

Media and Investment Management*

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Abstract

We classify news items about equity hedge funds over 1999–2008 into three source groups: General newspapers, Specialized magazines, and Corporate Communication. Applying a textual analysis to news items, we uncover three types of media biases. First, a reporting style bias, that is, when a fund is covered by multiple sources at the same time, the sentiment is most positive in Corporate coverage and least in General coverage. The differences in source sentiment are more significant in cases of exclusive coverage, indicating a second bias, editorial selection. Finally, examining post-coverage performance, we document that Corporate-covered funds outperform and General-covered funds underperform, with a performance difference of about 11% annually. This result suggests a content bias, consistent with fund managers presenting conservative forecasts, while reporters present relatively more lenient views. However, investor fund flow does not react to this information, which suggests that investors do not seem to exploit valuable information embedded in media coverage.

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1 Introduction

Economists have long been interested in the economics of information. The media are an avenue through which information is gathered, processed, and disseminated to a public of economic agents. To the extent that media outlets include information about economic activity, the media can affect asset prices, through agents making decisions that might be based on the information provided by the media.

But, are the media biased? The literature includes several works, both internationally and in the United States, all showing the answer to this fundamental question is *yes* (see, e.g., Groseclose and Milyo (2005) and Gentzkow and Shapiro (2006)). In this paper, we focus on the information in media pertaining to the investment management industry, specifically equity hedge funds. Hedge funds are subject to regulatory constraints limiting their ability to market themselves to the public, thereby making the media's interpretation of events highly important.¹ We ask the following questions: Do different media sources systematically differ in the manner in which they cover hedge funds? Are they overly negative or too lenient? Do media contain information about future fund performance? And, do investors understand this information and act upon it? Studying these questions suggests the existence of three types of media biases: reporting style, editorial selection, and a content bias. Yet, although the information in the media can be used to predict fund performance, investor fund flow does not react to this information, which suggests that investors do not seem to exploit valuable information embedded in media coverage.

We access different media sources and devise a measure of the information they report. We use Google News archive to collect about 67,000 news articles on a sample of Long/Short-Equity US hedge funds over the period 1999–2008. The sample includes about 3,600 unique media sources which we separate into three main categories: *General*, which typically includes daily newspapers such as The New York Times, The Washington Post, etc., *Specialized*, which includes industry venues such as Pensions and Investments, BusinessWeek, and other investment magazines, and *Corporate* communication, which includes press releases and wire services such as PR Newswire and Business Wire. We then apply a textual analysis to the title of each news item to gauge a measure of news-item sentiment. Essentially, this procedure classifies each word into positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. The (positive)

¹For details on the regulatory constraints pertaining to the marketing of hedge funds see Johnson (2006).

sentiment of a news-item title is then measured by the ratio of its positive words and the sum of its positive and negative words (this is similar in spirit to Tetlock (2007), Tetlock, Saar-Tsechnansky, and Macskassy (2008), Loughran and McDonald (2009), and Demers and Vega (2010)). By focusing on funds covered in different venues, along with a measure of news sentiment uniformly measured across news items, we are able to identify several types of media biases.

First, a reporting style bias is shown by comparing the news sentiment of different media sources covering the same fund in a particular month. The identification assumption is that if several sources cover the same fund in the same month, then the news items are likely to report the same information event. We find that, on average, when a fund is covered simultaneously by multiple sources, the sentiment of Corporate news is most positive and that of General news is least positive. This result is consistent with Gentzkow and Shapiro (2006) documenting that for some news events such as war activities, the choice of words by different sources may convey radically different impressions of the actual event. It is also consistent with Butler and Gurun (2010) showing that the reporting of local media about local companies typically uses fewer negative words compared to the same media reporting about non-local companies. To the extent that Corporate is likely to include self-reported information by portfolio managers, the reporting style bias is consistent with expectation.

Second, we identify an editorial selection bias by studying the sentiment of different media sources when they exclusively cover a particular fund in a given month. We compute the average news sentiment of funds that are exclusively covered by one of the three sources each month. Consistent with the first type of bias, reporting style, we find that the average sentiment of exclusive Corporate coverage is the most positive while that of General is the least positive. Yet, the differences in source sentiment are about twice as large in cases of exclusive coverage than non-exclusive coverage. This suggests that not only do media sources differ in the way they choose to report information, but they also apply discretion in choosing on which events to report. This type of bias is similar in spirit to other editorial selection biases. For example, Groseclose and Milyo (2005) document a significant left-wing political-view bias in the media by showing the tendency of certain media outlets to cite politically biased think tanks. Another example is Reuter and Zitzewitz (2006), who report that financial media are biased toward recommending funds from fund families that advertise within their pages.

Third, the media exhibit a content bias in that the media do not report the news to their full

extent. We identify this type of bias by observing post-coverage fund returns. We find that funds exclusively covered by Corporate exhibit positive cumulative returns over the following year, while funds with exclusive General coverage lose over the following year. Naturally, this result is also consistent with an editorial selection bias, and therefore to control for it we compute sentiment-adjusted returns. First, covered funds in each month are separated into three groups of sentiment; the first group includes funds with undefined sentiment (e.g., their news-item titles do not include either positive or negative words), while the other two groups are defined according to whether their average positive sentiment is above or below the median positive sentiment across all funds and news items with defined sentiment that month. Then, sentiment adjustment is achieved by subtracting from each fund's monthly return the average monthly return of its sentiment group. If the return patterns are due to reporting-style and editorial-selection biases, then the sentiment adjustment will reduce or even eliminate these biases, i.e. the return patterns will diminish. Yet, we find that the outperformance of Corporate-coverage funds and the underperformance of General-coverage funds remain unchanged when using sentiment-adjusted returns. This points to an underreporting effect, that is, the media do not report the full extent of either favorable or unfavorable news.

There are several explanations for the content bias. To the extent that Corporate coverage may reflect the incentives of fund managers, it is quite reasonable to expect them to express moderate, conservative views about their performance (for example, due to concerns about litigation risk). It is also similar to evidence in the accounting literature pointing to conservatism in announced corporate earnings (e.g., Basu (1997)). The content bias of General coverage can be explained by reporter incentives to retain access to information from managers in the future. Therefore, even though reporters in the General media choose to report negative news, they do not report them to the full extent. This is similar to the evidence in Dyck and Zingales (2003) suggesting a quid pro quo between journalists and their sources, whereby journalists receive private information in exchange for a positive spin on companies' news. A positive bias is also exhibited by sell-side research analysts (e.g., O'Brien (1988), McNichols and O'Brien (1997), and Das, Levine, and Sivaramakrishnan (1998)). In sum, the content bias suggests that given the choice to cover a particular news event, Corporate sources seem to express pessimistic views, while General seem to express optimistic views.

The literature about media coverage often attempts to separately measure media content and consumer behavior. For example, DellaVigna and Kaplan (2007) measure the impact of the avail-

ability of Fox News on voting outcome of presidential elections. Barber and Odean (2008) show that individual investors tend to buy media-covered stocks. Engelberg and Parsons (2010) show that media affect investor behavior by comparing the behaviors of investors with access to different media coverage of the same information event. They find that local media coverage predicts local trading. Disentangling the causal impact of media reporting from the impact of the events being reported is particularly challenging when the events pertain to priced assets. For example, in the case of stocks, looking at prices to infer content is problematic for a couple of reasons: (a) investors might over- or under-react to the information. For example, the behavioral finance literature documents numerous cases of over/under reaction to corporate news, such as earnings announcements and mergers; (b) the investor-recognition hypothesis (Merton (1987)) suggests that information provision on a stock, regardless of bad/good news, should translate into a price premium (see also Veldkamp (2006) and Fang and Peress (2009)).

In this paper, we study the media coverage of funds, not their underlying positions. Since funds are not directly traded by investors, one would expect neither an investor under/over-reaction nor an investor-recognition premium, to affect their performance. Therefore, we can use post-coverage fund returns to draw inferences about the information content of media coverage. One caveat, however, is the possibility that investor reaction would translate into fund flow, which may ultimately affect asset value via price pressure. Yet, we do not find any evidence that this is the case, because media coverage does not seem to attract investor flow and the effect of media on return is robust to controlling for flow. In the context of Reuter and Zitzewitz (2006), they find that funds recommended by specialized magazines attract investor flow, despite that these recommended funds do not exhibit superior performance in the future. In contrast, we find that media coverage contains information about future fund performance, yet investors do not seem to exploit this information. In other words, investors seem responsive to false information and insensitive to valuable information. This result therefore provides further evidence for "dumb money" (e.g., Frazzini and Lamont (2008)).

The rest of this paper is organized as follows. Section 2 describes the data used for this study. Sections 3,4, and 5, describes the reporting style, editorial selection, and content biases. Additional test are performed in Section 6, followed by some concluding remarks in Section 7.

2 Data

2.1 News Items

We extract news items about hedge funds using Google News archive (news.google.com/archivesearch). Google News archive is a web-based search application which allows users to retrieve historical news articles. A result of a search query is a web-page which includes a list of news articles, their titles, publication dates, and the sources on which they appear. The advantage of Google News over, for example, Lexis-Nexis, which is the most widely used news archive in the social sciences, is that Google includes press releases and wire services. Weaver and Bimber (2008) study the differences between the Lexis-Nexis and Google News, and conclude that the former misses about half or more of the articles appearing in major newspapers and in broad searches of English-language news, mainly because it does not include wire services.

