (Securities and Exchange Commission, 2000).

Overall, our paper has several implications. First, we provide one of the first pieces of evidence on the role of media coverage of fund holdings in attracting flows. Second, we offer novel evidence on the effect of media coverage on investors' evaluation of corporate disclosure and show that a richer information environment need not lead to better investment decisions. In particular, our findings show that media coverage could exacerbate investor biases, such as the chasing of past returns. Third, to our knowledge, our paper is the first to demonstrate that media coverage is the necessary condition underlying the efficacy of window dressing.

The rest of the paper is organized as follows. Section 2 discusses related work. Section 3 describes data and summary statistics. Section 4 examines the role of media coverage in investors' evaluation of fund holdings. Section 5 distinguishes between the information and salience views. Section 6 studies investors' response to fund window dressing. Section 7 concludes.

2. Related literature

Our paper adds to the literature on the role of media in financial markets. We examine a central question in this area: the effect of media coverage on capital allocation decisions. Theoretical models offer diverging predictions about this media effect. Under the information view, media coverage improves investment decisions by reducing the cost of information acquisition (Grossman and Stiglitz, 1980; Verrecchia, 1982) and by increasing investors' awareness of financial assets (Merton, 1987). Consistent with this view, media coverage has been associated with a quicker incorporation of information into stock prices (DellaVigna and Pollet, 2009), a lower cost of capital (Fang and Peress, 2009), and lower information asymmetry between investors and firms (Bushee, Core, Guay, and Hamm, 2010; Tetlock, 2010).

An alternative is the salience view, which posits that media coverage merely shifts investor attention across securities, causing a transitory increase in investor demand for stocks in the news (Daniel, Hirshleifer, and Subrahmanyam, 1998; Hong and Stein, 1999). Consistent with this view, previous work shows that media coverage generates temporary upward price pressure on stocks in the news (Barber and Odean, 2008), a pattern attributed to investor overreaction to salient events (Huberman and Regev, 2001; Tetlock, 2011).

Our paper seeks to examine the relative importance of these two effects by studying whether and how the decisions of mutual fund investors vary with media coverage of fund holdings. Our findings support the salience view. In particular, our evidence suggests that media coverage of fund holdings appears to contribute to return chasing instead of facilitating the processing of useful information contained in fund holdings.

Another strand of the media literature shows that media coverage is biased toward media advertisers (Reuter and Zitzewitz, 2006; Gurun and Butler, 2012), clients of investor relations firms (Solomon, 2012), and firms engaging in strategic disclosure (Ahern and Sosyura, 2014). Instead of focusing on the biases in media reporting, we show that media coverage contributes to biases in investors, namely, the chasing of past returns.

Our paper is also related to the literature on mutual funds. We contribute to research on window dressing in the investment management industry. In earlier work, Lakonishok, Shleifer, Thaler, and Vishny (1991) examine the investment behavior of pension funds. The authors find that pension fund managers generally follow contrarian strategies but tend to get rid of their extreme losers before reporting dates, particularly at the end of the year. This behavior is more pronounced at small funds, which typically have less sophisticated sponsors. The authors conclude that their evidence uncovers some window dressing at pension funds, albeit not a radical departure from the funds' usual strategy. More recently, Meier and Schaumburg (2006) detect increased turnover at equity mutual funds on the last days of the quarter and show that this trading activity is related to purchasing past winners and selling past losers prior to holdings' disclosure. The authors attribute this finding to window dressing and show that it cannot be explained by momentum, liquidity considerations, or tax-motivated selling. A critical assumption in the window-dressing literature, previously untested, is that investors react to holdings' returns, even though these returns are neither reported by funds nor included in regulatory filings. Our evidence suggests that media coverage serves as an important channel through which investors learn about stock returns and that window-dressing strategies are likely to work only for stocks featured in the national press.

Our results also provide one plausible explanation that connects two pieces of evidence in prior work. In particular, Falkenstein (1996) shows that mutual funds hold stocks with greater news coverage, and Chae and Lewellen (2005) find that fund managers follow momentum strategies in foreign markets where momentum is not profitable. Our evidence suggests that funds could hold stocks with high past returns featured in the news to attract investors instead of merely following momentum and that this strategy has a positive effect on capital flows.

We also contribute to the literature on information processing by mutual fund investors. Previous research has studied the implications of investor attention in the context of mutual fund fees (Barber, Odean, and Zheng, 2005). Our paper extends this literature by studying how investors react to mutual fund information in a new context—portfolio holdings. In this respect, portfolio holdings are particularly important for two reasons. First, portfolio holdings comprise perhaps the richest information set available to investors in the public domain, which can be used to infer a fund manager's skill (Kacperczyk and Seru, 2007; Kacperczyk, Sialm, and Zheng, 2005, 2008; Kacperczyk, Van Nieuwerburgh, and Veldkamp, 2013) and uncover important changes in a fund's strategy (Huang, Sialm, and Zhang, 2011). Second, mutual fund holdings are a subject of regulated and costly disclosure, and relatively little is known about how investors evaluate this disclosure. Our evidence suggests that retail investors react to the salience of portfolio holdings instead of their information content. Interpreted broadly, these findings highlight one mechanism that contributes to the less sophisticated, return-chasing fund flows (Frazzini and Lamont, 2008).

Our study also provides new evidence on how mutual funds are marketed to and evaluated by investors. Previous research has shown the importance of fund advertising (Jain

and Wu, 2000) and fund recommendations in the press (Reuter and Zitzewitz, 2006) for attracting flows. However, these channels are typically unavailable to the overwhelming majority of fund managers, as only about 10% of funds receive positive mentioning in the press (Kaniel, Starks, and Vasudevan, 2007) and even fewer funds are advertised by their families. Our paper suggests an alternative strategy that could be used by mutual funds to benefit from media exposure, namely, establishing positions in past winners that received prominent coverage in the national press.

More generally, our paper expands the evidence on the role of media in portfolio investing. In recent work, Fang, Peress, and Zheng (2012) find that mutual fund managers whose trades are correlated with public information, as proxied by media coverage, earn lower returns. The authors show that this effect is persistent and indicates lower managerial ability. Our paper studies the effect of media coverage from a different perspective, that of mutual fund investors. We find that investors' flows follow media-covered holdings, but this reaction is driven by holdings' salience, not valuable inference about managerial ability. Overall, our results suggest that the preferences of fund managers and their investors for media-covered stocks are likely interconnected. In particular, some decisions of low-ability managers to purchase media-favored stocks could reflect window-dressing efforts motivated by investors' preference for media-covered winners.

Finally, our evidence on fund investors adds to the broader literature on individual investment decisions, recently examined in Barber and Odean (2008), Brown, Ivković, Smith, and Weisbenner (2008), Ivković, Sialm, and Weisbenner (2008), and Kelley and Tetlock (2013). Our findings suggest that at least some investors evaluate financial data more naïvely than might be expected and that their reaction to regulatory filings is heavily influenced by mass media.

3. Data and summary statistics

3.1. Mutual funds

We begin our sample construction with the universe of open-end mutual funds covered by the Center for Research in Security Prices (CRSP) Mutual Fund Database between January 1998 and December 2008, inclusive. Our choice of the time period is motivated by the availability of media coverage data in Factiva, which tends to be significantly sparser in earlier years.

We limit our analysis to domestic, actively managed equity funds, thus excluding international funds, index funds, and funds specializing in bonds, precious metals, and other asset classes.³ We focus on domestic instead of international funds because foreign stocks receive relatively little media coverage in the US. To address

incubation bias, we exclude fund observations before the starting year reported in CRSP, portfolio snapshots with fewer than ten stocks, funds with a missing name, and funds with total net assets under \$5 million.

Our sample of mutual funds contains 1,731 open-end domestic equity funds, whose combined assets under management totaled \$1.7 trillion in December 2008. During our sample period, the average (median) fund managed \$1.8 billion (\$339 million) in assets, charged an expense ratio of 1.41% (1.40%), earned net market-adjusted returns of 1.38% (−1.17%) per year, experienced annual turnover of 89% (70%), and had quarterly capital flows of 6.94% (−0.88%). Panel A of Table 1 provides summary statistics for the mutual fund sample.

3.2. Portfolio holdings

Data on fund holdings come from Thomson Reuters, a database that compiles fund portfolio disclosures filed with the Securities and Exchange Commission (SEC). Since May 2004, funds are required to report their holdings quarterly. In earlier periods, funds were required to report semiannually, but the majority of them voluntarily disclosed quarterly (Wermers, Yao, and Zhao, 2012). For funds that disclosed semiannually before 2004, we use the holdings from the most recent semiannual filing in quarters without a filing. The intuition is that these are the holdings that were observable to investors in such quarters. Our results are similar if we exclude quarters without a filing.

We match portfolio holdings to mutual funds by using the MFLINKS table developed by Russ Wermers and made available via Wharton Research Data Services. The main unit of fund analysis is the “wfcfn” identifier from MFLINKS. Because the CRSP “fundno” identifier lists each share class as a separate series, we aggregate multiple fundno share classes into a single wfcfn. To derive total net assets, we sum over all fundnos with the same wfcfn. To compute fund returns and flows, we take the average over all fundnos with the same wfcfn.

After matching the two samples, we impose several additional filters to eliminate observations with errors. We exclude observations for which the number of shares held by a fund exceeds the number of shares outstanding for the stock and observations for which the value of shares held by a fund exceeds the value of fund assets reported by Thomson Reuters. We also eliminate observations with significant differences between the total assets reported by Thomson Reuters and the sum of assets for all share classes in CRSP.⁴ This screen serves as another control to eliminate funds that hold a significant portion of their portfolios in non-equity assets.

3.3. Media coverage

Our media data set contains four widely circulated national newspapers: the *Wall Street Journal*, the *New York*

³ We drop funds with the following Thomson Investment Objective Codes: International, Municipal Bonds, Bond & Preferred, Balanced, Metals, and Unclassified, as well as funds for which this information is missing. We exclude index funds based on the inclusion of the word “Index,” names of common indices, and variations and abbreviations of these words.

⁴ We drop an observation if the combined CRSP TNA is above 200% or below 50% of the assets in Thomson Reuters.

Table 1

Summary statistics.

This table shows summary statistics for the main sample of 1,731 open-end domestic equity funds. The sample period is from January 1998 to December 2008. Media coverage refers to articles about the company in the *Wall Street Journal*, the *New York Times*, the *Washington Post*, or *USA Today* over the quarter for which the holdings are reported.

