Active Short Selling by Hedge Funds

Finance Working Paper N° 609/2019
June 2020

Ian Appel
Boston College

Vyacheslav Fos
Boston College CEPR and ECGI

ECGI Working Paper Series in Finance

Active Short Selling by Hedge Funds

Working Paper N° 609/2019

June 2020

Ian Appel
Vyacheslav Fos

We have benefited from comments by Yakov Amihud, Alon Brav, Adrian Corum, Nick Gantchev, Cliff Holderness, Robert Jackson, Wei Jiang, Marcel Kahan, Peter Kelly, Andrey Malenko, and Jeff Pontiff and seminar/conference participants at Bentley University, The Chinese University of Hong Kong, Fanhai International School of Finance, UC Berkeley Law, Economics, and Business workshop, the SEC, Yale Junior Finance Conference, NYU Law & Finance seminar, the RCFS/RAPS Conference at Baha Mar, the 2019 American Law and Economics Association annual meeting, the 2020 PENN/NYU Conference on Law and Finance, and the 2020 SFS Cavalcade. We also thank Sourabh Banthia, Troy Heidenberg, Ryan Leary, Vinh Nguyen, Spencer Olson, Fisher Pressman, and Jonah Schumer for excellent research assistance. This paper was previously circulated under the title "Public Short Selling by Activist Hedge Funds.

Abstract

We examine the role of strategic communication in public short selling campaigns by hedge funds. Such campaigns are associated with abnormal returns for targets of approximately -7% as well as changes in the behavior of stakeholders (e.g., other short sellers). The effects are driven by campaigns that feature specific allegations rather than general claims of overvaluation. Campaigns are primarily undertaken by activist hedge funds, particularly those that have more experience or employ hostile tactics. Overall, our findings are consistent with models of strategic communication in which investor reputation and the credibility of allegations facilitates the flow of negative information into prices.

Keywords: Activist Hedge Funds, Short Selling, Strategic Communication

JEL Classifications: G23, G14

Ian Appel*
Assistant Professor of Finance
Boston College, Carroll School of Management
140 Commonwealth Avenue
Chestnut Hill, MA 02467-3809, United States
phone: +1 617 552 1459
e-mail: ian.appel@bc.edu

Vyacheslav Fos
Associate Professor of Finance
Boston College, Carroll School of Management
140 Commonwealth Avenue
Chestnut Hill, MA 02467, United States
phone: +1 617 552 1536
e-mail: fos@bc.edu

*Corresponding Author

Active Short Selling by Hedge Funds[☆]

Ian Appel
Carroll School of Management, Boston College
ian.appel@bc.edu

Vyacheslav Fos
Carroll School of Management, Boston College
CEPR, ECGI
vyacheslav.fos@bc.edu

June 2020

[☆]We have benefited from comments by Yakov Amihud, Alon Brav, Adrian Corum, Nick Gantchev, Cliff Holderness, Robert Jackson, Wei Jiang, Marcel Kahan, Peter Kelly, Andrey Malenko, and Jeff Pontiff and seminar/conference participants at Bentley University, The Chinese University of Hong Kong, Fanhai International School of Finance, UC Berkeley Law, Economics, and Business workshop, the SEC, Yale Junior Finance Conference, NYU Law & Finance seminar, the RCFS/RAPS Conference at Baha Mar, the 2019 American Law and Economics Association annual meeting, the 2020 PENN/NYU Conference on Law and Finance, and the 2020 SFS Cavalcade. We also thank Sourabh Banthia, Troy Heidenberg, Ryan Leary, Vinh Nguyen, Spencer Olson, Fisher Pressman, and Jonah Schumer for excellent research assistance. This paper was previously circulated under the title "Public Short Selling by Activist Hedge Funds."

Active Short Selling by Hedge Funds

Abstract

We examine the role of strategic communication in short-selling campaigns by hedge funds. Such campaigns are associated with abnormal returns for targets of approximately -7% as well as changes in the behavior of stakeholders (e.g., other short sellers). The effects are driven by campaigns that feature specific allegations rather than general claims of overvaluation. Campaigns are primarily undertaken by activist hedge funds, particularly those that have more experience or employ hostile tactics. Overall, our findings are consistent with models of strategic communication in which investor reputation and the credibility of allegations facilitate the flow of negative information into prices.

Short sellers have been cast as villains throughout history. Following the crash of 1929, for example, the U.S. Senate released the names of large short sellers in an attempt to brand them as "unpatriotic" (Jones, 2012). More recently, the Attorney General of New York likened short sellers to "looters after a hurricane" during the financial crisis.[1] Perhaps because of this sentiment, investors are often reluctant to publicly discuss short positions. Yet, recent years have seen a new phenomenon: high-profile short-selling campaigns by hedge funds. David Einhorn's short of Allied Capital provides an illustrative example. In May of 2002, Einhorn announced a short position in Allied at an investment conference, arguing the firm engaged in questionable accounting practices. Allied's stock price dropped by over 10% the following day, and by the next month its short interest increased sixfold. The SEC later launched an investigation into Allied that "zero[ed] in on many of the criticisms made by short sellers."[2]

In this paper, we undertake a comprehensive analysis of short-selling campaigns by hedge funds. We refer to these campaigns as "active" short selling because funds not only passively trade, but also engage in public communication with other market participants. Such communication may be particularly important for short campaigns because, in contrast to long positions, US securities laws do not require disclosure of short positions. Moreover, while long investors may have incentives to communicate "behind the scenes" with managers (e.g., McCahery et al., 2016), private communication may limit the profitability of short positions by allowing managers to mitigate the effects of negative information. Our goal is to shed light on the use of strategic communication via active short selling to facilitate the aggregation of private information into security prices.