This paper studies the media biases pertaining to funds. Our sample of hedge funds includes all Long/Short-Equity funds from the Lipper-TASS database with at least 24 monthly observations over a period of ten years (1999–2008). The sample includes both operating, "Live" funds and "Graveyard" funds (that no longer report to the database), which reduces the impact of survivorship bias. Only funds that report their returns on a monthly basis and net of all fees (management, incentive, and other expenses) are kept in the sample. Overall, our sample consists of 774 unique funds, 425 per month on average, which requires submitting some 50,999 fund-month requests to the Google News archive. The searches result in 67,125 news items, which we are able to classify into different categories, as explained below.

2.2 Media-Coverage Groups

To test for media biases, we need access to different media sources. The sample includes 3,614 unique media sources, which we separate into three main categories: *General*, which includes daily national and local newspapers, *Specialized*, which includes investment focused outlets, and *Corporate* communication, which includes press releases and wire services. We believe this type of classification naturally partitions different media sources by incentive and access to information. First, General and Specialized both differ from Corporate by their access to information because the latter mainly reflects managerial inside information selected to be disclosed through press releases

and wire services. Second, General and Specialized may differ in their incentives; for example, Reuter and Zitzewitz (2006) find that specialized magazines are more likely to recommend funds that advertise with them, while general outlets, such as The New York Times and The Wall Street Journal, are not. General and Specialized also differ in their readership, general public versus the investment community, which can affect the content they report (for some related theory see Mullainathan and Shleifer (2005)).

To assign each source with its media type, we combine a list of known sources with a simple form of textual analysis of source name. The list of sources comprising the General newspapers group is derived mainly from Engelberg and Parsons (2010), who define a list of 19 local newspapers for their study. We add The Wall Street Journal and USA Today to arrive at 21 sources. For the list of Specialized media outlets, we prepare a list of commonly known magazines such as Forbes, The Economist, and Kiplinger, and completed the list with sources whose names include certain keywords. For example, if a source name includes keywords such as "bank", "investment", "pension", or "money", we classify it as Specialized. Similarly, the list of Corporate communication sources include pre-selected sources, such as Bloomberg and Reuters, in addition to sources whose names include keywords such as "wire" and "press release."

Table 1 lists the top 10 media sources by the number of news items in the sample, for each group. There is a fair amount of concentration in each group. Out of 21 different General sources, the top three, The New York Times, The Washington Post, and The Los Angeles Times, contain about 61% of the news items of that group. The top three Specialized sources (out of 3,305), Pensions and Investments, BusinessWeek, and CNNMoney, account for about 17% of the news items of that group. Finally, the top three Corporate sources (out of 288), PR Newswire, Business Wire, and Bloomberg, contain 74% of the news items of that group.

Because we are interested in differences between media groups rather than intra-group effects, we define media group dummy variables that indicate whether a fund is covered by each one of the three media group each month. A fund is covered by a media group if it is covered by at least one of the sources that belongs to that media group. Naturally, a fund may be covered by multiple groups at the same time.

Table 2, Panel A, reports the unconditional probabilities of fund coverage. They are calculated as time-series averages of monthly cross-sectional fractions. On average, 23.90% of the funds in a given month are covered by at least one media group. The average fund coverages are 10.19%,

19.81%, and 11.27% for General, Specialized, and Corporate, respectively. We denote these values "inclusive" coverages, because they measure a group's coverage independent of possible overlap with the other two groups. In contrast, "exclusive" coverage denotes the percent of funds that are covered by only one group in a given month. The exclusive coverages of General, Specialized, and Corporate are 1.96%, 7.17%, and 1.91%, respectively.

To better understand the relation between the media groups, Figure 1 presents an Euler diagram for the three media sets. Each set is represented by a circle whose area is proportionate to its coverage probability. The distances between circle centers are also determined such that the intersection areas are proportionate to their coverage probabilities. The diagram presents the probability of fund coverage by each set unconditionally and conditional on having coverage. For example, conditional on coverage, Specialized has the largest exclusive coverage (30.0%). Also, conditional on coverage, about half of the funds are exclusively covered by one of the three media groups.

As mentioned above, the probabilities reported in Table 2, Panel A, are time-series averages of group coverage. Figure 2, Panels A and B, respectively display the time series from which the inclusive and exclusive average coverages are computed. All time series exhibit significant persistence. Panel A shows General coverage has dropped over time, while Specialized and Corporate coverage have increased. The patterns of Specialized and Corporate are consistent with the growth of assets under management (AUM) by hedge funds and the general interest in this asset class over the sample period. In Panel B, exclusive General and Specialized coverage seem to drop over time, suggesting that funds have been increasingly covered by both groups over time.

Some of our tests below are based on a comparison of funds with exclusive coverage by different groups. One concern might be that some groups consistently cover the same funds, which would imply that our results can be attributed to a fund effect rather than a media group effect. Table 2, Panel B, provides some evidence to alleviate this concern. This panel reports the transition probabilities between the different coverage groups. Each row reports the probability that a fund covered by a particular group in a given month will be covered by all possible groups during the next month. First, notice that a fund with no coverage in a particular month has about 90% chance of having no coverage the next month. Second, given exclusive coverage in either one of General, Specialized, or Corporate, there is about 50% chance of no coverage the next month, and about 90% chance of not being exclusively covered by the same group again next month. Yet,

there is evidence of some persistent exclusive coverage, as the conditional transition probabilities from one exclusive coverage group to itself are higher than the unconditional exclusive coverage probabilities reported in Panel A. For example, the transition probability from Specialized to itself is 19.79%, while unconditional Specialized coverage is 7.17%. Finally, given coverage by all three media groups, the probability of being covered in the next month is about 92%, and the probability of being covered by all three media groups again the next month is about 49%. In sum, even though the transition matrix suggests some persistence in coverage, it does not seem economically significant.

2.3 A Measure of News Sentiment

To measure news sentiment, we apply the following procedure. First, we collect all news items per fund in a given month and group them by source type, General, Specialized, or Corporate. Second, we apply a textual analysis to news-item titles. We rely on the Harvard IV-4 Psychosocial Dictionaries to identify positive and negative tones. Specifically, we use two bags of words (dictionaries): a list of 2,293 negative words (TagNeg), containing words such as "loss" and "fail", and a list of 1,193 positive words (TagPos), containing words such as "gain" and "great." We compare news-item titles with the two aforementioned lists and count the number of positive and negative matches per fund-month and by source type. Sentiment is calculated as the ratio of positive words and the sum of negative and positive words, per media group and in total, per fund every month. This measure conveniently positions each fund-month sentiment on a scale of 0 to 1, where 0 and 1 represent the lowest and highest (positive) tones, respectively.

There are however two potential concerns with our approach. First, the Harvard IV-4 Psychosocial Dictionary includes words appearing in their root form, while the news-item titles include words in non-restricted forms. We therefore use a linguistic technique called stemming to reduce each word in a news-item title to its root form (see Porter (1980)). For example, applying the stemming procedure to each of the words "connect", "connected", "connecting", "connection", and "connections" results in the same stem—"connect." A second concern is that for some fund-month occurrences, we are not able to match a single positive or negative word and are not able to determine the sentiment. We classify the sentiment of these occurrences as undefined.

Table 3 reports summary statistics of fund-month sentiment. The numbers reported in the table are the time-series means of statistics calculated monthly across funds. Each month we estimate

the mean fund sentiment, its standard deviation, minimum, maximum, and its quartile cutoff values. Additionally, the table reports the percentage of media-covered funds for which sentiment is undefined. For example, "Any" includes all 67,125 news items independent of the source on which they appear. On average, 29% of fund-month sentiments are undefined. The mean sentiment (among the 71% well-defined fund-month sentiment) is 0.60, suggesting that, on average, there are more positive fund-month sentiments than negative fund-month sentiments. Under "Inclusive" the table reports the sentiment statistics by source type. Corporate exhibits higher sentiment than Specialized and General displays the lowest sentiment. There is a slightly higher percentage of undefined occurrences among Corporate-covered funds. Under "Exclusive" and "Intersection" the table reports the same statistics by media type but for funds which are covered exclusively by one media type (Exclusive) and funds which are covered by more than one media type at a given month (Intersection). Corporate sentiment is higher than Specialized and General within each category.

Textual analysis has been recently used by financial researchers to gauge the sentiment of news, as well as financial and legal data (see Tetlock (2007) and Tetlock, Saar-Tsechnansky, and Macskassy (2008)). Loughran and McDonald (2009) discuss the limitations of using a general list of words, such as the Harvard Dictionary, in textual analysis of financial data. They develop alternative lists of words to study the textual content of financial statements (10-K) and conclude that their lists are more appropriate in that case. To study the robustness of our textual analysis, we also apply the word lists suggested by Loughran and McDonald (Fin-Neg and Fin-Pos).² Specifically, we replace the Harvard IV dictionaries with the Loughran and McDonald lists, and repeat the textual analysis described above (except that we follow Loughran and McDonald in skipping the stemming procedure because their word lists already include grammatical inflections). Generally, the sentiment results obtained with the new lists are similar to the results reported above. Both show highest (positive) sentiment for Corporate communication and lowest (positive) sentiment for General media. Moreover, the differences between sentiment of different source types are practically equal. Nevertheless, the percentage of undefined news items is significantly higher Loughran and McDonald (57%) and the average (positive) sentiment is much lower (0.25). We attribute the higher level of undefined items to the fact that Loughran and McDonald lists are developed specifically to analyze financial statements (10-K), and as such miss some general terms which appear in the media. The lower average sentiment could be attributed to the focus on the negative list (Fin-Neg)

²We thank Tim Loughran for providing these lists on his web site: http://www.nd.edu/~mcdonald/Word_Lists.html.

documented in Loughran and McDonald (2009).