Characteristics	Mean	25th percentile	Median	75th percentile	Standard deviation
<i>Panel A: Mutual funds</i>					
Total net assets (millions of dollars)	1,797	97	339	1,169	6,247
Turnover (percent per annum)	89.12	38.00	70.00	115.00	82.17
Market-adjusted return (percent per annum)	1.38	−7.02	−1.17	6.53	16.51
Expense ratio (percent per annum)	1.41	1.11	1.40	1.66	0.47
Capital flow (percent per quarter)	6.94	−4.57	−0.88	5.13	41.70
Fund age (years)	16.42	7.92	12.17	18.75	13.93
<i>Panel B: Fund holdings</i>					
Number of stocks held	108.81	48.00	72.00	110.00	169.05
Holdings return (percent per quarter)	2.17	−1.46	1.22	4.85	7.43
Media-covered holdings return (percent per quarter)	2.18	−1.69	1.21	4.99	8.06
Percent of holdings with media coverage	52.91	37.00	56.10	69.44	19.78
Backward-looking return gap (percent per quarter)	−0.46	−1.43	−0.16	0.86	3.98
Forward-looking return gap (percent per quarter)	0.04	−0.99	−0.03	0.92	4.69
<i>Panel C: Media coverage</i>					
Percent of stock-quarters with any article:					
All stocks	30.79				
Stocks held by at least one fund	36.06				
Stocks held by at least ten funds	45.28				
Media articles per quarter:					
All stocks	4.10	0	0	1	37.53
Stocks held by at least one fund	5.16	0	0	2	45.05
Stocks held by at least ten funds	7.11	0	0	2	53.77
Articles per quarter, given at least one article:					
All stocks	13.33	1	3	7	66.73
Stocks held by at least one fund	14.30	1	3	8	74.15
Stocks held by at least ten funds	15.86	1	3	8	79.58

Times, the *Washington Post*, and *USA Today*. This sample is intended to approximate the news that reaches the typical retail investor who reads the national press. We obtain the entire text of these publications between January 1998 and December 2008 from Factiva. Our sample includes 1.7 million articles, 39% of which appear in the *New York Times*, 35% in *USA Today*, 18% in the *Wall Street Journal*, and 8% in the *Washington Post*. The data set contains each article's full text, source, title, author, publication date, and page number in the newspaper.

To match newspaper articles to firms, we search for variations of the firm's name in the headline, the lead paragraph, and the tail paragraph of each article, analogously to Tetlock, Saar-Tsechansky, and Macskassy (2008). All news coverage is measured at a quarterly frequency to control for firms' quarterly disclosures, such as earnings announcements, and to match the frequency of mutual fund portfolio reporting. These data are supplemented by the information on stock prices from CRSP and firm financials from Compustat.

Panels B and C of Table 1 summarize media coverage statistics for our sample. Approximately 30.8% of CRSP stocks are featured in at least one of the four newspapers in our sample in a given quarter, and the average number of articles per stock is 4.1. Among the stocks with newspaper coverage, the average number of articles is 13.3 per quarter. As expected, stocks held by mutual funds receive more media attention. About one half (53%) of mutual fund holdings are featured in at least one of the four

newspapers per quarter. For stocks held by at least one fund (at least ten funds) in our sample, the average number of articles in the four newspapers is 5.16 (7.11) per quarter. The average return of media-covered holdings (2.18% per quarter) is nearly identical to the average return of all holdings (2.17% per quarter).

4. Mutual fund holdings, media coverage, and capital flows

This section presents the main results. We first examine how media coverage of fund holdings affects investors' capital flows and then present additional evidence on the tone of media coverage, the timing of holdings' disclosure, and the media coverage of mutual funds.

4.1. Returns of media-covered holdings and fund flows

In this subsection, we examine whether investors react to the returns of fund holdings after controlling for the return of the fund and whether this relation varies with holdings' media coverage. We begin our analysis with a set of panel regressions, in which the dependent variable is the quarterly fund flow, defined as the percentage change in TNA that is not driven by fund returns.⁵ The regression

⁵ Formally, $Flow_t = (TNA_t - TNA_{t-1} * Return_t) / TNA_{t-1}$.

model is specified by the following equation:

$$\begin{aligned} \text{Flow}_{i,t} = & a + b_1 * \text{NewsHoldRetMkt}_{i,t-1} + b_2 * \text{HoldRetMkt}_{i,t-1} \\ & + b_3 * \text{FundRetMkt}_{i,t-1} + b_4 * \text{FundRetMktSq}_{i,t-1} \\ & + b_5 * \text{FracNews}_{i,t-1} + b_6 * \text{FundVolatility}_{i,t-1} \\ & + b_7 * \text{Age}_{i,t-1} + b_8 * \text{ExpenseRatio}_{i,t-1} \\ & + b_9 * \text{LogAssets}_{i,t-1} + b_{10} * \text{MStar-dum}_{i,t-1} \\ & + b_{11} * \text{IOC-qtr-dum}_{i,t} + b_{12} * \text{Style-qtr-dum}_{i,t} + e_{i,t} \end{aligned} \quad (1)$$

The two main independent variables of interest are *HoldRetMkt* and *NewsHoldRetMkt*. *HoldRetMkt* is the average return for the fund's holdings over the trailing quarter, adjusted for the return on the CRSP value-weighted index.⁶ For instance, fund flows between June 30 and September 30 are regressed on the average market-adjusted returns between March 31 and June 30 earned by portfolio holdings reported as of June 30.

NewsHoldRetMkt is the average market-adjusted return of the holdings covered in at least one of the four national newspapers over the trailing quarter. This variable is analogous to a dummy indicator for media coverage interacted with the holdings' returns, but for the fund average. Intuitively, this term captures the effect of the returns of media-covered stocks on fund flows, over and above the effect of the returns of all stocks.

Other independent variables include market-adjusted fund returns over the trailing year (*FundRetMkt*) and their squared values (*FundRetMktSq*), which are intended to account for the convexity in the flow-return relation. To capture the effect of past fund returns beyond the trailing year, we also control for a fund's Morningstar rating by including Morningstar rating dummies (*MStar-dum*). Morningstar ratings, obtained from Morningstar Direct, capture long-horizon historical fund performance (Sharpe, 1998) and serve as an additional control for the independent effect of fund ratings on capital flows (Del Guercio and Tkac, 2008).

As other controls, we include the fraction of fund holdings covered in the media in the trailing quarter (*FracNews*), the fund's age in years since the initiation date in CRSP (*Age*), the size of the fund's asset base defined as the natural logarithm of TNA (*LogAssets*), the standard deviation of daily fund returns from CRSP (*FundVolatility*), and the expense ratio (*ExpenseRatio*). All variable definitions appear in Table A1.

To control for fund flows that are common to a fund's investment objective in a given quarter, we include objective-quarter fixed effects based on the Thomson Investment Objective Code classification (*IOC-qtr-dum*). To account for fund flows that are common for the type of stocks in which a fund invests in a given quarter, we also include fund style-quarter fixed effects (*Style-qtr-dum*). The style classification reflects a fund's style based on a three-by-three matrix of stock size (small, medium, and large) and valuation (value, growth, and mixed), based on

the holdings' average percentile rankings relative to the CRSP stock universe. The specifications with and without fixed effects allow us to capture investors' response to both a fund's absolute market-adjusted returns and its relative performance within its style and investment category in a given quarter. Further, the inclusion of fixed effects based on both a fund's declared objective and its revealed holdings' characteristics captures different dimensions of fund style and accounts for the possibility that fund holdings could deviate from a fund's declared objective. Standard errors are clustered by fund and quarter.

Panel A in Table 2 shows that the returns of holdings positively affect fund flows and that this effect is significantly larger for stocks featured in the media. Before adding controls, in Column 1, *HoldRetMkt* has a coefficient of 0.170 (significant at the 10% level with a *t*-statistic of 1.66) and *NewsHoldRetMkt* has a coefficient of 0.314 (significant at the 1% level with a *t*-statistic of 2.62). These coefficients suggest that the response of flows to the returns of media-covered holdings ($0.314 + 0.170 = 0.484$) is about 2.8 times as large as the response to all holdings (0.170).

In Columns 2–5 of Table 2, Panel A, we test whether holdings' returns have an incremental effect on flows over and above fund performance and other fund characteristics. We find that the base effect of all holdings (*HoldRetMkt*) disappears once we account for fund returns. This suggests that the apparent effect of the returns of holdings without media coverage is explained by the returns of the fund itself. After adding all controls and fixed effects in Column 5, the effect of *HoldRetMkt* is virtually zero (coefficient of 0.009 with a *t*-statistic of 0.13).

In contrast, the effect of media-covered holdings, captured by the variable *NewsHoldRetMkt*, is incremental to the effect of fund returns and other fund characteristics and remains positive and reliably significant at the 1% level (*t*-statistics of 2.82–3.35) across Columns 2–5. The magnitude of this effect is substantial. Based on the point estimate in Column 5, which includes all controls and fixed effects, a 1 standard deviation increase in the market-adjusted returns of media-covered holdings (8.06%) is associated with an increase in the quarterly fund flows of 1.13%, or about \$20.3 million for the average fund in our sample.⁷ To provide a relative comparison, the effect of a 1 standard deviation increase in the returns of media-covered holdings on fund flows is approximately 21.2% as large as the effect of an analogous increase in fund returns.⁸

In Panel B, we explore how the effect varies with the quantity of media coverage (Columns 1–4) and the direction of returns (Column 5). If media coverage affects investor decisions, the information and salience views predict that a greater quantity of media coverage should have a larger effect. To this end, we replace the overall

⁷ To arrive at this estimate, we multiply the incremental effect of the returns of media-covered holdings by the standard deviation of these holdings' returns (8.06%): $(0.131 + 0.009) * 8.06\% = 1.13\%$.

⁸ We derive this estimate by dividing the effect of a 1 standard deviation increase in the returns of media-covered holdings on fund flows [$1.13 = 8.06 * (0.131 + 0.009)$] by the effect of a 1 standard deviation increase in the market-adjusted fund returns on flows ($5.33 = 16.51 * 0.323$) as follows: $1.13 / 5.33 = 0.212$.

⁶ Our results are very similar in magnitude and significance if we use raw instead of market-adjusted holdings' returns.