A priori, the extent to which hedge funds engage in active short selling is unclear. On one hand, many hedge funds engage in highly-publicized activism campaigns that often require the support of other shareholders (e.g., in a proxy fight). Consequently, market participants may assign high levels of credibility to accusations made by hedge funds,

[1] See "S.E.C. Temporarily Blocks Short Sales of Financial Stocks," *The New York Times* (9/19/2008)
[2] See "SEC Is Investigating Allied Capital," *The Wall Street Journal* (6/24/2004)

thus facilitating strategic communication (e.g., Crawford and Sobel, 1982; Sobel, 1985; Benabou and Laroque, 1992). On the other hand, hedge funds, in aggregate, have trillions of dollars under management, face few investment restrictions related to short selling, and use contractual provisions that mitigate risks associated with short selling. These investors may therefore convey information via trading rather than strategic communication (e.g., Kyle, 1985). Moreover, strategic communication may be particularly costly in this setting because short-selling campaigns may invite scrutiny from regulators and the managers of targeted firms (Lamont, 2012).[3]

We use media reports to manually construct a database of active short-selling campaigns by hedge funds.[4] We identify 252 campaigns over a twenty-year period (1996–2015). Consistent with anecdotal evidence, the prevalence of campaigns has increased considerably in recent years. Prior to 2008, the average number of campaigns was fewer than 10 per year. However, from 2008 onward, the average number of campaigns approximately tripled, peaking at 45 in 2015 (see Figure 1). Campaigns feature a wide array of allegations; the most common are general overvaluation, problems with the industry/competitors, defective product/business models, and fraud. While activists constitute less than a quarter of all hedge funds, they undertake over 80% of campaigns in our sample.[5] At the fund-quarter level, the likelihood of engaging in active short selling is 0.56% for activist hedge funds, relative to the unconditional likelihood of 0.16%. Other fund characteristics (e.g., portfolio liquidity, concentration, and turnover) have relatively little explanatory power for undertaking short-selling campaigns.

Evidence suggests that short-selling campaigns have a negative effect on the value of targets. Specifically, cumulative abnormal returns (CARs) average approximately -3% in a [t–10, t+10] window around campaign announcements. The negative abnormal returns

[3]Consistent with this idea, Jones, Reed, and Waller (2016) and Jank, Roling, and Smajlbegovic (2016) find that mandatory disclosure of short positions leads to a decrease in short selling.

[4]For brevity, we refer to "active short-selling campaigns" as "short-selling campaigns" throughout the paper.

[5]We define a hedge fund as an activist if it has filed at least one Schedule 13D (Brav et al., 2008). In our dataset, 240 out of 1,199 hedge funds are activists.

are not short-lived; CARs decrease to less than -7% for the [t–10, t+100] window. The magnitudes of these effects are considerably larger than CARs associated with large changes in short interest, suggesting that active short selling has an incremental impact on targets. We find similar results for campaigns announced at investment conferences, the timing of which are predetermined and likely orthogonal to other events that may affect target returns (e.g., negative news).

To the extent that short-selling campaigns produce a credible signal, this form of strategic communication may also lead to changes in the behavior of other stakeholders. We identify two pieces of evidence that are consistent with this idea. First, campaigns are associated with approximately a 10% increase in aggregate short interest, suggesting that short sellers respond to strategic communications by hedge funds. Second, campaigns are associated with an increase in the likelihood of litigation (e.g., shareholder class actions) against firms. Similar to the valuation results, the effects on litigation are not driven by changes in aggregate short interest.

A fundamental idea from models of strategic communication is that the reputation of the sender and credibility of the message play a key role in facilitating information transmission (e.g., Sobel, 1985). We next examine the characteristics of active short sellers and the nature of their allegations to shed light on this idea. Specifically, given that activist hedge funds undertake the bulk of campaigns in our sample, we examine the relationship between long-activism campaign characteristics and active short selling. We hypothesize that short-selling campaigns are positively associated with proxies for the reputation of activists and the credibility of their messages.

Two pieces of evidence are consistent with the idea that investor reputation facilitates active short selling. First, the likelihood of engaging in active short selling is positively associated with activism experience, as measured by the number of long campaigns undertaken. The economic magnitude of this relation is sizable; a 10% increase in the number of long campaigns undertaken is associated with approximately a 15% increase in the likelihood of active short selling. Second, short-selling campaigns tend to be undertaken

by activists that employ hostile tactics (e.g., proxy fights), which may require higher reputational capital to gain support from other shareholders. Specifically, activists that use hostile tactics are approximately twice as likely to engage in active short selling as those that do not.