3 Reporting Style Bias

The first bias we document is a reporting style bias. This type of bias suggests that different media groups may report the same events, but with a different style, tone, etc., which we measure by news item sentiment. For example, for some non-financial events such as war activities, Gentzkow and Shapiro (2006) document that the choice of words by different sources may convey radically different impressions of the actual event. To the extent that Corporate coverage is likely to include self-reported information by portfolio managers, we expect Corporate sentiment to be higher than the other media groups. Ex-ante, it is not clear whether Specialized sentiment would differ than that of General, although Specialized may have incentive to apply a more favorable spin, to support the hedge-fund industry.

To test for the reporting style bias, we make the assumption that if several sources cover the same fund in the same month, then all news items are likely focused on the same information event. The reporting style bias is shown by comparing the average news-item sentiment of two different media groups that simultaneously cover the same funds in a particular month. The sentiment difference is calculated each month; the time-series mean sentiment difference and respective t -statistic are then calculated.

Table 4, Panel A, reports the test results for the three possible pairwise comparison of media groups. Due to sample size, we are not able to conduct meaningful tests using funds simultaneously covered by all three media groups. The results indicate that all the differences between the media groups are significant: the sentiment of Corporate coverage is higher than that of Specialized coverage by 9%, and the sentiment of Specialized coverage is higher than that of General coverage by 3%. For completeness, we also report the sentiment differences for the cases of inclusive and exclusive media coverage. In comparison to the differences using media coverage intersections, inclusive coverage differences are typically higher, and exclusive differences are further higher. This suggests another type of bias which we discuss below.

Additional evidence is provided in Figure 3. This figure plots the time series of the twelve-month average sentiment for each media group for the cases of inclusive and exclusive coverages (Panels A and B, respectively). The patterns displayed in this figure match the results of the tests above,

that is, on average, the news sentiment is most positive by Corporate coverage and least positive by General coverage.

4 Editorial Selection Bias

We identify a second media bias, editorial selection. This bias suggests that different media groups apply discretion as to which news events to report. The literature includes several examples of media biases similar in spirit to this type of bias. Groseclose and Milyo (2005) document a significant left-wing political-view bias in the media by showing the tendency of certain media outlets to cite politically biased think tanks. Another example is Reuter and Zitzewitz (2006), who report that financial media are biased toward recommending funds from fund families that have advertised within their pages. In our case, we postulate that Corporate coverage tends to be biased towards reporting more favorable news than the other media groups because of managerial self-interest of disclosing positive information. Given that Reuter and Zitzewitz (2006) find the relation between recommendations and advertising applies to specialized magazines rather than to general newspapers, we also expect Specialized coverage to be more positively biased than General.

We apply a difference-of-difference approach to test for the editorial selection bias. Specifically, we compare the sentiment difference between two media groups when they exclusively cover funds versus when they cover funds simultaneously. The rationale is that exclusive coverage may reflect an editorial choice. For example, a fund might disclose some favorable news about its investment opportunity set through a press release, but the editor of a General newspaper might choose to ignore it. This would correspond to a fund with exclusive Corporate coverage. Conversely, a reporter for a General newspaper may conduct independent research about a fund, which can result with an exclusive General coverage. Comparing the news sentiment of exclusive coverage of different media groups is insufficient for drawing conclusions because of the first bias discussed above, the reporting style bias. To correct for the latter, we further subtract from this difference the sentiment difference when two media groups simultaneously cover the same funds.

The results are reported in Table 4, Panel B. The most significant selection bias (exclusive minus intersection) is exhibited for Corporate minus General, 7% with a t -statistic of 2.02. Specialized minus General is marginally significant, 5% with a t -statistic of 1.82. Another look at Table 3 reveals that the first difference is entirely due to Corporate coverage. Corporate sentiment is 0.65

when it is intersected with General and it increases to 0.73 when Corporate coverage is exclusive, whereas General sentiment remains 0.53 independent of whether General coverage is exclusive or intersected with Corporate. A similar results is shown when comparing Specialized and General: The selection bias seems to stem from Specialized having more positive sentiment when the coverage is exclusive than when it is intersected with General.

The results in Table 4, Panel B, therefore suggest that not only do media sources differ in the way they choose to report information, but they apply discretion in choosing on which news to report. This bias is mainly exhibited in Corporate and Specialized coverages.

5 Content Bias

In this section we examine the third bias, a content bias.

5.1 Theoretical Motivation and Testing Framework

A content bias implies the possibility that the media do not report news to their full extent. There are several reasons to expect such a bias. For example, to the extent that Corporate coverage reflects the incentives of fund managers, it is quite reasonable to expect them to express moderate, conservative views about their performance (for example, concerns about litigation risk). Therefore, even though managers would choose to disclose favorable information, they might not want to fully reveal it. There is also literature in accounting that documents the conservatism principle in that companies tend to understate positive earnings, which results with earnings reflecting bad news more quickly than good news (e.g., Basu (1997)). For General coverage, we also expect a similar content bias. For example, reporters who rely on access to inside information from fund managers, may wish to ensure continuing receiving such information in the future. Therefore, even though journalists writing for General media choose to report less favorable news, they do not report them to the full extent. This is similar to the evidence in Dyck and Zingales (2003) that point to a quid pro quo relation between journalists and their sources, where they receive private information in exchange for a positive spin on companies' news. Another example similar in spirit is the recommendations of sell-side research analysts. Analyst recommendations exhibit a positive bias insofar as the recommendations consistently overstate company earnings (see, e.g., Das, Levine, and Sivaramakrishnan (1998)), which is often explained by analysts desire to please corporate managers

in the hope of getting better access to information. In sum, a content bias suggests that given the choice to cover a particular news event, Corporate media sources will tend to express pessimistic views, while General will express optimistic views.

How can we measure a content bias? We observe fund returns during the months proceeding the fund media coverage. Since fund performance may be attributed to risk exposures, we use the Fung and Hsieh (2001) risk factors for hedge funds to calculate abnormal performance (alpha).³ If a fund exhibits positive abnormal returns post-coverage we conclude that the coverage understated the true value of the information and we interpret this as pessimistic views. Similarly, we interpret the coverage after which abnormal returns are negative as optimistic. To compare between the content bias of different media groups, we only use fund returns following exclusive coverage by a media group.

However, there are two potential concerns when using realized performance to infer media content. First, abnormal returns may be a consequence of the second bias, editorial selection. For example, we might observe positive abnormal returns following an exclusive Corporate coverage simply because, as shown above, such a coverage typically reports favorable information (good news). Therefore, in addition to risk, fund performance should be adjusted for the editorial selection bias. To control for this bias, we compute sentiment-adjusted returns. First, each month covered funds are separated into three groups of sentiment, the first group includes funds with undefined sentiment (e.g., their news-item titles do not include either positive or negative words), while the other two groups are defined according to whether their average positive sentiment is above or below the median positive sentiment across all funds and news items with defined sentiment that month. Then, sentiment adjustment is achieved by subtracting from each fund's monthly return the average monthly return of its sentiment group. If the return patterns are a results of the reporting-style and editorial-selection biases, then the sentiment adjustment will account for these biases, i.e. the return patterns will diminish.

The second concern of using realized performance is that it may be affected by investor behavior. The literature about media coverage often attempts to separately measure media content and consumer behavior. For example, DellaVigna and Kaplan (2007) measure the impact of the availability of Fox News on voting outcome of presidential elections. Engelberg and Parsons (2010)

³We thank David Hsieh for providing the risk factors on his web site: <http://faculty.fuqua.duke.edu/~dah7/DataLibrary/TF-FAC.xls>.

show that media affect investor behavior by comparing the behaviors of investors with access to different media coverage of the same information event. They find that local media coverage predicts local trading. Disentangling the causal impact of media reporting from the impact of the events being reported is particularly challenging when the events pertain to priced assets. For example, in the case of stocks, looking at prices to infer content is problematic for a couple of reasons: (a) investors might over- or under-react to the information. For example, the behavioral finance literature documents numerous cases of over/under reaction to corporate news, such as earnings announcements and mergers; (b) the investor-recognition hypothesis (Merton (1987)) suggests that merely information provision on a stock, regardless of bad/good news, should translate into a price premium (see also Veldkamp (2006) and Fang and Peress (2009)).

The utilization of hedge funds, rather than their underlying tradable security positions, in this study alleviates the second concern about using fund returns to draw inference. Since funds are not directly traded by investors, one would not expect either above-mentioned effects, investor under/over-reaction and investor-recognition premium, to be present among funds. Therefore, we can use post-coverage fund performance to draw inferences about the content of media coverage. One caveat, however, remains. It is the possibility that investor reaction would translate into fund flow, which may ultimately affect asset value via price pressure. Yet, we do not find any evidence that this is the case, because media coverage does not seem to attract flow and the effect of media on return is robust to controlling for flow (see discussion below).

5.2 Results

To measure the content bias, each month we form portfolios based on exclusive coverage by each of the media groups, and we compute portfolio returns one month post-formation. Funds are held in the portfolio for one month; portfolios are equally weighted. The time-series averages and t -statistics of portfolio excess returns and sentiment-adjusted returns are reported in Table 5, Panels A and B, respectively. The table also reports risk-adjusted returns in Panels C and D, which are computed as the intercepts of regressions of portfolio excess returns on the seven factors of Fung and Hsieh (2001).