Table 2

Effect of media-covered holdings on mutual fund flows.

This table presents ordinary least squares regressions of quarterly fund flows on the trailing returns of fund holdings. The dependent variable is quarterly fund flow (*Flow*). Panel A examines the effect of holdings' media coverage on fund flows. *HoldRetMkt* is the average return of fund holdings over the quarter for which the holdings are reported, minus the Center for Research in Security Prices value-weighted market return over the same period. *NewsHoldRetMkt* is the average market-adjusted holdings' return (computed analogously to *HoldRetMkt*) for holdings that received media coverage during the quarter in the *Wall Street Journal*, the *New York Times*, the *Washington Post*, or *USA Today*. *FracNews* is the fraction of the fund's holdings that received media coverage in the aforementioned newspapers over the quarter. *FundRetMkt* is the market-adjusted fund return over the trailing year. *FundRetMktSq* is the square of the market-adjusted fund return over the trailing year. *FundVolatility* is the standard deviation of daily fund returns, *Age* is fund age since inception, and *LogAssets* is the log of the fund's total net assets. Morningstar rating FE is the set of dummies for the fund's Morningstar rating (*MStar-dum*). *Objective-qtr FE* and *Style-qtr FE* denote fixed effects for the fund's investment objective category and investment style, respectively, which are specific to each quarter (*IOC-qtr-dum* and *Style-qtr-dum*). In Panel B, the returns of media-covered holdings are split according to the level of media coverage. The cutoffs are based on the stocks with at least one media article during the quarter. Cutoff points divide the sample at the median in Columns 1 and 2 and into quartiles in Columns 3 and 4. In quartile definitions, *100Pct* indicates the quartile with the highest media coverage. *HoldRetMktNeg* equals *HoldRetMkt* when this variable is negative and zero otherwise. *NewsHoldRetMktNeg* equals *NewsHoldRetMkt* when this variable is negative and zero otherwise. Controls include the same control variables as in Panel A. Variable definitions appear in Table A1. Reported *t*-statistics [in brackets] are based on standard errors clustered by fund and quarter. Significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Panel A: Effect of any media

Variable	Dependent variable = quarterly fund flow (<i>Flow</i>)				
	(1)	(2)	(3)	(4)	(5)
<i>NewsHoldRetMkt</i>	0.314*** [2.62]	0.348*** [3.35]	0.309*** [3.02]	0.296*** [3.17]	0.131*** [2.82]
<i>HoldRetMkt</i>	0.170* [1.66]	-0.147 [-1.40]	-0.111 [-1.04]	-0.103 [-1.10]	0.009 [0.13]
<i>FracNews</i>	0.031 [1.38]	0.054** [2.43]	0.049** [2.37]	0.056*** [2.68]	0.001 [0.03]
<i>FundRetMkt</i>		0.291*** [6.41]	0.263*** [7.31]	0.237*** [6.72]	0.323*** [8.16]
<i>FundRetMktSq</i>			0.096 [0.86]	0.095 [0.88]	-0.070 [-0.70]
<i>FundVolatility</i>			-0.918* [-1.84]	-0.855* [-1.89]	0.411 [0.46]
<i>Age</i>			-0.304 [-1.24]	0.022 [0.09]	0.372 [1.40]
<i>LogAssets</i>			0.014*** [5.16]	0.011*** [4.21]	0.012*** [4.59]
<i>ExpenseRatio</i>			2.795*** [3.56]	3.397*** [4.26]	3.304*** [4.33]
Morningstar rating FE	No	No	No	Yes	Yes
<i>Objective-qtr FE</i> and <i>Style-qtr FE</i>	No	No	No	No	Yes
<i>R</i> ²	0.008	0.019	0.022	0.027	0.047
Number of observations	51,219	51,006	50,769	50,769	49,200

Panel B: Quantity of media coverage and return direction

Variable	Dependent variable = quarterly fund flow (<i>Flow</i>)				
	(1)	(2)	(3)	(4)	(5)
<i>NewsBelowMedHoldRetMkt</i>	0.019 [0.54]	0.013 [0.43]			
<i>NewsAboveMedHoldRetMkt</i>	0.160*** [3.90]	0.080*** [2.81]			
<i>News25PctHoldRetMkt</i>			-0.002 [-0.12]	0.007 [0.42]	
<i>News50PctHoldRetMkt</i>			0.024 [0.94]	0.015 [0.60]	
<i>News75PctHoldRetMkt</i>			-0.029 [-1.64]	-0.015 [-0.76]	
<i>News100PctHoldRetMkt</i>			0.135*** [3.66]	0.065** [2.42]	
<i>HoldRetMkt</i>	0.021 [0.32]	0.050 [0.82]	0.079 [1.18]	0.074 [1.02]	0.033 [0.38]
<i>HoldRetMktNeg</i>					-0.092 [-0.60]
<i>NewsHoldRetMkt</i>					0.164** [2.30]
<i>NewsHoldRetMktNeg</i>					-0.110 [-0.90]
Controls, Morningstar rating FE	Yes	Yes	Yes	Yes	Yes
<i>Objective-qtr FE</i> and <i>Style-qtr FE</i>	No	Yes	No	Yes	Yes
<i>R</i> ²	0.027	0.047	0.027	0.047	0.047
Number of observations	50,779	49,209	50,779	49,209	49,200

effect of news (*NewsHoldRetMkt*) with two variables that capture high and low coverage stocks: the average return of holdings with media coverage above the median for that quarter and the average return of holdings with media coverage below the median (*NewsAboveMedHoldRetMkt* and *NewsBelowMedHoldRetMkt*, respectively). In the second specification, we examine four variables: the average returns of holdings with media coverage in quartiles 1 through 4 based on the frequency of coverage (*News25-PctHoldRetMkt* to *News100PctHoldRetMkt*). All percentiles are taken over firms with at least one article.

The evidence in Columns 1–4 of Panel B in Table 2 shows that the effect on flows is larger for holdings that received more media coverage. When holdings are split at the median amount of media coverage, the high coverage stocks have a coefficient of 0.080 (significant at the 1% level), and the low coverage stocks have a coefficient of 0.013 (insignificant). When holdings are split by quartiles of media coverage, the effect is driven by the top quartile of holdings with the highest media coverage.

Finally, we examine whether the effect of media-covered holdings' returns varies between good and bad news, as inferred from stock returns. To evaluate whether investors' capital flows respond more strongly to positive or negative returns of media-covered holdings, we include two additional variables. *NewsHoldRetMktNeg* is equal to *NewsHoldRetMkt* when that variable is negative and zero otherwise. Similarly, *HoldRetMktNeg* is equal to *HoldRetMkt* when that variable is negative and zero otherwise. The regression also includes analogous variables *FundRetMktNeg* and *FundRetNeg*, which equal, respectively, *FundRetMkt* when that variable is negative and zero otherwise and *FundRet* when that variable is negative and zero otherwise.

Column 5 of Table 2, Panel B, suggests that the effect of media-covered holdings' returns is larger in absolute magnitude for holdings with positive returns than for holdings with negative returns. The key variable of interest is *NewsHoldRetMktNeg*, which captures the difference in investors' response to media-covered holdings with negative returns over and above that for holdings with positive returns. This variable has a negative and economically sizable point estimate (coefficient = -0.110), suggesting that the effect on flows is smaller in absolute magnitude for holdings with negative returns than for holdings with positive returns, although this difference falls short of being statistically significant.

In summary, past returns of media-covered fund holdings have significant predictive power for future fund flows, over and above the returns of all portfolio holdings and the returns of the fund itself. A greater amount of holdings' media coverage has a larger effect on flows. The effect on flows appears to be driven more by rewarding funds that hold media-covered winners than penalizing funds that hold media-covered losers.

4.2. Variables correlated with media coverage

Media coverage of a stock is correlated with firm characteristics, such as size, analyst coverage, and book-to-market ratio. Moreover, omitted or unobservable

variables could be associated with media attention. This subsection investigates whether investors' reaction to fund holdings can be explained by other firm attributes.

We follow the same empirical approach as for media coverage and construct four analogous variables for the average returns of fund holdings that were above the NYSE midpoint of market capitalization, analyst coverage, book-to-market ratio, and momentum. We then include these four variables in the same regression as in Subsection 4.1 and report our results in Table 3. The evidence shows that these variables do not influence investors' capital flows. Though all four variables are correlated with media coverage (Solomon, 2012), holdings' returns sorted on these variables show no significant effect on fund flows, and they do not reduce the economic effect of media-covered holdings. This conclusion persists whether we test the effect of each correlated variable separately in Columns 1–4 or include all of them jointly in Column 5. This evidence suggests that the extra response of capital flows to holdings' returns is driven by holdings' media coverage, not by other firm attributes.

Though the analysis of interaction effects with particular firm characteristics enables a researcher to test the influence of specific variables, an omitted or unobservable variable could be correlated with media coverage. To mitigate this concern, we exploit temporal variation in newspaper coverage of stocks within one quarter. This approach seeks to distinguish the effect of changes in media coverage from that of other observable and unobservable firm characteristics that remain unchanged during one quarter.

To study the temporal effect of media coverage, we introduce three variables that identify stocks based on the timing of their media coverage in the reporting period, namely, coverage in the month immediately before the period of fund flows (*NewsMth1HoldRetMkt*), the month ending one month before the period of fund flows (*NewsMth2HoldRetMkt*), and the month ending two months before period of fund flows (*NewsMth3HoldRetMkt*). We add these variables to the independent terms in our base specification [Eq. (1)] and estimate panel regressions of quarterly fund flows. Panel A of Table 4 shows that the effect of media attention is driven by newspaper coverage in the most recent month in the reporting quarter, as shown by the positive and significant coefficient on *NewsMth1HoldRetMkt*, which accounts for the entire economic magnitude of the media effect. The effect of media coverage weakens rapidly as newspaper articles get older, as indicated by the smaller, insignificant coefficients on *NewsMth2HoldRetMkt* and *NewsMth3HoldRetMkt*. These conclusions hold whether we estimate the effect of media coverage for each month individually with a full set of controls and fixed effects in Columns 1–3 or include the three monthly variables simultaneously in Column 4.