Evidence also suggests that message credibility plays an important role in active short selling. We hypothesize that specific allegations (e.g., fraudulent behavior) are perceived as more credible that general ones (e.g., overvaluation). We find that campaigns with specific allegations are associated with stronger effects on stock prices, short interest, and litigation. For example, when hedge funds make specific allegations, CARs average -9% in a [t–10, t+100] window around campaign announcements. By contrast, allegations of general overvaluation are associated with CARs of approximately -1%, which are not significantly different from CARs associated with large increases in short interest.

We find less evidence supporting alternative economic mechanisms. First, we argue that limits to arbitrage are unlikely to explain the differences in behavior between activist and non-activist hedge funds as well as the differences in responses to specific allegations and general claims of overvaluation. Second, active short selling is not used to hedge existing long positions. Finally, we argue that short-selling campaigns do not constitute a form of shareholder activism.

Our paper is related to multiple strands of literature. Our main contribution is to the literature that studies strategic communication (e.g., Crawford and Sobel, 1982; Sobel, 1985; Farrell and Gibbons, 1989; Benabou and Laroque, 1992; Bommel, 2003; Che, Dessein, and Kartik, 2013; Levit, 2018). This literature emphasizes the role of investor reputation and credibility as well as the decision to communicate information either publicly or privately. Consistent with this literature, our results suggest that investor reputation and allegation credibility play a key role in strategic communication.[6] Our findings also suggest an important difference between strategic transmission of positive

[6]Short-selling campaigns studied in this paper differ from pseudonymous attacks studied by Mitts (2019). In these attacks, the pseudonymous authors exploit the perception that they are credible and switch to new identities when their credibility is lost.

information (accompanied by long positions) and negative information (accompanied by short positions). Specifically, activists with long positions often begin campaigns by communicating privately with the targets' management teams (e.g., Becht, Franks, Mayer, and Rossi, 2008; Brav, Jiang, Partnoy, and Thomas, 2008; McCahery, Sautner, and Starks, 2016). When their demands do not receive an adequate response, activists may engage in public confrontation. However, short sellers do not have incentives to privately communicate negative information because, if such communication is successful (e.g., the firm stops engaging in fraud), this may limit the profitability of the short position. Our findings indicate that hedge funds increasingly *publicly* disclose short positions to overcome this problem.

The fundamental asymmetry between short and long positions resembles findings in the literature on feedback effects (e.g., Goldstein and Guembel, 2008; Goldstein, Ozdenoren, and Yuan, 2013; Edmans, Goldstein, and Jiang, 2015). In this class of models, uninformed short selling may decrease firm value when managers learn about project quality from stock prices. When managers invest in a negative NPV project following uninformed short selling, firm value drops, thus benefiting investors that sold shares. By contrast, such real effects are not possible when uninformed purchases take place because when managers invest in a negative NPV project following unformed purchases, firm value drops and hurts the investor who purchased shares. Our findings suggests that it is potentially important to account for strategic communication in this class of models.

We also contribute to the literature on short selling. Several papers show short interest is associated with weaker future performance at both the market and individual stock levels.[7] A related strand of literature studies the informational advantages of short sellers, including the detection of financial misconduct (Karpoff and Lou, 2010), anticipation of

[7]For example, see Seneca (1967), Senchack and Starks (1993), Desai et al. (2002), and Rapach et al. (2016). Previous work has also analyzed alternative measures of aggregate or institutional short selling, including required disclosure in European markets (e.g., Jones et al., 2016), costs associated with shorting (e.g., Cohen et al., 2007; Jones and Lamont, 2002), and institutional short sale orders (e.g., Boehmer et al., 2008). See Reed (2013) for a comprehensive review of this literature.

earnings and analyst downgrades (e.g., Christophe et al., 2004, 2010), and the ability to process public news releases (Engelberg et al., 2012). In contrast to this literature, most of which studies aggregate short interest, we focus on the voluntary disclosure of short positions by hedge funds. While such disclosures have historically been rare, they have become increasingly common in recent years. Our findings suggest that this form of strategic communication has incremental effects on firm value and stakeholder behavior beyond that which can be explained by changes in aggregate short interest.

Third, our paper is related to recent work on public disclosure of short positions by different market participants. Ljungqvist and Qian (2016) show that research reports help small investors to overcome limits to arbitrage. Zuckerman (2011) studies the use of public recommendations of long and short positions by hedge funds as a coordinating mechanism. Zhao (2019) analyzes the relation between accounting opacity and public short selling by financial institutions, research firms, and individual investors. By contrast, we highlight the presence of economic synergies between active short selling and access to activism technology. Specifically, we show that the majority of short-selling campaigns by hedge funds are undertaken by activists, and evidence suggests that this finding is related to investor reputation and the credibility of their allegations. Thus, activism experience not only affects the manner in which hedge funds engage in short selling, but ultimately has implications for the effects of active short selling on targeted firms.