All panels show the Corporate-coverage portfolio exhibits positive returns, the General-coverage portfolio exhibits negative returns, and the performance of the Specialized-coverage portfolio lies in between the other two groups. The content bias can be inferred from the results of Panel D, the

sentiment- and risk-adjusted returns. The Corporate-coverage portfolio earns an adjusted return of 0.49% per month (t -statistic of 2.94), the General-coverage portfolio earns an adjusted return of -0.41% per month (t -statistic of -2.77), and the Specialized-coverage portfolio earns insignificant returns. These results demonstrate the content bias: The future outperformance of Corporate-coverage funds implies pessimistic views, whereas the future underperformance of General-coverage funds implies optimistic views. Specialized coverage does not seem to contain a content bias.

Table 5 also reports the return difference between the coverage portfolios. All of the differences in performance between the three media groups are statistically significant. Most noticeable is the return difference Corporate-minus-General, which earns 0.90% per month (t -statistic of 4.28; about 11% annually). From an investment perspective, these returns seem valuable as they demonstrate that media coverage can predict differences in the performance of funds.

6 Additional Tests

6.1 Media Coverage and Fund Flow

We identify the content bias of media sources by observing post-coverage returns. As mentioned above, one caveat to this logic is that the media may induce investor fund flow (see, e.g., Sirri and Tufano (1998)), and the process of engaging this capital into assets (buy orders in case of inflows) or retracting capital (sell orders in case of outflows) may in turn generate price pressure on fund assets, causing an impact on fund return (see Ozik and Sadka (2010)). If this is the case, then part of the returns observed post portfolio formation may reflect investor response to media coverage, thereby clouding the ability to infer media content from observed returns.

To test whether media coverage affects fund flow, we run regressions of individual fund quarterly flow on dummy variables that account for exclusive coverage in each of the three media groups and several control variables. As control variables we use fund characteristics that are commonly used in the literature. These are: quarterly cumulative lagged returns, quarterly lagged fund flow, a lockup dummy that equals 1 if a fund's lockup period is greater than zero and zero otherwise (see Aragon (2007)), fund assets under management (AUM) as of the end of the previous quarter (in logs), and management and performance fees. Due to sample size, the regressions are run pooled across firms and quarters, while standard errors are clustered by fund and by quarter (see Pedersen

(2009)).

The results are reported in Table 6. None of the media groups exhibits significant coefficients, which confirms that media coverage does not significantly impact future fund flow. This results is consistent with the empirical results in Sirri and Tufano (1998). In the context of Reuter and Zitzewitz (2006), they find that funds recommended by specialized magazines attract investor flow, despite that these recommended funds do not exhibit superior performance in the future. In contrast, we find that media coverage contains information about future fund performance, yet investors do not seem to exploit this information. In other words, investors seem responsive to false information and insensitive to valuable information. This analysis therefore provides further evidence for "dumb money" (e.g., Frazzini and Lamont (2008)).

6.2 Controlling for Fund Characteristics

While testing for the content bias, we use sentiment- and risk-adjusted portfolio returns. A natural question is whether there are some other, fund-specific characteristics that might impact the results. To study this we use a regression analysis approach. We run regressions of individual fund sentiment-adjusted quarterly returns on dummy variables that account for exclusive coverage in each of the three media groups, and several control variables, similar to the analysis of fund flow in the previous subsection.

The results are reported in Table 7. When we include media-group dummies individually, they are all significant: General and Specialized are negative, while Corporate is positive. When put together, General and Specialized remain significant, while the significance of Corporate slightly drops (t -statistic of 1.88). Lagged return and flow display positive, albeit insignificant, coefficients. The positive coefficient on lagged return is consistent with prior literature that documents persistence in hedge-fund returns ("smoothed returns"), which is typically attributed to the lack of liquidity of some of the assets held by hedge funds (see, e.g., Getmansky, Lo, and Makarov (2004)). The positive coefficient on lagged flow is consistent with the "smart-money effect," that is, investors allocate capital into funds that subsequently outperform (see, e.g., Gruber (1996) and Zheng (1999)). Fund size displays a significantly negative coefficient, suggesting that large funds tend to underperform small funds. Lockup is positive but not significant. The coefficients of management and performance fees are positive and significant, consistent with high fees for outperforming fund managers. Overall, the results of Table 7 show our results hold even after controlling for various fund

characteristics.

Another way of studying the effects of control variables is using double-sorted portfolios, i.e. sorting funds into a few groups according to a particular control variable, and then sorting the funds in each group into the media group. The advantage of this method is that it allows nonlinearity in the control variable and a simple calculation of alphas. The weakness is that one could only study one control variable at a time (given our sample size). We offer this analysis as an additional robustness test.

Table 8 reports the performance of double-sorted portfolios. The first sorting variable is either previous-month fund size, lockup dummy, past twelve-month cumulative return, and past twelve-month total flow. We use two groups for size (small and large) and lockup (value of zero or one), and three groups for past return and past flow. The second sorting variable is the media group, i.e. exclusive coverage by either General, Specialized, or Corporate. We report both sentiment-adjusted returns and sentiment-adjusted alphas of all portfolios as well as the difference portfolio Corporate-minus-General. A few results are noticeable. First, for all portfolio sorts, portfolio returns monotonically increase from General to Specialized to Corporate. Second, the portfolio return spread Corporate-minus-General is significantly positive for nine out of the ten cases. It does not vary much between small and large funds, as well as funds with and without a lockup, but it is more significant among poor performing funds, and among funds at the top and bottom of historical fund flow.

6.3 Long-Run Performance

The results so far used returns of portfolios rebalanced monthly. Figure 4 plots the long-run cumulative portfolio returns, in event time, while holding funds in the portfolios for up to 18 months. The figure plots both sentiment-adjusted returns and sentiment-adjusted alphas. The plots show that the spread between funds covered exclusively by Corporate and those exclusively covered by General increases over the 18 months post portfolio formation, while funds with exclusive Specialized coverage lie in between the two. The Corporate and Specialized portfolios exhibit positive cumulative returns post formation, while the General portfolio exhibits negative performance during the first five and 13 months post formation, for return and alpha, respectively.

6.4 Content Bias and Competition

Hong and Kacperczyk (2010) study the effect of competition among analysts on the optimism bias of their earning forecasts. They find evidence consistent with competition reducing the bias. In the context of the third bias documented in this paper, the content bias, we can expect similar results. That is, the optimistic (conservative) bias of General (Corporate) coverage would decrease in the presence of stronger competition in the market for news.

To test this prediction, we make an additional assumption that competition in the market for news is weak when a fund is covered exclusively by one media group in a given month (but potentially by multiple sources in the same group), and that competition is stronger when a fund is covered by more than one media group at a given month. We compare the size of the content bias calculated on funds that are covered exclusively by one media group with funds which are covered by the same group and at least one other group. The results, reported in Table 9, indicate that both the optimistic bias of General coverage and the conservative bias of Corporate coverage diminish when funds are subject to non-exclusive, shared coverage. The sentiment-adjusted returns and alphas of funds with shared coverage are insignificant. The results are therefore consistent with predictions and evidence in the literature.

6.5 Other

Before concluding, we would like to present a few more robustness tests.

6.5.1 Incubation Bias

Some studies raise concerns about a potential back-fill, or incubation bias in the hedge-fund database. Such a bias can occur if a hedge fund begins to report its performance to the data provider, and simultaneously provides its recent historical performance. It is not clear why such a potential bias should affect the results presented in this paper. Nevertheless, to alleviate any concerns, we follow the suggestion in Jagannathan, Malakhov, and Novikov (2010), that is to discard the first 25 observations of a hedge fund reported in the Lipper/TASS database.

The back-fill bias is relevant only to the analysis of the media content bias for which returns are used. We find that the return spread of Corporate- and General-covered funds remains significant, 0.53% per month (t -statistic of 2.70). The corresponding alpha is 0.55% per month (t -statistic of

2.74). Sentiment-adjusted returns and alphas are 0.75% and 0.82%, respectively (t -statistics of 3.26 and 3.62). For brevity, we do not report the complete analysis, however it is available from the authors upon request. To conclude, our results are unaffected by a potential incubation bias.

6.5.2 Fraud Events

One question often raised is about the type of news reported in each media group. For example, some speculate that general newspapers are more likely to cover hedge funds when they are associated with scandals, such as fraud cases. Yet, with a total of 67,125 news items used for this study, it is quite difficult to read through all of them to provide a satisfying answer. For this reason, our approach in the paper is to use a textual analysis of news-item titles to measure sentiment.

For robustness, we investigate the number of fraud-related news items. We detect news-item titles with words sharing the stem with the following list: "fraud", "fake", "crime", "hoax", "deception", "delude", "cheat", and "scandal." For the entire sample period, there are only 337 such news items: 140 General, 117 Specialized, and 80 Corporate. As a fraction of the total number of news items these constitute 0.50%, and in each media group, these constitute 0.89%, 0.48%, and 0.30%, respectively. These results are consistent with the editorial selection bias insofar as, relatively speaking, General sources include the most fraud-related articles, while Corporate media include the least fraud-related articles. However, given the low coverage frequency of fraud overall, fraud cannot be a significant contributor to our results. In fact, discarding fraud-related news items, we arrive at virtually the same results for the all analyses conducted throughout the paper.

7 Conclusion

This paper provides means of measuring the media biases pertaining to funds. We achieve this by collecting data of media coverage from various sources, which can be divided into three types: General newspapers, Specialized magazines, and Corporate communications, and by applying a textual analysis of news items to gauge coverage sentiment. Three types of biases are documented: reporting style, editorial selection, and content. The latter is consistent with fund managers presenting conservative, pessimistic forecasts, while reporters present relatively more optimistic views. However, we find that investor fund flow does not react to this information, which suggests that investors do not seem to exploit valuable information embedded in media coverage.