In summary, media coverage appears to have a short-lived effect on investors' capital allocations. This result reinforces the role of media coverage under both the information and salience views, which predict that the most recent news should be most informative and most salient to investors. In contrast, we do not find evidence that investors' reaction to holdings' returns can be explained by other firm characteristics, either when we explicitly include time-variant characteristics as controls

Table 3

Effect of variables correlated with media coverage.

This table examines whether stock characteristics other than media coverage affect the relation between holdings' returns and fund flows, using ordinary least squares regressions of quarterly fund flows on the trailing returns of fund holdings. The dependent variable is quarterly fund flow (*Flow*). The main independent variable is *NewsHoldRetMkt*, defined as the average market-adjusted return of media-covered fund holdings in the quarter for which the holdings are reported. Market-adjusted returns are computed by subtracting the returns on the Center for Research in Security Prices value-weighted index. Other variables include the returns of holdings that were above the NYSE median of market capitalization (*MktCapHoldRetMkt*), above the median of analyst coverage (*NumAnHoldRetMkt*), above the median of book-to-market ratio (*BMHoldRetMkt*), and above the median of momentum (*MomHoldRetMkt*). Controls include market-adjusted fund returns over the trailing year, squared market-adjusted fund returns over the trailing year, volatility of daily fund returns, fund age, expense ratio, fraction of holdings with media coverage, and log assets. All regressions include dummies for a fund's Morningstar rating, investment style-quarter fixed effects, and investment objective-quarter fixed effects. Variable definitions appear in Table A1. Reported *t*-statistics [in brackets] are based on standard errors clustered by fund and quarter. Significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Variable	Dependent variable = quarterly fund flow (<i>Flow</i>)				
	(1)	(2)	(3)	(4)	(5)
<i>NewsHoldRetMkt</i>	0.135*** [2.87]	0.156** [2.56]	0.131*** [2.84]	0.116** [2.42]	0.139** [2.53]
<i>HoldRetMkt</i>	0.008 [0.08]	0.138 [1.18]	−0.048 [−0.57]	0.019 [0.20]	0.050 [0.34]
<i>MktCapHoldRetMkt</i>	−0.004 [−0.06]				0.001 [0.01]
<i>NumAnHoldRetMkt</i>		−0.169 [−1.21]			−0.128 [−1.03]
<i>BMHoldRetMkt</i>			0.067 [1.09]		0.073 [1.09]
<i>MomHoldRetMkt</i>				−0.001 [−0.04]	−0.002 [−0.07]
Controls, Morningstar rating FE	Yes	Yes	Yes	Yes	Yes
Objective-qtr FE and Style-qtr FE	Yes	Yes	Yes	Yes	Yes
R ²	0.047	0.047	0.047	0.046	0.046
Number of observations	49,124	49,186	49,189	47,793	47,698

or when we control for time-invariant firm characteristics by exploiting within-quarter variation in media coverage.

4.3. Tone of media coverage

So far, our research design has focused on the interaction of media coverage with holdings' returns. We have assumed that media coverage makes investors aware of the performance of particular stocks and of major news about these firms. This analysis has relied on the market's reaction (stock returns) as a proxy for whether the media coverage of a stock conveys positive or negative news. We believe that this approach has several advantages compared with attempting to infer the content of media coverage from the article. First, this approach relies on market participants instead of an algorithm to interpret the information. Second, it allows us to evaluate news relative to prevailing market expectations instead of considering each article in isolation.

However, for completeness, we examine an alternative method of distinguishing between positive and negative news based on textual analysis. This approach accounts for the possibility that some well-performing stocks could receive negative press, which might not be fully reflected in stock returns.

To evaluate article tone, we rely on the classification of positive and negative words in financial texts developed in Loughran and McDonald (2011). The lists of positive and negative words contain 353 and 2,337 words, respectively. To measure article tone, we compute the difference between the number of positive and negative words in

each article and scale it by the total number of words in the article. To reduce the effect of outliers, the tone of each article is first converted to a percentile value, and this value is averaged across all holdings of the fund at that time. Our measure of tone (*AvgTonePctile*) is the fund's percentile rank in the distribution of holdings' tone across all funds in that quarter. This variable construction is designed to measure the relative effect of the media tone of fund holdings in the cross section of funds, while controlling for the fact that the average tone differs from quarter to quarter.

When we replace our main measure, *NewsHoldRetMkt*, with the measure of the tone of holdings' media coverage, *AvgTonePctile*, we find that the tone measure is positively related to future fund flows, but this effect is weaker than that of holdings' returns. Column 5 of Table 4, Panel A, shows that the tone of holdings' media coverage has a statistically significant positive relation to fund flows at a univariate level. When all controls are added in Column 6, the coefficient on *AvgTonePctile* is somewhat reduced, and the *t*-statistic drops to 1.61, slightly below the 10% significance level. In Column 7, we introduce both the return-based and tone-based measures of holdings' media coverage simultaneously. The inclusion of the tone-based measure in the regression does not seem to materially affect the magnitude or significance of *NewsHoldRetMkt*, suggesting that the effect of article tone does not subsume the effect of the returns of media-covered holdings. Overall, the effect of the tone-based measure of holdings' media coverage is generally supportive of the main effect of the return-based measure, but the return-based measure

Table 4

The timing of media coverage and holdings' disclosure.

This table examines how the timing of holdings' media coverage and the timing of holdings' disclosure affect fund flows. Panel A examines how the timing and tone of media coverage affect the relation between holdings' returns and fund flows, using ordinary least squares regressions of quarterly fund flows on the trailing returns of fund holdings. The dependent variable is quarterly fund flow (*Flow*). The independent variables of interest include *NewsMth1HoldRetMkt*, *NewsMth2HoldRetMkt*, and *NewsMth3HoldRetMkt*, which indicate the returns of fund holdings that received media coverage in the month immediately before the period of fund flows, in the month ending one month before the period of fund flows, and in the month ending two months before the period of fund flows, respectively. *AvgTonePctile* measures the fund's percentile rank in the quarter according to the tone of media coverage of its holdings. The tone of media coverage is measured by the difference between the number of positive and negative words in an article, divided by the total number of words. Panel B examines the relation between holdings' returns and fund flows during the parts of the quarter before the holdings' filing date (Column 1) and after the holdings' filing date (Column 2). The dependent variable in Panel B is a flow per day measure (*FlowPerDay*), constructed by dividing cumulative fund flows during each part of the quarter by the number of trading days in the respective part of the quarter, which is specific to a fund-quarter pair. The main independent variable of interest is *NewsHoldRetMkt*, defined as the average market-adjusted return of media-covered fund holdings in the quarter for which the holdings are reported. Market-adjusted returns are computed by subtracting the returns on the Center for Research in Security Prices value-weighted index. Controls include market-adjusted fund returns over the trailing year, squared market-adjusted fund returns over the trailing year, volatility of daily fund returns, fund age, expense ratio, fraction of holdings with media coverage, and log assets. All regressions, except in Column 5, include dummies for a fund's Morningstar rating, investment style-quarter fixed effects, and investment objective-quarter fixed effects. Variable definitions appear in Table A1. Reported *t*-statistics [in brackets] are based on standard errors clustered by fund and quarter. Significance levels at 10%, 5%, and 1% are indicated by *, ** and ***, respectively.

Panel A: Timing and content of media coverage							
Variable	Dependent variable = quarterly fund flow (<i>Flow</i>)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>NewsMth1HoldRetMkt</i>	0.131** [2.47]			0.151* [1.72]			
<i>NewsMth2HoldRetMkt</i>		0.000 [0.00]		-0.084 [-1.21]			
<i>NewsMth3HoldRetMkt</i>			0.060 [1.09]	0.034 [0.48]			
<i>AvgTonePctile</i>					0.091** [2.13]	0.067 [1.61]	0.054 [1.30]
<i>HoldRetMkt</i>	0.007 [0.10]	0.146* [1.73]	0.084 [1.00]	0.038 [0.46]			0.008 [0.13]
<i>NewsHoldRetMkt</i>							0.126*** [2.68]
Controls, Morningstar rating FE	Yes	Yes	Yes	Yes	No	Yes	Yes
Objective-qtr FE and Style-qtr FE	Yes	Yes	Yes	Yes	No	Yes	Yes
R ²	0.047	0.047	0.047	0.047	0.001	0.046	0.047
Number of observations	49,171	49,169	49,169	49,121	51,229	49,209	49,200

Panel B: Timing of holdings' disclosure		
Variable	Dependent variable = fund capital flow per day (<i>FlowPerDay</i>)	
	Daily flows before holdings' filing date (1)	Daily flows after holdings' filing date (2)
<i>NewsHoldRetMkt</i>	0.00196 [0.91]	0.00534*** [2.71]
<i>HoldRetMkt</i>	-0.00273 [-1.11]	-0.00212 [-0.95]
<i>FracNews</i>	-0.00035 [-0.48]	-0.00031 [-0.44]
<i>FundRetMkt</i>	0.00603*** [6.01]	0.00421*** [6.38]
<i>FundRetMktSq</i>	-0.00311 [-1.49]	-0.00116 [-0.86]
<i>FundVolatility</i>	-0.01607 [-0.57]	0.01691 [0.91]
<i>Age</i>	-0.00014 [-0.03]	-0.00040 [-0.07]
<i>LogAssets</i>	0.00016*** [2.98]	0.00009** [2.17]
<i>ExpenseRatio</i>	0.05576*** [3.74]	0.01944 [1.01]
Morningstar rating FE	Yes	Yes
Objective-qtr FE and Style-qtr FE	Yes	Yes
R ²	0.062	0.056
Number of observations	13,414	15,406

appears to be more informative and less noisy than article tone. Therefore, throughout the rest of our analysis, we use stock returns as a proxy for the content of media coverage.

4.4. Timing of holdings' disclosure

In this subsection, we provide additional evidence that distinguishes the effect of media-covered holdings on fund flows from the effect of other fund characteristics. This analysis exploits the difference in timing when various fund data become observable to investors. While many fund attributes are observed daily (e.g., fund returns, volatility, TNA), fund holdings are released quarterly. If media-covered winners generate extra capital flows, investors should respond to the most recent holdings' returns only after (but not before) these holdings are filed with the SEC and made available to the public. This temporal dichotomy allows us to separate the effect of media-covered holdings from that of all other fund characteristics that are observed immediately or disclosed independently of fund holdings.