Finally, our paper is related to the literature on hedge fund activism. This literature broadly finds that long campaigns by activists are associated with positive stock price reactions and improved operating performance (e.g., Brav et al., 2008; Becht et al., 2008; Klein and Zur, 2009; Bebchuk et al., 2015; Clifford, 2008).[8] While this literature focuses on the long positions of activist hedge funds, we provide some of the first evidence on the strategic communication of negative information and short selling by this class of investors.[9]

[8]Other papers examine the effect of activists on various outcomes, including innovative activities (Brav et al., 2018), productivity and asset allocation (Brav et al., 2015), and takeover offers (Boyson et al., 2017; Greenwood and Schor, 2009). See Brav et al. (2010), Denes et al. (2017), and Gillan and Starks (2007) for comprehensive reviews of this literature.

[9]While activist hedge funds are prominent in our sample, we do not generally consider short-selling

1. Data

1.1. Sample and Data Sources

Our sample consists of short-selling campaigns by hedge funds between 1996 and 2015. Because U.S. securities laws do not mandate disclosure of short positions, we collect information on campaigns from public sources. To construct the sample, we begin with a list of more than 1,200 hedge funds from Agarwal, Fos, and Jiang (2013). This list consists of hedge funds that have filed a Form 13F with the Securities and Exchange Commission (SEC).

We use Factiva to create a database of publicly disclosed short positions by hedge funds. Specifically, we conduct searches for the terms "Hedge Fund Name" and "short position" or "short selling", as well as other variants of these terms across the newspapers, newswires, blogs, and television transcripts covered by Factiva. In some cases, we conduct internet searches to find additional information. For each campaign, we collect the date of the announcement, the revelation method (e.g., investment conference, media interview, release of a white paper, etc.), and the primary allegations made by the hedge fund (e.g., general overvaluation, fraud, threats from competitors, etc.). We match target firms to their respective identifiers by searching the CRSP/Compustat merged database. The final sample consists of 252 short-selling campaigns by 51 hedge funds from 1996 to 2015.

We merge data from several other sources with our sample. Financial accounting and stock return information are from the Compustat annual files and CRSP daily files, respectively. Short interest and fails-to-deliver data are from Compustat and the SEC, respectively. Institutional ownership data are from Thomson Reuters and Form 13F filings.[10] Analyst coverage is from IBES, and litigation data are from Audit Analytics.

---

campaigns a form of activism. In a shareholder activism campaign, an activist engages with the target to achieve this action, often using (or threatening to use) decision rights inherent to stock ownership (e.g., voting or board representation). By contrast, short-selling campaigns seek to enhance the flow of negative information into prices though strategic communication.

[10]Form 13F, which discloses the quarter-end holdings of an institution, is mandatory for all institutions that exercise investment discretion over $100 million of assets in equity and other publicly traded securities. Institutions are required to disclose all securities that appear on the official list of "Section 13(f) Securities,"

All variables used in our analysis are defined in Table A1.

1.2. Selection Issues

Our reliance on media reports to construct our sample raises potential selection bias concerns. For example, it is possible that the media only covers short position disclosures that are associated with significant changes in stock prices. However, two pieces of evidence suggest that such effects likely do not drive our main findings.

First, investors often pseudo-anonymously report short positions on platforms such as Seeking Alpha (Mitts, 2019). If a short-selling campaign does not receive media attention, investors may use such platforms to share information non-anonymously. However, we do not find evidence that such behavior is widespread. Specifically, searches for short-selling campaign disclosures by the ten largest activist and non-activist hedge funds do not reveal widespread reporting on Seeking Alpha, suggesting that announcements by such funds are likely to be covered in the media.

Second, in addition to the full sample, we report our analysis of abnormal returns for the sub-sample of events disclosed at investment conferences. Such conferences often receive considerable media attention, and it is unlikely that the positions discussed are not widely reported by the media. For example, media outlets (e.g., CNBC and *The Wall Street Journal*) provide live analysis of the annual Sohn Investment Conference.[11] Thus, the existence of a systematic bias is unlikely for the reporting of campaigns disclosed at conferences.

2. Campaign and Target Characteristics

In this section, we study the prevalence of short-selling campaigns over time, as well as their allegations and disclosure methods. We also examine the characteristics of targets that predict campaigns.

including almost all publicly traded equity, some preferred stocks, bonds with convertible features, warrant, and exchange-traded call and put options. The Thomson Reuters database contains only holdings of equity.

[11] See, for example, "Ira Sohn Conference: Live Blogging The David Einhorn Show" available at https://blogs.wsj.com/deals/2012/05/16/ira-sohn-conference-live-blogging-the-david-einhorn-show/.

2.1. Campaign Characteristics

Figure 1 shows the time series distribution of short-selling campaigns. Prior to 2008, the number of campaigns averaged approximately five per year. In later years, however, the number of campaigns increased substantially, averaging 25 per year from 2008 to 2015. While some of campaigns launched in 2007–2008 were launched in direct response to the financial crisis (e.g., Bill Ackman's campaign against Lehman Brothers), the number of campaigns by hedge funds has remained elevated in the post-crisis period.[12] Indeed, 2015 saw more short-selling campaigns by hedge funds than any other year in our sample. Panel B shows the number of hedge funds that have launched short-selling campaigns during the sample. The time series pattern is similar to panel A, though the magnitudes are lower, indicating that some hedge funds launch multiple campaigns in the same calendar year.