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Table 1
Media Groups

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. This table counts all news items considered for this study by news source and media group. The sample includes a total of 67,125 news items for 774 Long/Short-equity hedge funds during 1999–2008.

General			Specialized			Corporate		
Rank	Source	News Items	Rank	Source	News Items	Rank	Source	News Items
1	New York Times	5,042	1	Pensions & Investments	1,716	1	PR Newswire	12,065
2	Washington Post	2,480	2	BusinessWeek	1,243	2	Business Wire	4,865
3	Los Angeles Times	2,021	3	CNNMoney	1,190	3	Bloomberg	3,010
4	Denver Post	1,237	4	Tribune Business News	1,095	4	M2 Presswire	1,622
5	USA TODAY	902	5	Forbes	824	5	Associated Press	1,483
6	San Diego Union - Tribune	844	6	Business Intelligence	683	6	AAP General News	564
7	Minneapolis Star-Tribune	604	7	Bizjournals.com	594	7	Reuters	244
8	Boston Globe	548	8	Financial News	553	8	Inter Press Service English News Wire	151
9	San Antonio Express-News	298	9	MarketWatch	534	9	Citywire	121
10	Sacramento Bee	287	10	Hedgeworld	490	10	zwire.com	55
11 - 21	Multiple sources	1,392	11 - 3,305	Multiple sources	15,574	11 - 288	Multiple sources	2,794
Total		15,655	Total		24,496	Total		26,974

Table 2
Diagnostics of Media Coverage

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. A fund is considered covered if there is at least one news item on the fund in a given month. "Inclusive" measures the probability that a fund is covered by a media group, independent of its coverage by other media groups. "Exclusive" measures the probability that a fund is covered only by one media group in a given month. "Intersection" measures the probability that a fund is covered inclusively by multiple media groups in a given month. The sign ' \cap ' represents exclusive intersection, that is a fund is covered by only two groups and not by the third group. Probabilities of fund coverage are calculated as time-series averages of monthly cross-sectional fractions. Panel A reports the unconditional coverage probabilities and Panel B reports the transition probability matrix from a coverage state in one month to the coverage state the next month. The sample includes equity hedge funds during 1999–2008.

Panel A: Unconditional Probabilities

	Inclusive coverage	Exclusive coverage	Intersections (exclusive)
Not Covered	76.10%		
General	10.19%	1.96%	
Specilaized	19.81%	7.17%	
Corporate	9.36%	1.91%	
General \cap Specialized			3.51%
General \cap Corporate			0.22%
Specialized \cap Corporate			4.64%
General \cap Specialized \cap Corporate			4.50%

Panel B: Transition Probabilities

Time t coverage	Time $t+1$ coverage			
	Not Covered	Exclusive coverage		
		General	Specialized	Corporate
Not Covered	89.67%	0.60%	4.81%	1.76%
General	58.84%	4.84%	12.11%	4.36%
Specilaized	50.90%	1.86%	19.79%	4.15%
Corporate	52.53%	1.33%	11.07%	12.55%
General \cap Specialized	21.55%	2.30%	14.65%	2.63%
General \cap Corporate	25.00%	1.09%	19.57%	4.35%
Specialized \cap Corporate	18.81%	0.85%	11.60%	5.94%
General \cap Specialized \cap Corporate	8.02%	0.78%	7.35%	2.08%
	Intersections (Exclusive)			
	General \cap Specialized	General \cap Corporate	Specialized \cap Corporate	General \cap Specialized \cap Corporate
Not Covered	0.93%	0.09%	1.55%	0.59%
General	8.96%	0.24%	6.78%	3.87%
Specilaized	6.55%	0.56%	10.62%	5.56%
Corporate	2.81%	0.62%	14.03%	5.07%
General \cap Specialized	24.77%	0.53%	10.45%	23.13%
General \cap Corporate	9.78%	1.09%	19.57%	19.57%
Specialized \cap Corporate	4.58%	0.41%	38.44%	19.35%
General \cap Specialized \cap Corporate	10.91%	0.25%	22.04%	48.57%

Table 3
News Sentiment by Media Group

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. We separately sum the number of positive and negative words of news-item titles per media group for each fund every month. Sentiment is calculated as the ratio of positive words and the sum of negative and positive words, per media group and in total per fund every month. Each month, sentiment mean, standard deviation, minimum, maximum, and quartile cutoffs are calculated. Additionally, we report the percentage of media-covered funds for which sentiment is undefined. The table reports the time-series averages of the above-mentioned statistics. "Any" summarizes the sentiment of news-titles across all media groups. "Inclusive" reports the sentiment statistics for all news-item titles per media group, while "Exclusive" considers funds covered exclusively by the respective media group. Under "Intersection" the table reports the sentiment statistics per media group of news titles for funds which are covered inclusively by the respective intersection at a given month. The sample period is 1999–2008.

	Mean	Std	Min	25th	Median	75th	Max	Undefined
Any coverage								
	0.60	0.33	0.00	0.39	0.61	0.94	1.00	0.29
Inclusive coverage								
General	0.53	0.37	0.00	0.21	0.56	0.88	1.00	0.30
Specialized	0.59	0.35	0.00	0.32	0.60	0.96	1.00	0.33
Corporate	0.68	0.36	0.01	0.42	0.81	0.99	1.00	0.37
Exclusive coverage								
General	0.53	0.34	0.18	0.27	0.56	0.77	0.86	0.39
Specialized	0.60	0.40	0.02	0.28	0.69	0.97	1.00	0.49
Corporate	0.73	0.27	0.37	0.55	0.78	0.93	0.94	0.54
Intersections (inclusive)								
General	0.54	0.36	0.00	0.23	0.56	0.87	1.00	0.28
Specialized	0.56	0.31	0.00	0.36	0.56	0.80	1.00	0.17
General	0.53	0.36	0.01	0.24	0.55	0.84	1.00	0.26
Corporate	0.65	0.35	0.03	0.41	0.74	0.95	0.99	0.31
Specialized	0.58	0.32	0.00	0.37	0.59	0.87	1.00	0.22
Corporate	0.67	0.36	0.02	0.42	0.78	0.99	1.00	0.33

Table 4
Sentiment Differences of Media Groups

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. We separately sum the number of positive and negative words of news-item titles per media group for each fund every month. Sentiment is calculated as the ratio of positive words and the sum of negative and positive words, per media group per fund every month. Panel A reports the time-series means and *t*-statistics (in square brackets) of monthly differences in the average sentiment of funds in different media-coverage groups. Panel B reports the time-series means and *t*-statistics (in square brackets) of monthly differences of differences. "Inclusive" includes the sentiment of all news-item titles in the respective media group. "Exclusive" includes the sentiment of news-item titles on funds covered exclusively by the respective media group. "Intersections" includes the sentiment of news-item titles for funds covered by the two respective media groups. The sample period is 1999–2008.

Panel A: Sentiment Differences						
	Corporate minus General		Corporate minus Specialized		Specialized minus General	
Inclusive	0.15	[15.57]	0.09	[10.79]	0.05	[6.56]
Exclusive	0.20	[5.93]	0.12	[5.00]	0.07	[3.04]
Intersection	0.12	[9.44]	0.09	[8.55]	0.03	[3.52]
Panel B: Sentiment Differences of Differences						
	Corporate minus General		Corporate minus Specialized		Specialized minus General	
Exclusive minus Inclusive	0.05	[1.63]	0.03	[1.21]	0.02	[1.00]
Inclusive minus Intersection	0.02	[2.48]	0.01	[0.97]	0.02	[4.84]
Exclusive minus Intersection	0.07	[2.02]	0.04	[1.29]	0.05	[1.82]

Table 5
Portfolio Sorts by Media Coverage

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. We separately sum the number of positive and negative words of news-item titles per media group for each fund every month. Sentiment is calculated as the ratio of positive words and the sum of negative and positive words, per media group per fund every month. Each month funds are separated into three sentiment groups, the first group includes funds with undefined sentiment (e.g., their news-item titles do not include either positive or negative words), while the other two groups are defined according to whether their average positive sentiment is above or below the median (positive) sentiment across all funds and news items with defined sentiment that month. Independently, funds are sorted into three groups each month based on fund exclusive coverage by one of three media groups. The table reports average monthly portfolio excess returns, sentiment-adjusted returns, risk-adjusted returns (alphas), and sentiment-adjusted alphas. *T*-statistics are reported in square brackets. Sentiment adjustment is achieved by subtracting from each fund's monthly return the average monthly return of its sentiment group. Alphas are calculated as the intercepts of regressions of portfolio excess returns or sentiment-adjusted returns on the seven factors of Fung and Hsieh (2001). The sample period is 1999-2008.