To implement this analysis, we break the quarter in which we examine fund flows into two parts: (1) the period after the prior quarter end but before the filing date and (2) the period of the quarter after the filing date. For example, if a fund reports its holdings for the second calendar quarter ending June 30 and files its holdings report on August 20, we examine fund flows in the third quarter by breaking the quarter into two periods: before the filing date (July 1–August 20) and after the filing date (August 20–September 30). Because the filing dates vary for each fund and are spread out across the quarter, an accurate estimation of this effect requires intra-quarter flows at the fund level.

To construct a precise measure of fund flows during each part of the quarter, we obtain data on daily fund TNAs on the starting and ending dates of each intra-quarter period from Lipper, a Thomson Reuters company. We merge these data with fund-level filing dates for each quarter in our sample.⁹ Next, we use daily fund returns from CRSP to compute cumulative fund returns from the start of the quarter to the holdings' filing date and from the holdings' filing date to the end of the quarter. By combining data on TNAs and fund returns, we can compute cumulative fund flows for each intra-quarter period (as before, we define capital flow as changes in TNA in excess of fund returns). Finally, because the intra-quarter periods before and after the filing date have a different number of trading days, we scale the cumulative fund flows in each of the two periods by the number of trading days in the respective period, which is specific to a fund-quarter pair. As a result, we arrive at the flow per day measure (*FlowPerDay*) for each of the two intra-quarter periods: (1) before the holdings are released and (2) after the holdings are released. Because the computation of this measure requires the intersection of three data sets (filing dates, daily returns, and daily TNAs), this variable is

available for approximately one-third of the fund-quarter observations in our sample.

The analysis of capital flows before and after the filing date is presented in Panel B of Table 4. The dependent variable is the flow per day measure of fund flows during the periods of the quarter before the fund's filing date (Column 1) and after the fund's filing date (Column 2).

Column 1 of Table 4, Panel B, presents evidence on the relation between the returns of fund holdings and fund capital flows before the holdings' filing date. The coefficient on the main variable of interest, *NewsHoldRetMkt*, is not significantly different from zero, indicating that the returns of media-covered fund holdings have no effect on fund flows during the period of the quarter before the holdings' filing date. The same conclusion holds for the returns of all holdings, as indicated by the insignificant coefficient on the variable *HoldRetMkt*. Collectively, this evidence indicates that until fund holdings are publicly disclosed, no significant relation exists between fund flows and portfolio holdings, regardless of media coverage. Because other fund characteristics, such as fund performance, volatility, and fees, are already known to investors during this period, this result shows that none of these independently disclosed characteristics generates a spurious correlation between holdings' returns and fund flows.

Column 2 of Table 4, Panel B, examines the relation between the returns of media-covered holdings and fund flows after the holdings' filing date. Analogously to Column 1, the dependent variable is a flow per day measure, but for the period of the quarter after the filing date. The results are in sharp contrast to those reported in Column 1. The coefficient on *NewsHoldRetMkt* is positive, reliably significant at the 1% level, and economically large. To facilitate the comparison of this coefficient's economic magnitude with that in our baseline specification with quarterly flows, we multiply the flow per day point estimate on *NewsHoldRetMkt* (coefficient=0.00534) by the number of trading days per quarter (63 trading days, assuming 252 trading days per year): $0.00534 \times 63 = 0.336$. This estimate is about two and a half times greater than the average effect of *NewsHoldRetMkt* over the entire quarter (coefficient=0.131) in the baseline specification with a full set of controls (Column 5 of Table 2, Panel A), as would be expected if the effect of *NewsHoldRetMkt* is operative only during a part of the quarter. Also, consistent with previous evidence, capital flows respond only to the returns of holdings with media coverage, as shown by the insignificant coefficient on *HoldRetMkt*.

In summary, the evidence in this subsection suggests three conclusions. First, the effect of holdings' returns on fund flows is driven by the period of the quarter after the filing date. Second, this effect is observed only for holdings that received media coverage. Third, the effect of holdings' disclosure on fund flows is incremental to that of other fund characteristics observed immediately or reported independently of fund holdings.

4.5. Media coverage of mutual funds

Though media coverage of mutual funds is relatively rare, media coverage of a stock could overlap with media

⁹ We thank Chris Schwarz for sharing data on holdings' filing dates from Schwarz and Potter (2012).

coverage of the fund that holds this stock. For example, a newspaper article about a mutual fund could list some of the fund's holdings or discuss the fund manager's top picks. In this case, investors' capital flows could be driven by the media coverage of the fund instead of that of its holdings.

To investigate this possibility, we identify all media articles that include the word “fund” or its variations. We find that such articles are rare and account for only 2.0% of the articles in our sample. Another fact that mitigates this concern is that the average portfolio holding in our sample is shared by 56 mutual funds, making it unlikely that more than a small fraction of the funds are mentioned individually. In unreported results, we exclude all articles that mention the word “fund” or its variations and repeat our main analyses. We find that excluding these articles has virtually no effect on the magnitude and significance of the results, suggesting that our evidence is unlikely to be driven by media coverage of funds instead of that of their holdings.

5. The role of information and salience

To distinguish between the information and salience views, we present evidence on the following three questions. First, does investors' response to media-covered holdings vary with measures of holdings' informativeness or holdings' salience? Second, do investors distinguish between holdings that were purchased before and after the arrival of news? Third, do investors realize higher returns by following media-covered holdings?

5.1. Evidence from information and salience proxies

In this subsection, we study how the effect of media-covered fund holdings varies with proxies for information and salience. If investors' reaction to media-covered holdings is driven by information, it is likely to vary with informativeness of fund holdings. To measure this informativeness, we use the variable *Turnover*, which captures annual portfolio turnover at the fund level. We conjecture that a snapshot of portfolio holdings is less informative of a fund's current investment strategy if a fund changes its holdings more frequently. *Turnover* in our sample has an inter-quartile range of 38% to 115% and a standard deviation of 82%, indicating large variation in stock holding periods across funds.

Alternatively, if investors' reaction to media-covered holdings is related to a shift in attention toward more salient stocks, the effect of holdings' returns is likely to be related to measures of salience and investor attention. We examine this conjecture by using two proxies for salience. The first proxy is the mentioning of the company's name in the article's headline or lead paragraph. We posit that articles that display a company's name more prominently are likely to be more attention-grabbing to a casual reader. To test this conjecture, we examine the returns of holdings that received media coverage and were mentioned in the article's headline or lead paragraph (the variable *News-HeadHoldRetMkt*), and we test whether these holdings' returns have a stronger effect.

Our second test of the salience view examines the effect of end-of-year holdings featured in the most prominent fund disclosure—the annual report. While the additional disclosure makes the fourth-quarter holdings more salient, there is little reason to believe that they are more informative than holdings reported in other quarters. To ascertain that the fourth-quarter filing corresponds to the holdings' snapshot in the annual report, we collect data on each fund's fiscal year-end from mutual fund form N-CSR (the Certified Shareholder Report of Registered Management Investment Companies). Next, we construct a binary indicator, *YearEndFiling*, which equals one for the fourth quarter reports that coincide with a fund's fiscal year-end.

We also study how the response of capital flows to media-covered holdings varies with investor sophistication. To proxy for investor sophistication, we use the fraction of marketing and distribution fees (12b-1 fees) in a fund's total expenses, the variable we label *MarketingFees*.¹⁰ Mutual funds that charge 12b-1 fees of at least 25 basis points are typically sold to investors through brokers, financial advisers, and other intermediaries and attract a less sophisticated investor clientele (Bergstresser, Chalmers, and Tufano, 2009). For example, according to the Investment Company Institute (ICI) survey of mutual fund investors, investors purchasing funds through the broker channel tend to have lower incomes, smaller financial assets, and less education, with 43% of these investors without a four-year college degree (Investment Company Institute, 2004). Investors in this distribution channel likely make their investment decisions based on factors less tangible than a fund's expense ratio, tracking error, or other common evaluation metrics. Bergstresser, Chalmers, and Tufano (2009) find that investors in broker-channel funds pay fees that are twice as large as the fees of direct-channel funds, incur higher expense ratios, and, most important, purchase funds that underperform direct-channel funds even before fees. To the extent that this proxy captures investor sophistication, a stronger response to media-covered holdings among less sophisticated investors would be consistent with the more naïve salience view. Conversely, a stronger response to media-covered holdings among funds with more sophisticated investors would be more consistent with the information view.

To study how investors' capital flows vary with the measures of holdings' informativeness, holdings' salience, and investor sophistication, we estimate panel regressions of fund flows and present our results in Table 5. The independent variables include the measures of information, salience, and sophistication and all the control variables in Eq. (1). The key variables of interest in this regression are the interaction terms of the measures of informativeness and salience with the variables *HoldRetMkt* and *NewsHoldRetMkt*. These terms reflect whether

¹⁰ The term 12b-1 fee was introduced by SEC rule 12b-1 of the 1940 Investment Company Act. These fees are charged by the fund to pay for its marketing and distribution expenses.

Table 5

Effect of measures of holdings' informativeness and salience.

This table presents the interactions of holdings' returns with measures of holdings' informativeness and salience. The table shows ordinary least squares regressions of quarterly fund flows on the trailing returns of fund holdings. The dependent variable is quarterly fund flow (*Flow*). Informativeness is measured by fund turnover (*Turnover*). Attention and salience are measured by the end-of-year filings that appear in the fund's annual report (*YearEndFiling*) and market-adjusted returns of holdings mentioned in the article headline or lead paragraph (*NewsHeadHoldRetMkt*). *YearEndFiling* is a binary indicator that equals one for the fourth-quarter filings that coincide with a fund's fiscal year-end. Investor sophistication is measured by the fund's marketing fees (*MarketingFees*), defined as the amount of 12b-1 fees expressed as a fraction of the fund's expense ratio. Controls include market-adjusted fund returns over the trailing year, squared market-adjusted fund returns over the trailing year, volatility of daily fund returns, fund age, expense ratio, fraction of holdings with media coverage, and log assets. All regressions include dummies for a fund's Morningstar rating, investment style-quarter fixed effects, and investment objective-quarter fixed effects. Variable definitions appear in Table A1. Reported *t*-statistics [in brackets] are based on standard errors clustered by fund and quarter. Significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Variable	Dependent variable = quarterly fund flow (<i>Flow</i>)			
	(1)	(2)	(3)	(4)
<i>NewsHoldRetMkt</i>	0.152 [1.29]	0.034 [0.53]	0.200** [2.17]	-0.411 [-1.26]
<i>HoldRetMkt</i>	-0.087 [-0.58]	0.014 [0.20]	-0.025 [-0.22]	0.462 [1.39]
<i>NewsHoldRetMkt*Turnover</i>	-0.056 [-0.27]			
<i>HoldRetMkt*Turnover</i>	0.156 [0.70]			
<i>NewsHeadHoldRetMkt</i>		0.094** [2.05]		
<i>NewsHoldRetMkt*YearEndFiling</i>			0.427* [1.95]	
<i>HoldRetMkt*YearEndFiling</i>			-0.145 [-0.58]	
<i>NewsHoldRetMkt*MarketingFees</i>				1.737* [1.73]
<i>HoldRetMkt*MarketingFees</i>				-1.408 [-1.35]
Controls, Morningstar rating FE	Yes	Yes	Yes	Yes
Objective- <i>qtr</i> FE and Style- <i>qtr</i> FE	Yes	Yes	Yes	Yes
R ²	0.045	0.047	0.029	0.048
Number of observations	47,863	48,234	49,200	42,324

and how the effect of holdings' returns and media coverage varies with proxies for information and salience.