[Insert Figure 1 here]

We next examine campaign allegations. For each campaign in our sample, we classify the allegations into six categories: financials/capital structure, industry/competitors, general overvaluation, fraud/accounting, product/business model, and management/insider selling. The classifications are not mutually exclusive, so some campaigns include multiple types of allegations. Panel A of Table 1 reports the distribution of short campaigns across allegation types.

Approximately 37% of the campaigns allege that the target is generally overvalued but do not make a specific allegation. The remaining campaigns make specific allegations regarding the target firm. The most common allegations relate to a target's industry/competitors (25.0%), product/business model (16.3%), or fraud/accounting problems (13.5%). Other allegations include issues related to financials/capital structure (12.1%) and issues with management or insider selling (4.4%).

[12]Two major rule changes were made in relation to short selling during the crisis. In September of 2008, the SEC banned most short selling in nearly 1,000 financial stocks and "abusive" naked short selling in all stocks (Boehmer et al., 2013). The short selling ban was lifted the following month; restrictions on naked short selling were made permanent in 2009.

[Insert Table 1 here]

Panel B reports the distribution of disclosure methods for short-selling campaigns. We classify disclosure methods into four categories: letters to investors, newspapers/television, investment conferences, and white papers/other. The most common form of disclosure, in the newspaper or on television, accounts for about 54% of campaigns. Another 23% of positions are announced at investor conferences. Approximately 13% of campaigns are disclosed in a letter to the fund's investors. The remaining 10% are disclosed through a white paper or other methods.

2.2. Target and Fund Characteristics

Table 2 compares the characteristics of active short-selling targets to matched firms. The firm characteristics and matching methodology used in this table follow Brav et al. (2008). Targets differ from the matched sample along several dimensions. The starkest difference is in terms of size: on average, the market cap for targets is close to $11 billion greater than matched firms. We match on firm size (as measured by market cap) in the remainder of our analysis to account for this difference.

Targets tend to have higher Q, ROA, and previous stock returns than matched firms, indicating that they are firms with strong past performance. We also find evidence that targets, on average, have higher institutional ownership, more analyst coverage, and higher leverage than matched firms. We do not find evidence of differences in cash holdings or payouts between the targets of short-selling campaigns and matched firms. However, targets are more liquid, as measured by Amihud (2002) illiquidity measure.

[Insert Table 2 here]

Table 3 analyzes which target and fund characteristics predict short-selling campaigns. Panel A uses firm characteristics as explanatory variables in a probit model (column 1) and OLS models (columns 2–4). The dependent variable is an indicator equal to one if

a firm is targeted by a campaign in year t. The sample consists of all Compustat firm-year observations from 1996 to 2015. Similar to Table 2, we find robust evidence that the likelihood of targeting is positively associated with firm size and leverage.

Short interest also predicts campaigns. Specifically, the estimates in column 4 indicate that large increases in short interest ($\geq$5 percentage points) is associated with a 0.2% increase in the likelihood of targeting. This relation is economically significant relative to the 0.16% unconditional likelihood of a campaign. This finding suggests that active short campaigns may target stocks in which passive short selling is ineffective in transmitting negative information into prices. That is, investors turn to strategic communication when the transmission of information through trading is ineffective.

Finally, the likelihood of targeting is negatively associated with institutional ownership when regressions include year, industry, or industry-year fixed effects (in contrast to the univariate results in Table 2). One potential interpretation of this finding is that targets' shareholders are less engaged in monitoring, which in turn increases the likelihood that a short seller will identify a problem with the firm and decides to engage in active short selling. We discuss this mechanism further in Section 5.

[Insert Table 3 here]

Panel B examines the characteristics of the hedge funds that undertake campaigns.[13] Regressions cover Schedule 13F fund-quarter observations for all hedge funds in our sample. Column 1 uses a probit model for this analysis, and columns 2 and 3 use OLS. Columns 1 and 2 indicate a positive relationship between being an activist and the likelihood of undertaking a short-selling campaign. Specifically, column 2 indicates that the likelihood of undertaking a campaign is 0.56% higher for activist than for non-activist hedge funds. The economic magnitude of this coefficient is approximately three times the unconditional likelihood of a short-selling campaign. This finding is consistent with the fact that activists

[13]Table A2 in the Internet Appendix reports descriptive statistics for the fund-level variables used in this analysis.

initiate 208 out of 252 campaigns in our sample (82%). Importantly, the effect is not driven by a higher representation of activists in the sample of hedge funds; in our dataset, 240 out of 1,199 hedge funds are activists.

Other fund characteristics have less explanatory power. The likelihood of a campaign is positively correlated with assets under management, though this finding is not statistically robust across all specifications. We also find some evidence that funds undertaking campaigns tend to have smaller long positions in heavily shorted securities, though this effect is not robust across all specifications. We do not find evidence that other observable characteristics of funds (e.g., returns, portfolio turnover rate, portfolio illiquidity, number of holdings, etc.) are associated with active short selling.