	Portfolios			Portfolio Spreads		
	General	Specialized	Corporate	Corporate minus General	Specialized minus General	Corporate minus Specialized
Excess Returns	-0.02% [-0.06]	0.32% [1.14]	0.59% [1.72]	0.61% [3.20]	0.34% [2.12]	0.26% [2.12]
Sentiment-Adjusted Returns	-0.30% [-1.47]	0.06% [0.47]	0.51% [1.84]	0.81% [3.67]	0.36% [2.23]	0.45% [2.47]
Risk-Adjusted Returns (alphas)	-0.14% [-0.83]	0.31% [2.48]	0.53% [2.97]	0.67% [3.47]	0.45% [2.82]	0.22% [1.94]
Sentiment-Adjusted Alphas	-0.41% [-2.77]	0.07% [0.81]	0.49% [2.94]	0.90% [4.28]	0.47% [2.99]	0.42% [3.15]

Table 6
Regressions of Fund Flow on Media Coverage and Controls

This table reports quarterly regression results of investor fund flow on exclusive media coverage and controls. *General*, *Specialized*, and *Corporate* are dummy variables equal to one, if a fund is exclusively covered by either media group, respectively, and zero otherwise. *R[Q-1]* and *F[Q-1]* are fund lagged quarterly return and flow, respectively. *AUM* is the log of a fund's assets under management at the end of the previous month, *Lockup* is a dummy variable which equals one if a fund applies a redemption lockup and zero otherwise. *Mng. Fees* represents a fund's annual management fees as a fraction of its assets under management. *Perf. Fees* represent a fund's performance fees calculated as a fraction of fund performance. *T*-statistics are reported in square brackets. Standard errors are clustered by quarter and by fund. The sample includes Long/Short-Equity hedge funds over the period 1999-2008.

	Model 1		Model 2		Model 3		Model 4	
Intercept	128.91%	[10.51]	128.90%	[10.52]	128.87%	[10.52]	128.85%	[10.51]
General	0.33%	[0.09]					0.28%	[0.08]
Specialized			-1.20%	[-1.03]			-1.16%	[-0.98]
Corporate					1.54%	[0.53]	1.46%	[0.49]
R[Q-1]	32.64%	[5.48]	32.66%	[5.48]	32.66%	[5.49]	32.66%	[5.48]
F[Q-1]	14.66%	[7.75]	14.66%	[7.75]	14.66%	[7.75]	14.66%	[7.75]
AUM	-7.74%	[-10.49]	-7.73%	[-10.49]	-7.74%	[-10.50]	-7.73%	[-10.49]
Lockup	-0.15%	[-0.13]	-0.12%	[-0.10]	-0.17%	[-0.14]	-0.14%	[-0.12]
Mng. Fees	8.81E-07	[9.80]	8.86E-07	[9.78]	8.80E-07	[9.89]	8.85E-07	[9.93]
Perf. Fees	0.43%	[3.15]	0.43%	[3.17]	0.43%	[3.15]	0.43%	[3.16]

Table 7
Regressions of Sentiment-Adjusted Returns on Media Coverage and Controls

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. We separately sum the number of positive and negative words of news-item titles per media group for each fund every month. Sentiment is calculated as the ratio of positive words and the sum of negative and positive words, per media group per fund every month. Each month funds are separated into three sentiment groups, the first group includes funds with undefined sentiment (e.g., their news-item titles do not include either positive or negative words), while the other two groups are defined according to whether their average positive sentiment is above or below the median (positive) sentiment across all funds and news items with defined sentiment that month. Sentiment-adjusted return is calculated by subtracting from each fund's monthly return the average monthly return of its sentiment group. This table reports quarterly regression results of sentiment-adjusted fund returns on exclusive media coverage and controls. General, Specialized, and Corporate are dummy variables equal to one, if a fund is exclusively covered by either media group, respectively, and zero otherwise. $R[Q-1]$ and $F[Q-1]$ are fund lagged quarterly return and flow, respectively. AUM is the log of a fund's assets under management at the end of the previous month, $Lockup$ is a dummy variable which equals one if a fund applies a redemption lockup and zero otherwise. $Mng. Fees$ represents a fund's annual management fees as a fraction of its assets under management. $Perf. Fees$ represent a fund's performance fees calculated as a fraction of fund performance. T -statistics are reported in square brackets. Standard errors are clustered by quarter and by fund. The sample includes Long/Short-Equity hedge funds over the period 1999-2008.

	Model 1		Model 2		Model 3		Model 4	
Intercept	0.90%	[1.85]	0.92%	[1.87]	0.88%	[1.81]	0.91%	[1.86]
General	-1.35%	[-2.87]					-1.39%	[-2.90]
Specialized			-0.66%	[-2.37]			-0.66%	[-2.37]
Corporate					0.46%	[2.10]	0.40%	[1.88]
$R[Q-1]$	2.40%	[0.91]	2.40%	[0.91]	2.39%	[0.91]	2.40%	[0.91]
$F[Q-1]$	0.11%	[1.03]	0.11%	[1.03]	0.11%	[1.04]	0.12%	[1.06]
AUM	-0.05%	[-2.69]	-0.05%	[-2.65]	-0.05%	[-2.68]	-0.05%	[-2.64]
$Lockup$	0.04%	[0.27]	0.06%	[0.35]	0.04%	[0.25]	0.06%	[0.34]
$Mng. Fees$	0.00%	[1.82]	0.00%	[2.63]	0.00%	[1.71]	8.34E-09	[2.64]
$Perf. Fees$	0.03%	[3.66]	0.03%	[3.58]	0.03%	[3.59]	0.03%	[3.61]

Table 8

Double-Sorted Portfolios: Fund Characteristics and Media Coverage

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. We separately sum the number of positive and negative words of news-item titles per media group for each fund every month. Sentiment is calculated as the ratio of positive words and the sum of negative and positive words, per media group per fund every month. Each month funds are separated into three sentiment groups, the first group includes funds with undefined sentiment (e.g., their news-item titles do not include either positive or negative words), while the other two groups are defined according to whether their average positive sentiment is above or below the median (positive) sentiment across all funds and news items with defined sentiment that month. Sentiment-adjusted return is calculated by subtracting from each fund's monthly return the average monthly return of its sentiment group. Each month, funds are double sorted into portfolios by fund characteristic and exclusive coverage by one of the three media groups. The fund characteristics are: fund size as measured by the assets under management as of the end of the previous month, the application of a redemption lockup period, lagged twelve-month cumulative return, and lagged twelve-month net flow. Panel A reports average sentiment-adjusted portfolio returns, and Panel B reports sentiment-adjusted alphas, calculated as the intercepts of regressions of the former on the seven factors of Fung and Hsieh (2001). *T*-statistics are reported in square brackets. The sample includes Long/Short-Equity hedge funds over the period 1999-2008.

Panel A: Sentiment-Adjusted Returns					Panel B: Sentiment-Adjusted Alphas				
	General	Specialized	Corporate	Corporate minus Specialized		General	Specialized	Corporate	Corporate minus Specialized
<u>Fund size</u>					<u>Fund size</u>				
Small	-0.22%	0.08%	0.45%	0.67%	Small	-0.32%	0.15%	0.62%	0.94%
	[-0.80]	[0.62]	[1.73]	[1.90]		[-1.26]	[1.49]	[3.28]	[2.62]
Large	-0.21%	0.07%	0.52%	0.73%	Large	-0.29%	-0.02%	0.38%	0.68%
	[-0.81]	[0.39]	[1.55]	[2.75]		[-1.47]	[-0.14]	[1.66]	[2.59]
<u>Lockup</u>					<u>Lockup</u>				
No	-0.14%	-0.04%	0.35%	0.49%	No	-0.34%	-0.09%	0.32%	0.67%
	[-0.45]	[-0.26]	[1.10]	[1.53]		[-1.49]	[-0.80]	[1.54]	[2.11]
Yes	-0.09%	0.22%	0.73%	0.82%	Yes	-0.03%	0.28%	0.70%	0.73%
	[-0.41]	[1.69]	[2.50]	[2.82]		[-0.16]	[2.53]	[3.26]	[2.84]
<u>Lagged twelve-month return</u>					<u>Lagged twelve-month return</u>				
Top 20%	0.48%	0.69%	1.25%	0.77%	Top 20%	0.12%	0.37%	0.77%	0.65%
	[1.16]	[2.04]	[2.26]	[1.81]		[0.34]	[1.20]	[1.80]	[1.52]
Middle 60%	-0.28%	0.11%	0.37%	0.65%	Middle 60%	-0.28%	0.15%	0.36%	0.64%
	[-1.46]	[0.89]	[1.72]	[2.91]		[-1.56]	[1.43]	[2.38]	[2.88]
Bottom 20%	-1.07%	-0.53%	-0.14%	0.93%	Bottom 20%	-1.15%	-0.30%	0.43%	1.57%
	[-2.07]	[-1.63]	[-0.27]	[1.73]		[-2.54]	[-1.08]	[1.17]	[2.99]
<u>Lagged twelve-month flow</u>					<u>Lagged twelve-month flow</u>				
Top 20%	-0.55%	0.22%	0.89%	1.45%	Top 20%	-0.53%	0.02%	0.50%	1.03%
	[-1.70]	[1.00]	[2.25]	[3.23]		[-1.84]	[0.08]	[1.48]	[2.35]
Middle 60%	0.05%	0.16%	0.47%	0.42%	Middle 60%	-0.12%	0.20%	0.52%	0.64%
	[0.23]	[1.13]	[1.62]	[1.62]		[-0.67]	[2.26]	[2.90]	[2.59]
Bottom 20%	-0.64%	-0.37%	0.21%	0.85%	Bottom 20%	-0.80%	-0.26%	0.40%	1.20%
	[-1.43]	[-1.89]	[0.62]	[1.66]		[-1.80]	[-1.55]	[1.26]	[2.22]

Table 9
Content Bias and Competition

Google News archive is used to retrieve historical news items on equity hedge funds. News sources are classified into three media groups: General newspapers, Specialized magazines, and Corporate communication. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. We separately sum the number of positive and negative words of news-item titles per media group for each fund every month. Sentiment is calculated as the ratio of positive words and the sum of negative and positive words, per media group per fund every month. Each month funds are separated into three sentiment groups, the first group includes funds with undefined sentiment (e.g., their news-item titles do not include either positive or negative words), while the other two groups are defined according to whether their average positive sentiment is above or below the median (positive) sentiment across all funds and news items with defined sentiment that month. Independently, funds are sorted into six groups each month. Three groups, denoted "Exclusive", are formed based on fund exclusive coverage by one of three media groups. The other three groups are formed based on shared coverage: A fund is shared-covered by a media group if it is covered by that specific group and at least one other media group at a given month. The table reports average monthly portfolio excess returns, sentiment-adjusted returns, risk-adjusted returns (alphas), and sentiment-adjusted alphas. *T*-statistics are reported in square brackets. Sentiment adjustment is achieved by subtracting from each fund's monthly return the average monthly return of its sentiment group. Alphas are calculated as the intercepts of regressions of portfolio excess returns or sentiment-adjusted returns on the seven factors of Fung and Hsieh (2001). The sample period is 1999-2008.