Table 5 shows that investors' response to fund holdings is not affected by holdings' informativeness but is strongly affected by their salience. For example, the evidence on holdings' informativeness in Column 1 shows that investors react equally strongly to media-covered holdings of high-turnover funds, for which historical holdings are less informative about the fund's current investment strategy. This result can be seen from the insignificant interaction term of the variables *NewsHoldRetMkt* and *Turnover*. Similarly, investors' response to all holdings does not vary significantly with portfolio turnover.

In contrast, investors' response to fund holdings varies significantly with measures of salience and attention. Column 2 shows that fund holdings that are prominently featured in media headlines have a stronger effect on flows and account for the main effect of media-covered holdings. Column 3 provides evidence that end-of-year holdings have a significantly larger effect on fund flows than holdings reported in other quarters. This can be seen from the interaction term *NewsHoldRetMkt*YearEndFiling*, which captures the additional effect of the returns of media-covered holdings listed in the annual report, over and above the baseline effect of media-covered holdings in quarters 1–3. The coefficient on the interaction term is

positive, significant, and economically large, with a coefficient magnitude about twice as large as the baseline effect. In unreported results, using a measure of daily flows before and after the holdings' filing date (as in Table 4, Panel B), we confirm that the incremental end-of-year effect of holdings' returns is observed only after (but not before) the annual report filing date.

Finally, Column 4 of Table 5 shows that investors of funds with higher marketing fees react more strongly to media-covered holdings. The coefficient on *NewsHoldRetMkt*MarketingFees* is 1.737, significant at the 10% level. The economic magnitude of this effect is substantial. A 1 standard deviation increase in *MarketingFees* (0.145) is associated with an increase in the *NewsHoldRetMkt* coefficient of 0.252 ($0.145 \times 1.737 = 0.252$). This point estimate is nearly double the value of the base effect of *NewsHoldRetMkt* shown earlier. This evidence suggests that the response of capital flows to media-covered holdings is stronger among less sophisticated investors or, alternatively, in the presence of more aggressive marketing.

Overall, the evidence in Table 5 indicates that media coverage appears to capture investors' attention and increase the salience of particular stocks rather than serve as a source of useful information. Investors respond more strongly to the media effect when news articles mention the company name prominently in the headline and when

holdings are saliently featured in the fund's annual report. In contrast, variation in the informativeness of fund holdings does not affect investor behavior, suggesting either that investors do not respond to the information contained in media reports or that such reports provide little useful information.

5.2. Evidence from changes in fund holdings

Previous research shows that investors can extract information about managerial skill by studying how fund managers revise their holdings relative to corporate news. Media coverage of stocks in a fund's portfolio can reduce the cost of inferring managerial skill by helping investors identify managers who correctly anticipated the news before it was disclosed in the media (Baker, Litov, Wachter, and Wurgler, 2010). Under the information view, investors reward managers who hold media-covered winners because investors receive a signal that a manager correctly predicted the outcome of a future corporate event and purchased the stock before the event occurred and the stock appreciated. Similarly, investors penalize managers who hold media-covered losers because investors receive a signal that a manager failed to predict the news and sell the stock before the news was announced.

Under the salience view, investors react to media coverage of fund holdings because it attracts their attention to the returns of particular holdings. For example, media coverage can make investors familiar with the performance of a particular stock, or it can make the company more salient when investors are scanning the list of a fund's holdings. In this case, investors react positively (negatively) to past winners (losers) because they are chasing past returns, even if these holdings' returns were not realized by the fund.

To provide additional evidence on the information and salience hypotheses, we examine whether investors' capital flows respond differently to holdings that were added to the fund portfolio in the trailing quarter (after the stocks appreciated in value) and are, therefore, less informative about managerial skill. We introduce two variables—*AddedHoldRetMkt* and *NewsAddedHoldRetMkt*—that capture the differential effect of these newly added holdings over and above the baseline effect of *HoldRetMkt* and *NewsHoldRetMkt*, respectively. The variable *AddedHoldRetMkt* is the average market-adjusted return of the new fund holdings that were added to the fund portfolio in the trailing quarter. It is analogous to a dummy indicator for the new holdings interacted with these holdings' market-adjusted returns (averaged at the fund level). The second variable, *NewsAddedHoldRetMkt*, is the average market-adjusted return of the new fund holdings that were added to the fund portfolio in the trailing quarter and received media coverage during the trailing quarter. It is analogous to a dummy indicator for the new holdings interacted with a dummy indicator for media coverage and these holdings' market-adjusted returns (also averaged at the fund level). The primary variable of interest is the differential term *NewsAddedHoldRetMkt*, which shows whether investors react differently to the returns of the

newly added holdings that received media coverage, compared with the baseline effect for the returns of all media-covered holdings, *NewsHoldRetMkt*.

The information hypothesis predicts that there should be a significant differential effect for the newly added holdings that received media coverage. Namely, investors should discount the returns of these holdings, and we should observe a significant and economically large negative coefficient on *NewsAddedHoldRetMkt*, which would erode or negate the base effect of *NewsHoldRetMkt* for this category of holdings. The salience hypothesis predicts that there should be no difference in investors' reaction to the returns of media-covered holdings, whether these stocks were purchased before or after the arrival of news, a pattern that should result in an insignificant coefficient on the differential term *NewsAddedHoldRetMkt*.

Table 6 tests for the differential effect of the newly added holdings on investors' capital flows. Across all specifications, we find that none of the coefficients on the differential terms *AddedHoldRetMkt* and *NewsAddedHoldRetMkt* is significantly different from zero. This result suggests that investors appear to react similarly to all holdings reported at the end of the quarter and do not account for the timing of portfolio investments. Put differently, investors react to the composition of a fund's portfolio but fail to extract useful information from its dynamics. In subsequent analysis in Section 5, we also show that a similar conclusion emerges from the analysis of investors' reaction to mutual fund window dressing. In particular, investors reward funds with media-covered winners even if the returns of these holdings significantly overstate fund returns, indicating that these stocks were purchased after, not before, their price appreciation.

5.3. Evidence from investment outcomes

In this subsection, we study how investors' response to media-covered holdings is associated with subsequent fund performance. If the returns of media-covered holdings predict future fund performance, investors' attention to these stocks could improve investment outcomes, supporting the information view. Previous research identifies plausible mechanisms that could generate this predictive power. First, stocks with high past returns are likely to have higher future returns because of the momentum effect of Jegadeesh and Titman (1993). Second, the momentum effect is stronger among media-covered stocks (Chan, 2003).

We investigate this possibility in Table 7 by considering whether the returns of media-covered holdings predict future fund returns. In Panel A, the dependent variable is quarterly market-adjusted fund return, and the independent variables are the same as in Table 2. This analysis examines whether market-adjusted fund returns can be predicted based on the past returns of fund holdings. In Panel B, we form portfolios of funds sorted on levels of *NewsHoldRetMkt* and regress the returns of these portfolios on risk factors from the three-factor and four-factor asset pricing models, using MKT (market return), SMB (small minus big), HML (high minus low), and UMD (up minus down) portfolios. This analysis examines the relation between past returns of

Table 6

Media coverage and investors' reaction to new and old holdings.

This table examines whether investors' response to fund holdings is different for new holdings that were added to the portfolio in the trailing reporting period, as compared with all portfolio holdings. The dependent variable is quarterly fund flow (*Flow*). The main independent variables of interest are the variables *AddedHoldRetMkt* and *NewsAddedHoldRetMkt*, which capture the differential effect of returns for new holdings that were added to the fund portfolio in the trailing reporting period, over and above the effect of returns for all portfolio holdings. *AddedHoldRetMkt* is the average market-adjusted return of the new fund holdings that were added to the fund portfolio in the trailing reporting period. *News-AddedHoldRetMkt* is the average market-adjusted return of the new fund holdings that were added to the fund portfolio in the trailing reporting period and received media coverage during the trailing quarter in the *Wall Street Journal*, the *New York Times*, the *Washington Post*, or *USA Today*. Controls include market-adjusted fund returns over the trailing year, squared market-adjusted fund returns over the trailing year, volatility of daily fund returns, fund age, expense ratio, fraction of holdings with media coverage, and log assets. Morningstar rating FE is the set of dummies for the fund's Morningstar rating. *Objective-qtr FE* and *Style-qtr FE* denote fixed effects for the fund's investment objective category and investment style, respectively, which are specific to each quarter. Variable definitions appear in Table A1. Reported *t*-statistics [in brackets] are based on standard errors clustered by fund and quarter. Significance levels at 10%, 5%, and 1% are indicated by *, ** and ***, respectively.

Variable	Dependent variable = quarterly fund flow (<i>Flow</i>)		
	(1)	(2)	(3)
<i>NewsHoldRetMkt</i>	0.359*** [2.74]	0.349*** [2.81]	0.166** [2.00]
<i>HoldRetMkt</i>	-0.133 [-0.88]	-0.131 [-0.95]	0.006 [0.07]
<i>NewsAddedHoldRetMkt</i>	-0.051 [-1.36]	-0.050 [-1.32]	-0.042 [-1.02]
<i>AddedHoldRetMkt</i>	0.029 [0.59]	0.028 [0.58]	0.002 [0.05]
Controls	Yes	Yes	Yes
Morningstar rating FE	No	Yes	Yes
<i>Objective-qtr FE</i> and <i>Style-qtr FE</i>	No	No	Yes
R ²	0.022	0.027	0.047
Number of observations	47,935	47,935	46,997

media-covered holdings and future fund performance, while controlling for exposure to the standard risk factors.