Overall, this analysis suggests that access to activism technology plays an important role in understanding short-selling campaigns. One potential explanation for this finding is that, because activism campaigns often involve the use of hostile tactics to influence corporate policies (Brav et al., 2008), activists may be uniquely suited to bear costs associated with public confrontation (e.g., regulatory scrutiny and litigation). It is unlikely, however, that costs associated with retaining short positions can explain the difference in active short selling by activist and non-activist hedge funds. Specifically, Ljungqvist and Qian (2016) argue that small, constrained investors release research reports to mitigate limits to arbitrage. While both activists and non-activists incur costs associated with retaining short positions, the likelihood of undertaking a short-selling campaign is positively related to assets under management, the opposite effect predicted by the limits to arbitrage channel.

3. Shareholder Wealth Effects

We next turn attention to the potential benefits of active short selling. One potential benefit of strategic communication is that it enhances the flow of negative information into prices. To explore this idea, we examine the cumulative abnormal returns (CARs) associated with the announcement of short-selling campaigns. We also compare the CARs

to those from large changes in short interest to shed light on the incremental effects of active short selling.

Table 4 reports the results. The dependent variables in this table are CARs for the [t–10, t+10] period (columns 1–3) and [t–10, t+100] period (columns 4–6) around the announcement of a short-selling campaign. We calculate CARs using a one, three, and five-factor model for each interval. Panel A reports CARs for short-selling campaigns. We find broad evidence that campaigns are associated with negative abnormal returns. Specifically, CARs in the [t–10, t+10] period range from -3.4% to -3.6%, while those for [t–10, t+100] range from -6.0% to -7.9%. In Panel B, we conduct similar tests for large changes in short interest ($\geq$5 percentage points). The economic magnitudes of these effects are considerably smaller (and in some cases positive).[14] Panel C reports the difference between CARs for short-selling campaigns and large changes in short interest. The differences are economically large and statistically significant at conventional levels across all specifications.

[Insert Table 4 here]

We next examine the return dynamics around the announcement of short-selling campaigns. Figure 2 plots CARs for the [t–100, t+100] period using the three-factor model. The results are qualitatively similar for other models. The black line in Panel A plots the CARs associated with short-selling campaigns. Return dynamics differ dramatically in the periods before and after the announcement of a campaign. Abnormal returns are positive prior to a campaign, reaching approximately 4%. The positive returns suggest that campaigns may partially represent a response to increases in targets' valuations. This may particularly be the case for short sellers with existing positions in the target, who may be under increased pressure due to rising share prices. Following announcements, CARs drop to -7%, eventually stabilizing around -4%. Untabulated results indicate no reversal in abnormal returns when we consider the [t–100, t+200] period around campaign

[14]The positive CARs for the [t–10, t+10] period result from positive drift in the [t–10, t-1] period (as seen in Figure 2).

announcements. The economic magnitude of this effect is similar to abnormal returns associated with litigation related to financial fraud (Fich and Shivdasani, 2007).

[Insert Figure 2 here]

The dashed line in Panel A of Figure 2 plots CARs associated with large changes in short interest. CARs prior to such events are virtually indistinguishable from those for short-selling campaigns. Figure 2 shows that while CARs decrease when the market becomes aware of large changes in short interest, the economic magnitude of this effect is considerably smaller than for short-selling campaigns. This result suggests that active short selling has an incremental impact on targets.

Panel A also provides insights into abnormal turnover around campaigns. The dark bars in Figure 2 correspond to abnormal daily turnover. Abnormal turnover is negative during the [t–100, t–20] period and positive during the [t–10, t+30] period. Abnormal turnover jumps after announcements and remains elevated for approximately one month before decreasing to close to zero in the [t+30, t+100] period.

Panel B of Figure 2 separately analyzes CARs for campaigns announced at investment conferences and those announced in other ways (e.g., through the media). One advantage of the conference sample is that the timing of announcements is likely orthogonal to other firm-specific events that may confound the analysis. The light gray and black lines show CARs for campaigns announced at conferences and the rest of the sample, respectively. Prior to announcements, CARs for the conference sample are higher than those for other campaigns. After the announcement, CARs for both groups fall by a similar magnitude. Thus, our findings suggest that recent stock performance is an important factor for campaigns announced at conferences, perhaps because hedge funds disclose stronger cases of overvalued securities. Nevertheless, the evidence indicates that confounding events do not drive the negative relation between returns and active short selling.

Overall, consistent with other work that studies the voluntary disclosure of short positions in other contexts (e.g., Ljungqvist and Qian, 2016; Zhao, 2019), short-selling campaigns by hedge funds are associated with strongly negative abnormal returns. This

finding validates our empirical setting by indicating that market participants are largely unaware of campaigns prior to public disclosure. In the next section, we explore whether the effect of active short selling on shareholder wealth partially results from changes in behavior by other stakeholders that may negatively affect firms.