	General			Specialized			Corporate		
	Exclusive	Shared	Exclusive minus Shared	Exclusive	Shared	Exclusive minus Shared	Exclusive	Shared	Exclusive minus Shared
Excess Returns	-0.02%	0.41%	-0.43%	0.32%	0.36%	-0.04%	0.59%	0.37%	0.21%
	[-0.06]	[1.46]	[-2.38]	[1.14]	[1.30]	[-0.42]	[1.72]	[1.32]	[1.66]
Sentiment-Adjusted Returns	-0.30%	0.05%	-0.35%	0.06%	0.03%	0.03%	0.51%	0.04%	0.47%
	[-1.47]	[0.62]	[-1.79]	[0.47]	[0.40]	[0.50]	[1.84]	[0.50]	[2.07]
Risk-Adjusted Returns (alphas)	-0.14%	0.44%	-0.58%	0.31%	0.39%	-0.08%	0.53%	0.38%	0.15%
	[-0.83]	[4.10]	[-3.27]	[2.48]	[3.74]	[-1.14]	[2.97]	[3.32]	[1.23]
Sentiment-Adjusted Alphas	-0.41%	0.10%	-0.51%	0.07%	0.08%	-0.01%	0.49%	0.07%	0.42%
	[-2.77]	[1.41]	[-2.94]	[0.81]	[1.46]	[-0.14]	[2.94]	[1.12]	[2.78]

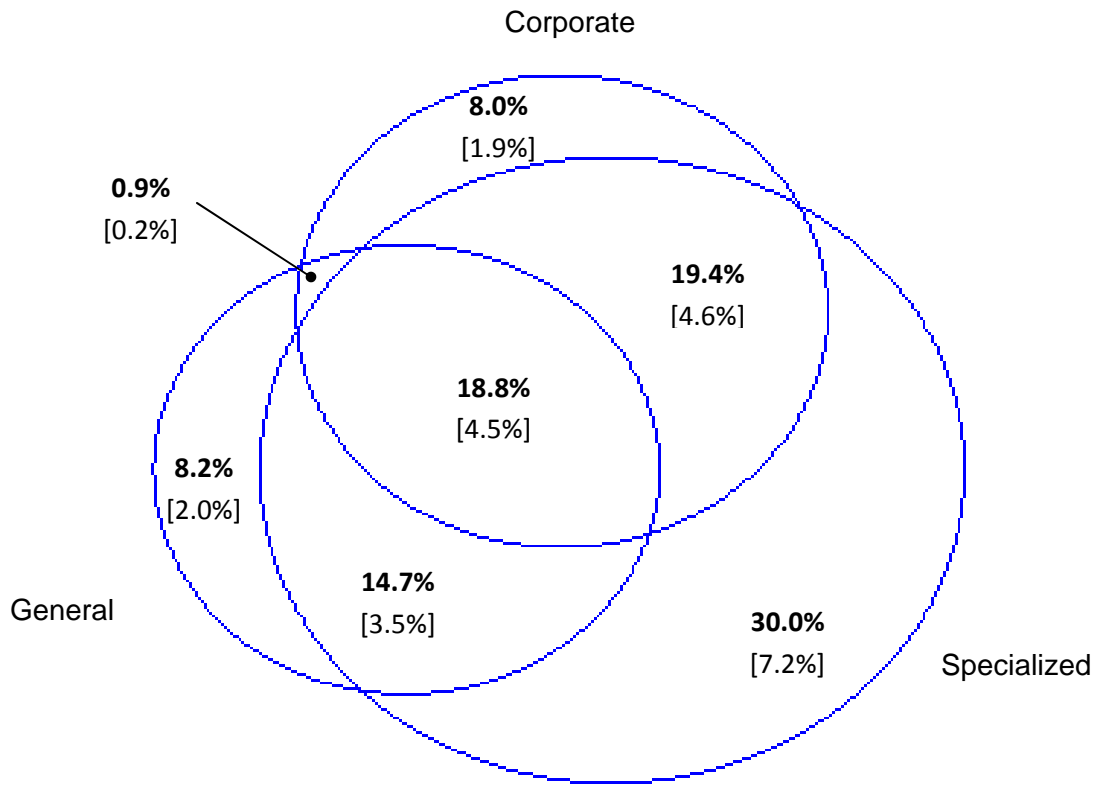
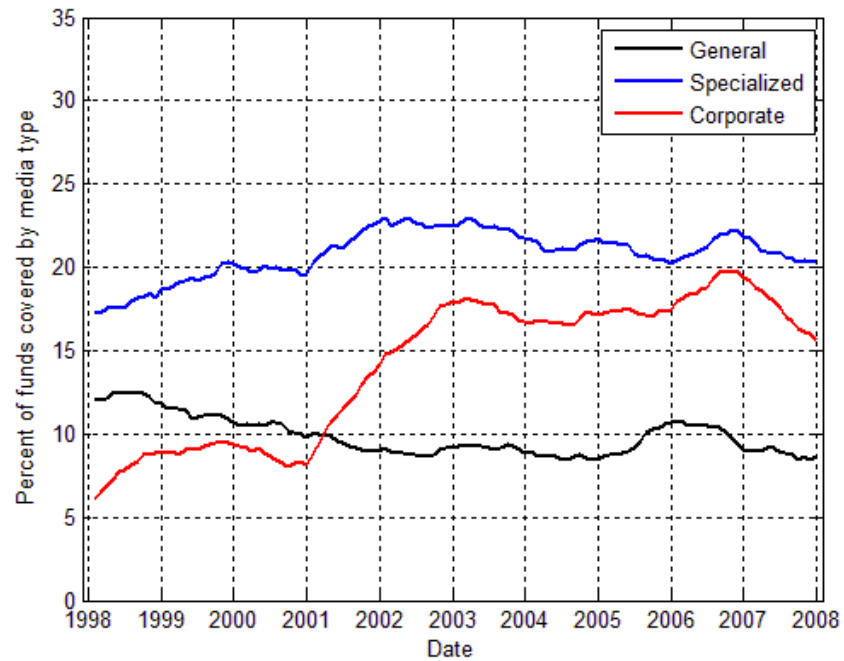
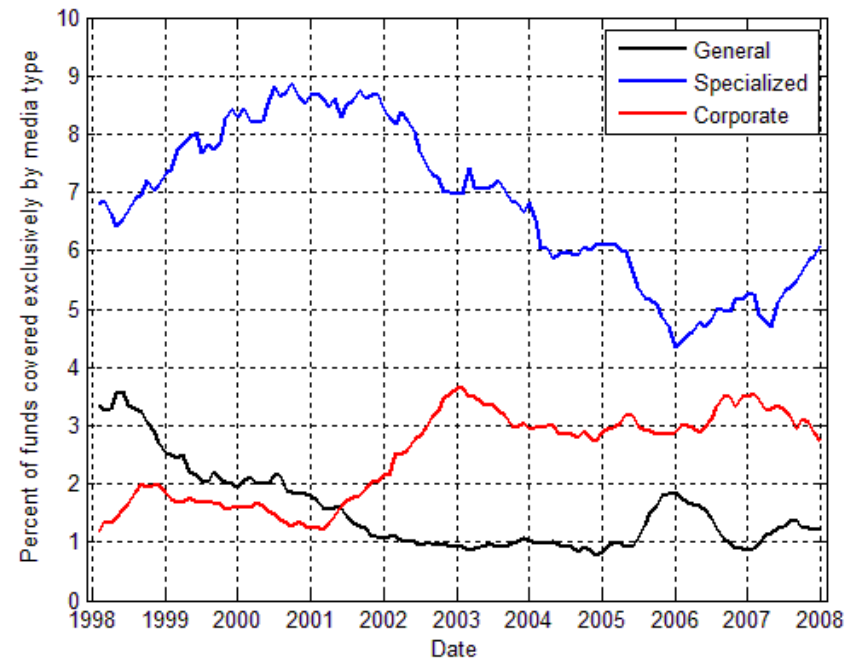


Figure 1. Euler diagram of media-source sets. The diagram displays the average monthly coverage of funds by three sources: General, Specialized, and Corporate communication. On average, 23.9% of funds are coverage by at least one type of media in a given month. The diagram presents the average monthly percent of funds covered by each set, relative to all funds covered in a month (in boldface) and relative to all funds in the sample (in square brackets). The sample includes Long/Short-Equity hedge funds (Lipper-TASS) over the period 1999–2008.