Table 7 shows that past returns of media-covered holdings have little predictive power for future fund returns. In Panel A, *NewsHoldRetMkt* has a coefficient of 0.085 and a *t*-statistic of 1.93 after controlling for *HoldRetMkt* (Column 1). Once we control for fund characteristics in Columns 3 and 4, the coefficient on *NewsHoldRetMkt* declines in magnitude and becomes statistically insignificant. Finally, the addition of style-quarter and investment objective-quarter fixed effects in Column 5 reduces the *NewsHoldRetMkt* effect to virtually zero (coefficient of 0.025 with a *t*-statistic of 0.87).

The results for calendar time portfolios, shown in Panel B, indicate an even weaker relation between past returns of media-covered holdings and future fund performance. At the end of every month, funds are sorted into quintiles and deciles based on levels of *NewsHoldRetMkt* (using the most recent reporting within the previous quarter). The results in Panel B show that all of the portfolios sorted on *NewsHoldRetMkt* have small and insignificant three-factor and four-factor alphas, with coefficients that occasionally flip signs. We also consider long-short portfolios between the top and bottom quintiles

and deciles and find that such portfolios fail to generate significant returns. In fact, four-factor alphas on these long-short portfolios have negative signs.

Overall, the results in this section show that past returns of media-covered holdings do not predict future fund performance and are unlikely to generate value for investors, to the extent that this value is measured by risk-adjusted returns. These findings are consistent with the salience view and undermine the information view.

6. Media coverage and window dressing

If investors' capital flows react to the presence of media-covered winners among fund holdings, fund managers could strategically respond to this investor behavior by purchasing past winners before reporting dates in an attempt to attract flows. Under the information view, investors extract useful information from media-covered holdings and should respond to holdings' returns only when these returns represent the actual returns of the fund, thus discounting the holdings of window-dressing funds. Under the salience view, investors react to the appeal of media-covered winners instead of the fund's investment strategy. In this case, we should observe a similar investor response to media-covered holdings of window-dressing funds. To distinguish between these views, this section provides one of the first pieces of evidence on the relation between capital flows and window dressing.

If a fund engages in window dressing by buying past winners or selling past losers before reporting dates, the past returns of the fund's holdings will exceed those of the fund, creating a return gap—the differential between the returns of the fund and the return of its holdings (Kacperczyk, Sialm, and Zheng, 2008). To construct a measure of window dressing, we use two variations of the return gap. Our first measure, the forward-looking return gap, *RetGapFwd*, is the difference between the quarterly return of the fund and the quarterly return of its holdings, in which the holdings snapshot is taken at the beginning of the quarter over which the returns are measured. Our second measure, the backward-looking return gap, *RetGapBack*, is constructed analogously, except the holdings snapshot is taken at the end of the quarter over which the returns are measured.

Table 8 examines whether the relation between holdings' returns and future fund flows varies with a fund's propensity to window dress. If this relation is weaker for window-dressing funds, this outcome would be consistent with the ability of investors to detect window dressing, reflecting an information-based approach in the analysis of holdings. Conversely, if the relation between holdings' returns and future fund flows does not depend on whether holdings' returns reflect the realized returns of the fund, this evidence would be consistent with the more naïve reaction to fund holdings and would support the salience view.

The results in Table 8 support the salience view. The main variables of interest are the interaction terms of the window-dressing measures *RetGapFwd* and *RetGapBack* with holdings' returns, *HoldRetMkt* and *NewsHoldRetMkt*, which examine whether investors' response to the past

Table 7

Effect of media-covered holdings on fund returns.

This table examines whether the returns of media-covered fund holdings predict future fund returns. Panel A presents ordinary least squares regressions of quarterly market-adjusted fund returns on the trailing returns of fund holdings. *NewsHoldRetMkt* is the average quarterly return of fund holdings that received media coverage, minus the Center for Research in Security Prices value-weighted return over the same period (i.e., one period before the fund returns). Morningstar rating FE is the set of dummies for the fund's Morningstar rating. *Objective-qtr FE* and *Style-qtr FE* denote fixed effects for the fund's objective category and investment style, respectively, which are specific to each quarter. Variable definitions appear in Table A1. Panel B shows the results of the portfolio analysis. We form quintile and decile calendar time portfolios of funds sorted on the returns of their media-covered holdings. We also consider long-short portfolios between the top and bottom quintiles and the top and bottom deciles. Excess portfolio returns are regressed on the market, size, book-to-market, and momentum factors [MKT (market return), SMB (small minus big), HML (high minus low), and UMD (up minus down)]. Reported in brackets are *t*-statistics. In Panel A, standard errors are clustered by fund and quarter. Significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Variable	Dependent variable = market-adjusted fund return next quarter				
	(1)	(2)	(3)	(4)	(5)
<i>NewsHoldRetMkt</i>	0.085* [1.93]	0.087* [1.93]	0.077 [1.61]	0.076 [1.61]	0.025 [0.87]
<i>HoldRetMkt</i>	0.013 [0.15]	−0.010 [−0.11]	−0.005 [−0.05]	−0.006 [−0.06]	0.033 [0.54]
<i>FracNews</i>	−0.052*** [−3.75]	−0.051*** [−3.32]	−0.052*** [−3.62]	−0.052*** [−3.67]	−0.017* [−1.70]
<i>FundRetMkt</i>		0.022 [0.49]	0.023 [0.46]	0.027 [0.54]	0.043 [0.93]
<i>FundRetMktSq</i>			0.012 [0.21]	0.006 [0.10]	−0.049 [−1.29]
<i>FundVolatility</i>			−0.616 [−0.97]	−0.631 [−0.98]	−1.655 [−1.40]
<i>Age</i>			0.002 [0.03]	0.016 [0.33]	0.011 [0.78]
<i>LogAssets</i>			−0.002** [−2.38]	−0.002** [−2.16]	−0.001* [−1.72]
<i>ExpenseRatio</i>			−0.463 [−1.45]	−0.514 [−1.64]	−0.259 [−1.48]
Morningstar rating FE	No	No	No	Yes	Yes
<i>Objective-qtr FE</i> and <i>Style-qtr FE</i>	No	No	No	No	Yes
<i>R</i> ²	0.037	0.040	0.047	0.050	0.358
Number of observations	51,236	51,023	50,785	50,785	49,216

Panel B: Calendar time portfolios sorted on returns of media-covered holdings

Portfolio	Three-factor alpha	Four-factor alpha	Analysis of portfolio returns					<i>R</i> ²	<i>N</i>
			MKT	SMB	HML	UMD			
<i>Decile 10 (highest)</i>	0.056 [0.22]	−0.079 [−0.38]	1.050*** [22.07]	0.552*** [9.66]	0.020 [0.35]	0.290*** [7.97]	0.881	120	
<i>Decile 9</i>	0.002 [0.01]	−0.089 [−0.66]	1.012*** [32.46]	0.381*** [10.16]	0.075** [1.98]	0.194*** [8.15]	0.931	120	
<i>Decile 8</i>	0.030 [0.25]	−0.023 [−0.22]	0.954*** [38.15]	0.246*** [8.19]	0.101*** [3.29]	0.115*** [6.02]	0.944	120	
<i>Decile 7</i>	−0.075 [−0.98]	−0.107 [−1.55]	0.954*** [60.03]	0.120*** [6.30]	0.113*** [5.82]	0.068*** [5.59]	0.975	120	
<i>Decile 6</i>	0.001 [0.01]	−0.009 [−0.16]	0.934*** [66.64]	0.072*** [4.30]	0.114*** [6.64]	0.021* [1.93]	0.979	120	
<i>Decile 5</i>	−0.023 [−0.40]	−0.015 [−0.27]	0.928*** [69.72]	−0.005 [−0.29]	0.086*** [5.28]	−0.016 [−1.58]	0.981	120	
<i>Decile 4</i>	−0.052 [−0.76]	−0.028 [−0.45]	0.927*** [63.74]	0.003 [0.16]	0.092*** [5.16]	−0.051*** [−4.57]	0.978	120	
<i>Decile 3</i>	0.002 [0.02]	0.046 [0.48]	0.939*** [41.98]	−0.028 [−1.05]	0.067** [2.46]	−0.095*** [−5.54]	0.954	120	
<i>Decile 2</i>	−0.034 [−0.24]	0.031 [0.26]	0.954*** [33.85]	−0.045 [−1.34]	0.090*** [2.60]	−0.140*** [−6.51]	0.933	120	
<i>Decile 1 (lowest)</i>	0.009 [0.04]	0.105 [0.58]	1.033*** [24.81]	0.020 [0.40]	−0.012 [−0.23]	−0.208*** [−6.51]	0.893	120	
<i>Decile 10–Decile 1</i>	0.048 [0.11]	−0.184 [−0.54]	0.017 [0.22]	0.532*** [5.64]	0.032 [0.33]	0.498*** [8.28]	0.547	120	

Table 7 (continued)

Panel B: Calendar time portfolios sorted on returns of media-covered holdings								
Portfolio	Three-factor alpha	Four-factor alpha	Analysis of portfolio returns					
			MKT	SMB	HML	UMD	R ²	N
Quintile 5 (highest)	0.029 [0.14]	−0.084 [−0.51]	1.031*** [26.84]	0.467*** [10.11]	0.048 [1.02]	0.242*** [8.25]	0.909	120
Quintile 4	−0.022 [−0.23]	−0.065 [−0.77]	0.954*** [48.57]	0.183*** [7.77]	0.107*** [4.44]	0.092*** [6.09]	0.963	120
Quintile 3	−0.011 [−0.21]	−0.013 [−0.23]	0.931*** [72.37]	0.034** [2.20]	0.100*** [6.35]	0.002 [0.24]	0.982	120
Quintile 2	−0.025 [−0.29]	0.009 [0.12]	0.933*** [52.32]	−0.013 [−0.59]	0.080*** [3.65]	−0.073*** [−5.34]	0.969	120
Quintile 1 (lowest)	−0.012 [−0.07]	0.068 [0.47]	0.994*** [29.38]	−0.013 [−0.32]	0.039 [0.95]	−0.174*** [−6.72]	0.917	120
Quintile 5 – Quintile 1	0.041 [0.12]	−0.152 [−0.55]	0.038 [0.59]	0.480*** [6.25]	0.009 [0.11]	0.416*** [8.52]	0.579	120

Table 8

Window dressing and investors' reaction to holdings' returns.