4. Stakeholder Behavior

If signals produced by active short selling are credible, this may lead to changes in the behavior of other stakeholders, potentially to the detriment of targeted firms. Indeed, anecdotal evidence suggests that other stakeholders play important roles in short selling campaigns. For example, while refuting allegations made by David Einhorn, the management of Allied Capital argued that tactics used by short sellers include creating "the illusion of a groundswell of concern" by coordinating with other stakeholders (Einhorn, 2010). Our analysis focuses on short selling by other market participants and litigation by shareholders and other parties. We hypothesize that short-selling campaigns lead to changes in the behavior along these dimensions that may have a negative effect on firm value. Moreover, we hypothesize that such changes are stronger than those induced by large increases in aggregate short interest.

4.1. Short Interest

A potential benefit of active short selling (from the perspective of hedge funds) is that it may induce a "bear raid" in which other investors sell the stock (e.g., Goldstein, Ozdenoren, and Yuan, 2013; Khanna and Mathews, 2012). In this section, we test whether any changes in aggregate short selling behavior occur around the announcement of campaigns. To address this question, we estimate the following regression:

$$y_{et} = \alpha Target_{et} + \zeta_e + \varepsilon_{et}, \tag{1}$$

where y_{et} is aggregate short interest (normalized by shares outstanding) for event e and period t, where a period is two weeks (due to the bi-weekly reporting of short interest).

$Target_{et}$ is an indicator for the announcement of a short-selling campaign, and ζ_e are event fixed effects.[15] The sample covers observation from 10 bi-weekly periods before the announcement of a campaign to 10 periods after. The results of this analysis are reported in Table 5.

[Insert Table 5 here]

The positive coefficient for the target indicator (both including and excluding event fixed effects in columns 1 and 2, respectively) indicates that total short interest increases after the announcement of a campaign. The economic magnitude of the effect is sizable, corresponding to over a 10% increase in short interest for the campaigns in our sample. The coefficient is significant at the 1% level when we control for time-invariant heterogeneity at the event level. Columns 3 and 4 report similar results when we consider campaigns announced at investment conferences.

Panel A of Figure 3 plots total short interest for the 20 two-week periods around the announcement of a short-selling campaign. Short interest shows an upward trend prior to the announcement, potentially a consequence of hedge funds building their positions. Following the announcement, average short interest continues to increase for approximately five periods (i.e., 10 weeks) and then remains relatively stable. The dashed line in Panel A plots short interest for the sample of campaigns revealed at investment conferences. The pre-trend is less apparent for this sample; short interest only increases following the announcement.

[Insert Figure 3 here]

As an alternative measure of short selling activity, we examine fails-to-deliver (FTDs). FTDs may indicate that speculators are engaging in naked short selling (i.e., when a stock is not borrowed prior to the settlement day), potentially resulting from an increase in short-selling activity (demand for borrowing shares) or a drop in the number of shares available

[15] In contrast to later tests, we do not include firm-level accounting controls in the regression specification due to the relatively high-frequency nature of short interest data.

to borrow (supply of shares available to borrow). Critics argue that naked short selling can be "abusive" and exacerbate price drops for heavily shorted securities, though some studies dispute this claim (e.g., Fotak et al., 2014).

Panel B of Figure 3 plots the percentage of FTDs from 100 days before the announcement of a campaign to 100 days after. The solid line plots the percentage FTDs for the full sample, and the dashed dark line plots the percentage of FTDs for short-selling campaigns revealed at investment conference. The percentage of FTDs increases sharply during the ten-day period prior to campaign announcement. The percentage of FTDs increases from about 0.04% to about 0.08% on the announcement date. In unreported analysis, we find that the increase in FTDs in the [t–10, t+10] period is statistically significant at conventional levels.

Overall, the evidence suggests that short-selling campaigns are associated with changes in trading behavior by other market participants. The findings shed light on factors that potentially influence the timing of announcements. Specifically, the sharp increase in FTDs for the full sample suggests that a decline in the number of shares available to borrow might be a factor that triggers the announcement of a short-selling campaign. This finding further supports the idea that investors turn to strategic communication when the transmission of information through trading is limited. However, when we consider campaigns announced at investor conferences, we find no changes in FTDs, suggesting that the strategic motives for the disclosure of campaigns at investment conferences differ from those disclosed through other channels.

4.2. Lawsuits

Next, we consider whether short-selling campaigns are associated with changes in the likelihood of litigation. Strategic communication of credible negative information about firms may lead to lawsuits by regulators, shareholders, or other parties harmed. Such lawsuits may lower firm value due to costs associated with mounting a defense or as part of a settlement or penalty. Indeed, according to one survey of Fortune 200 firms, total

litigation costs averaged over $100 million per firm in 2008.[16] Moreover, litigation may also be costly for targeted firms if it leads to a change in corporate behavior (e.g., discontinuing fraudulent practices).

The results of our analysis are reported in Table 6. The outcome variable is an indicator for litigation in the year following a campaign. The types of lawsuits considered include shareholder litigation, fraud or accounting suits (potentially initiated by the SEC or other regulators), intellectual property suits, product liability suits, and antitrust suits. The table reports estimates of the following OLS regression at the annual frequency:

$$y_{it} = \alpha Target_{it} + X'_{it}\beta + \zeta_t + \zeta_i + \varepsilon_{it}, \tag{2}$$

where y_{it} is the indicator for a lawsuit for firm i in year t, $Target_{it}$ is an indicator equal to one in the year following the announcement of a short-selling campaign , X_{it} is a vector of control variables, ζ_t are year fixed effects, and ζ_i are firm fixed effects.