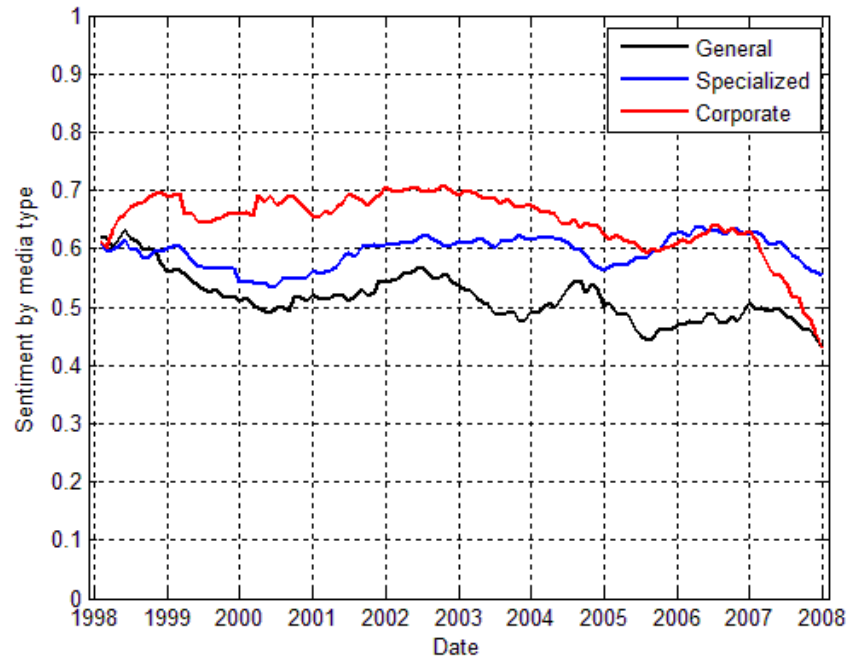


Panel A: Total media coverage by source

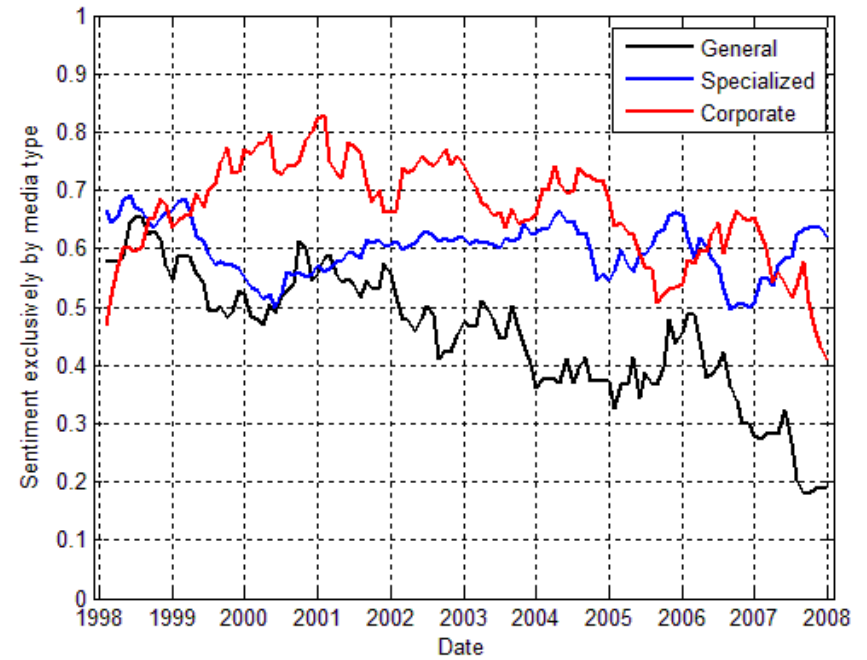


Panel B: Exclusive media coverage by source

Figure 2. Media coverage by source. The figures plot the funds covered by each media source as a fraction of all funds available the sample each month. In Panel A, a fund is considered covered by a particular media source independent of its coverage in other sources. Panel B includes only exclusive coverage, i.e. a fund is considered covered by a particular media source only if it is also not covered by other sources. Both figures present 12-month moving averages. The sample includes Long/Short-Equity hedge funds (Lipper-TASS) over the period 1999-2008.

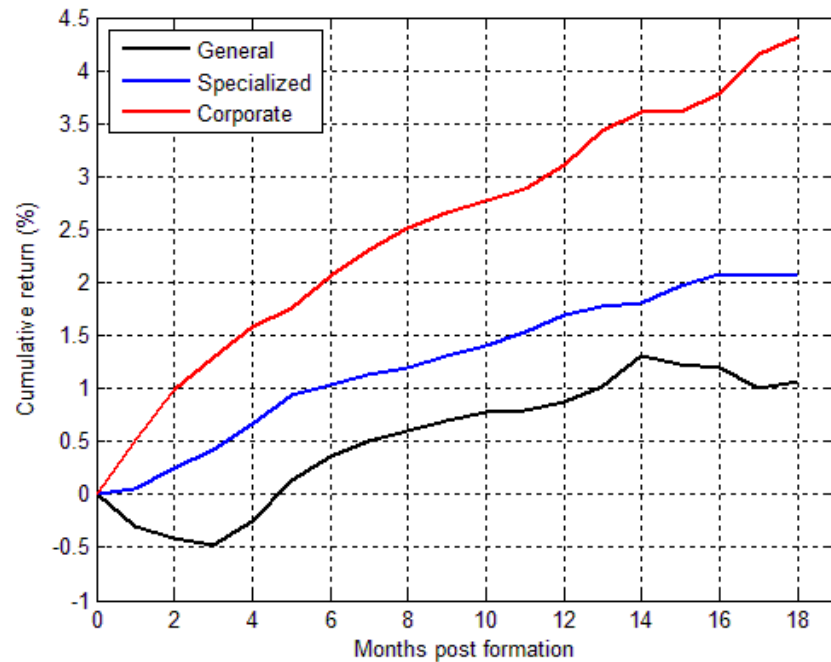


Panel A: Total media coverage by source

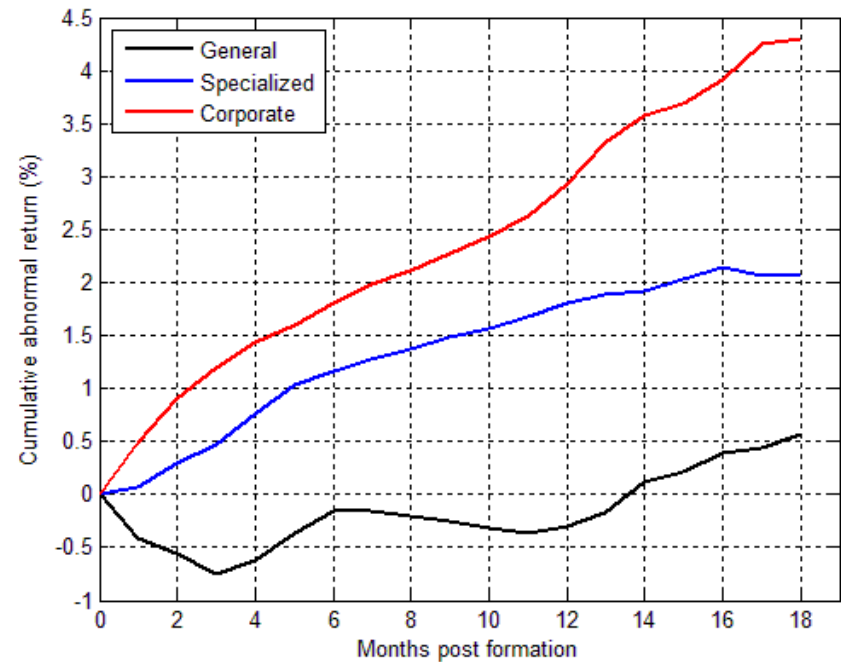


Panel B: Exclusive media coverage by source

Figure 3. Sentiment of media sources. The figures plot the monthly average positive sentiment of the news items of the funds covered by each media source. In Panel A, a fund is considered covered by a particular media source independent of its coverage in other sources. Panel B includes only exclusive coverage, i.e. a fund is considered covered by a particular media source only if it is also not covered by other sources. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. The positive sentiment of a news-item title is measured by the ratio of its positive words and the sum of its positive and negative words. Both figures present 12-month moving averages. The sample includes Long/Short-Equity hedge funds (Lipper-TASS) over the period 1999-2008.



Panel A: Long-run cumulative returns



Panel B: Long-run abnormal cumulative returns

Figure 4. Long-run sentiment-adjusted returns of media sources. Each word included in the title of a news item is classified as positive, negative, or undefined, according to the Harvard IV-4 Psychosocial Dictionary. The positive sentiment of a news-item title is measured by the ratio of its positive words and the sum of its positive and negative words. Each month funds are separated into three groups of sentiment, the first group includes funds with undefined sentiment (e.g., their news-item titles do not include either positive or negative words), while the other two groups are defined according to whether their average positive sentiment is above or below the median positive sentiment across all funds and news items with defined sentiment that month. Independently, funds are sorted into three groups each month based on fund exclusive coverage by one of three media sources: General, Specialized, and Corporate communication. The figures plot the cumulative sentiment-adjusted returns of each group of funds up to 18 months post-formation. Sentiment adjustment is achieved by subtracting from each fund's monthly return the average monthly return its sentiment group. Panel A applied no further adjustments, while Panel B applies further risk-adjustment using the Fung and Hsieh (2001) risk factors. The sample includes Long/Short-Equity hedge funds (Lipper-TASS) over the period 1999-2008.