This table examines the relation between fund flows and measures of window dressing. The dependent variable is quarterly fund flow (*Flow*). The main independent variables of interest are the interaction terms of the measures of window dressing: the backward-looking return gap (*RetGapBack*) and the forward-looking return gap (*RetGapFwd*) with measures of holdings' returns. *RetGapBack* is the difference between fund returns and returns of fund holdings, based on the snapshot of fund holdings taken at the end of the reporting period for which the returns are measured. *RetGapFwd* is the difference between fund returns and returns of fund holdings based on the snapshot of holdings taken at the beginning of the reporting period for which the returns are measured. Controls include market-adjusted fund returns over the trailing year, squared market-adjusted fund returns over the trailing year, volatility of daily fund returns, fund age, expense ratio, fraction of holdings with media coverage, log assets, and the forward-looking return gap (Column 1) or the backward looking return gap (Column 2). All regressions include dummies for a fund's Morningstar rating, investment style-quarter fixed effects, and investment objective-quarter fixed effects. Variable definitions appear in Table A1. Reported *t*-statistics [in brackets] are based on standard errors clustered by fund and quarter. Significance levels at 10%, 5%, and 1% are indicated by *, ** and ***, respectively.

Variable	Dependent variable = quarterly fund flow (<i>Flow</i>)	
	(1)	(2)
<i>NewsHoldRetMkt</i>	0.123*** [2.79]	0.140*** [2.90]
<i>NewsHoldRetMkt*RetGapFwd</i>	−0.269 [−0.43]	
<i>NewsHoldRetMkt*RetGapBack</i>		−0.872 [−0.81]
<i>HoldRetMkt</i>	0.009 [0.12]	0.104 [1.33]
<i>HoldRetMkt*RetGapFwd</i>	1.083 [0.95]	
<i>HoldRetMkt*RetGapBack</i>		1.010 [0.91]
Controls, Morningstar rating FE	Yes	Yes
Objective-qtr FE and Style-qtr FE	Yes	Yes
R ²	0.046	0.047
Number of observations	49,078	49,200

returns of fund holdings varies with the likelihood that these holdings are window-dressed. Across all four interaction terms, none of the coefficients is significantly

different from zero, indicating that investors do not react differently to the holdings of window-dressing funds. In other words, investors' flows chase media-covered holdings with strong past returns, even if these holdings do not reflect the actual fund performance.

In summary, our evidence suggests that window dressing is effective in generating flows. Investors respond positively to media-covered past winners, even if these returns were not captured by the fund.

7. Conclusion

In this paper, we study how media coverage affects investors' capital allocations to mutual funds. Investors reward funds that hold stocks with high past returns, but only if these stocks recently received media coverage. We argue that media coverage of firms increases the salience of their stock returns and attracts investor attention. When faced with a long list of fund holdings, investors appear to respond only to those companies that were recently featured in the news. As a result, funds holding high-visibility winners attract greater capital flows than their counterparts holding less visible winners. Conversely, funds holding high-visibility losers experience a greater attrition of flows than their counterparts holding losers with similarly poor performance but no media coverage. In absolute terms, the effect on fund flows is larger for media-covered winners than for media-covered losers.

In contrast to the view that media coverage provides investors with valuable information, we find little evidence that newspaper articles are associated with better investor decision making. Although investors react to media-covered holdings, they do not distinguish between the holdings that were purchased before and after the stocks appreciated in value. Investors also react equally strongly to holdings' past returns even when these returns do not accurately reflect the realized return of the fund. Ultimately, this capital allocation strategy does not predict future fund returns and likely generates significant transaction costs. Overall, our results suggest that at least some investors allocate capital to mutual funds in a fairly naïve fashion.

Appendix A. Formulas and definitions

Table A1

Variable definitions.

This table shows variable definitions. All variables appear in the order in which they are introduced in the text.

Variable	Definition
<i>Flow</i>	Quarterly fund flows: $\frac{TNA_t - TNA_{t-1} * R_t}{TNA_{t-1}}$, where R is the fund's return, and TNA is the fund's total net assets.
<i>NewsHoldRetMkt</i>	Market-adjusted average returns of fund holdings that received media coverage in the <i>Wall Street Journal</i> , the <i>New York Times</i> , the <i>Washington Post</i> , or <i>USA Today</i> : $\frac{\sum_{j=1}^K (R_{j,t} - R_{Mkt,t})}{K}$, taken over all holdings of the fund reported at the end of quarter t that received media coverage during quarter t .
<i>HoldRetMkt</i>	Market-adjusted average returns of fund holdings: $\frac{\sum_{j=1}^N (R_{j,t} - R_{Mkt,t})}{N}$, taken over all holdings of the fund reported at the end of quarter t .
<i>FundRetMkt</i>	Market-adjusted fund return (after expenses) over the trailing year, calculated as the difference between the fund return and the return on the Center for Research in Security Prices (CRSP) value-weighted index.
<i>FundRetMktSq</i>	Market-adjusted fund return (after expenses) over the trailing year, squared: $FundRetMkt^2$.
<i>MStar-dum</i>	Dummy variables for the fund's Morningstar rating based on the trailing five-year risk-adjusted fund returns.
<i>Age</i>	Fund age in years, relative to the earliest CRSP header date.
<i>ExpenseRatio</i>	Annual fund expense ratio, from CRSP.
<i>LogAssets</i>	Log of the fund's total net assets (summed over all share classes), from CRSP.
<i>FracNews</i>	The fraction of the fund's holdings that received media coverage in the trailing quarter.
<i>FundVolatility</i>	The standard deviation of daily fund returns over the trailing quarter.
<i>IOC-qtr-dum</i>	Dummy variables for a fund's investment objective based on the Thomson Investment Objective Category classification, which are specific to each quarter.
<i>Style-qtr-dum</i>	Dummy variables for the average market capitalization and book-to-market ratio of fund holdings, which are specific to each quarter. First, the percentile rank for each stock based on its market capitalization and book-to-market ratio is calculated, and this rank is averaged across all fund holdings in a quarter to get a fund average. Second, dummy variables are formed based on a 3*3 split of the fund-level averages (at that time) into high, middle, and low terciles.
<i>NewsBelowMedHoldRetMkt</i>	Market-adjusted average returns of fund holdings with less media coverage than the median firm (taken across firms with at least one article).
<i>NewsAboveMedHoldRetMkt</i>	As with <i>NewsBelowMedHoldRetMkt</i> , but with more media coverage than the median firm.
<i>News25PctHoldRetMkt to News100PctHoldRetMkt</i>	As with <i>NewsBelowMedHoldRetMkt</i> and <i>NewsAboveMedHoldRetMkt</i> , but for quartiles of media coverage, with <i>25Pct</i> indicating firms from zero to the 25th percentile of coverage and <i>100Pct</i> indicating firms from the 75th to the 100th percentile.
<i>NewsHoldRetMktNeg</i>	Variable equal to <i>NewsHoldRetMkt</i> if <i>NewsHoldRetMkt</i> < 0 and zero otherwise.
<i>HoldRetMktNeg</i>	Variable equal to <i>HoldRetMkt</i> if <i>HoldRetMkt</i> < 0 and zero otherwise.
<i>FundRetMktNeg</i>	Variable equal to <i>FundRetMkt</i> if <i>FundRetMkt</i> < 0 and zero otherwise.
<i>MktCapHoldRetMkt</i>	Market-adjusted average returns of fund holdings with market capitalizations above the NYSE median.
<i>NumAnHoldRetMkt</i>	Market-adjusted average returns of fund holdings with analyst coverage above the NYSE median.
<i>BMHoldRetMkt</i>	Market-adjusted average returns of fund holdings with book-to-market ratios above the NYSE median.
<i>MomHoldRetMkt</i>	Market-adjusted average returns of fund holdings with cumulative returns from two to 12 months ago that are above the NYSE median.
<i>NewsMth1HoldRetMkt</i>	Market-adjusted average returns of fund holdings that received media coverage in the month immediately before the period of fund flows.
<i>NewsMth2HoldRetMkt</i>	Market-adjusted average returns of fund holdings that received media coverage in the month ending one month before the period of fund flows.
<i>NewsMth3HoldRetMkt</i>	Market-adjusted average returns of fund holdings that received media coverage in the month ending two months before the period of fund flows.
<i>AvgTonePctile</i>	Average media tone of fund holdings. Media tone is the difference between the number of positive and negative words [according to the classification in Loughran and McDonald (2011)], divided by the total number of words in the article. This measure is first averaged for all articles during the quarter about a fund holding and then averaged across all holdings of the fund. Funds are sorted into percentiles according to their rank in this distribution of holdings' tone.
<i>FlowPerDay</i>	Cumulative fund flow (<i>Flow</i>) scaled by the number of trading days in the respective period.
<i>Turnover</i>	Annual fund turnover, from CRSP.
<i>YearEndFiling</i>	Binary indicator, which equals one for the fourth-quarter filings that coincide with a fund's fiscal year-end.
<i>NewsHeadHoldRetMkt</i>	Market-adjusted average returns of fund holdings that received media coverage mentioning the firm's name in the article headline or lead paragraph.
<i>MarketingFees AddedHoldRetMkt</i>	Average 12b-1 fees (across all share classes), divided by the average fund expense ratio. Average market-adjusted return of the new fund holdings that were added to the fund portfolio in the trailing reporting period.
<i>NewsAddedHoldRetMkt</i>	Average market-adjusted return of the new fund holdings that were added to the fund portfolio in the trailing reporting period and received media coverage in the trailing quarter in the <i>Wall Street Journal</i> , the <i>New York Times</i> , the <i>Washington Post</i> , or <i>USA Today</i> .
<i>RetGapBack</i>	Backward-looking return gap, computed as the difference between fund returns and returns of fund holdings based on the snapshot of holdings taken at the end of the reporting period.
<i>RetGapFwd</i>	Forward-looking return gap, computed as the difference between fund returns and returns of fund holdings based on the snapshot of holdings at the beginning of the reporting period.

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