[Insert Table 6 here]

Our findings indicate that active short selling is associated with an increase in litigation. Specifically, columns 2–4 report an increase in the likelihood of litigation (within firm) of approximately 11–13 percentage points. This effect is economically large relative to the sample mean of 11%. In untabulated analysis, we consider specific types of lawsuits and find a positive and statistically significant effect for shareholder lawsuits, fraud/accounting lawsuits, and IP lawsuits. We do not, however, find evidence of a change in antitrust lawsuits or product liability lawsuits. Importantly, the findings are robust to the inclusion of controls for aggregate short interest (columns 3–4). Thus, while previous research indicates short interest is associated with litigation or regulatory enforcement (e.g., Karpoff and Lou, 2010), our findings indicate an incremental positive effect of active short selling on litigation.

[16] See http://www.uscourts.gov/sites/default/files/litigation_cost_survey_of_major_companies_0.pdf.

In sum, our findings indicate that short-selling campaigns are associated with a significant increase in litigation against targeted firms. These results are consistent with the idea that campaigns reveal damaging information (e.g., fraud) that may be costly for firms. Moreover, these results indicate that market participants act on information disseminated through campaigns.

5. Economic Mechanisms

We next study economic factors that drive engagements in strategic communication through active short selling. Theoretical literature suggests that investor reputation and credibility play an important role in strategic communication (e.g., Sobel, 1985; Farrell and Gibbons, 1989; Benabou and Laroque, 1992). In this section, we analyze fund and campaign characteristics to test this idea. Specifically, we hypothesize that the likelihood of a fund undertaking a campaign is positively related to its reputation. We also conjecture that the effects of active short selling on firm value and actions taken by other stakeholders are stronger when hedge funds make more credible allegations.

5.1. Investor Reputation

Our previous findings (Panel B of Table 3) indicate that activism experience plays a critical role in understanding active short selling. In this section, we analyze the characteristics of activists that undertake campaigns. Specifically, we use two measures to proxy for activists' reputations. First, we analyze the relationship between active short selling and the intensive margin of activism experience, as measured by the total number of activism campaigns undertaken. We assume that signals sent by more experienced activists are perceived as more credible by other market participants. Second, we analyze the relationship between active short selling and whether an activist engages in hostile campaigns. We assume that activists that undertake such campaigns are more reputable, because hostile actions (e.g., proxy fights) often require the support of other shareholders.

We analyze the relationship between activist characteristics and active short selling in the cross-section. Table 7 reports our findings. The dependent variable is an indicator

for whether a fund undertakes a short-selling campaign at any point during the sample period. Approximately 10% of activists undertake a short-selling campaign during our sample. Column 1 indicates a positive relationship between the total number of activism campaigns undertaken by an activist and the probability of active short selling. Column 2 indicates that activists classified as hostile (i.e., at least 10% of long campaigns use hostile tactics) are nearly twice as likely to engage in active short selling. The estimated effects remain positive and statistically significant when jointly included in the regression specification (column 3). We do not find evidence that the likelihood of active short selling is related to activists' rates of success, failure, or settlements in long campaigns (columns 4 and 5).

Overall, the evidence suggests that short-selling campaigns are undertaken by hedge funds with more activism experience as well as those that employ hostile tactics. Consistent with models of strategic communication, the results suggest that investor reputation is an important factor for understanding engagements in active short selling.

5.2. Informational Content of Allegations

We next consider the role of information in explaining the sharp difference in active short selling engagement for activist and non-activist hedge funds. This difference potentially stems from differences in investment strategies. In particular, the investment strategies of activists focus on identifying problems with firms. Other types of investors, however, primarily focus on valuation. David Einhorn, an activist who undertakes 26 campaigns in our sample, highlights this fundamental difference:

> "*A typical process to identify opportunities is through computer screens that identify statistical cheapness, such as low multiples of earnings, sales, or book value combined with rising earnings estimates. Then, they evaluate the identified companies as possible investments...Greenlight takes the opposite approach. We start by asking why a security is likely to be misvalued in the market. Once we have a theory, we analyze the security to determine if it is, in fact, cheap or overvalued*" (Einhorn, 2010).

We hypothesize that activism experience can enhance the effectiveness of active short selling because activist investors can point to firms' specific problems. To shed light on this economic mechanism, we undertake further analysis of valuation consequences of short selling campaigns as well as the effects of these campaigns on short selling and litigation. We expect campaigns to lead to stronger changes in outcome variables when investors make specific allegations of problems for firms rather than general claims of overvaluation. We classify allegations into two broad samples: general overvaluation and specific allegations. Specific allegations—financials/capital structure, industry/competitors, fraud/accounting, product/business model, and management/insider trading—point to a particular problem with the target.

We begin by investigating whether stock price reactions depend on allegations of short-selling campaigns. The dark line in Figure 4 corresponds to CARs for campaigns with specific allegations. Prior to announcement, abnormal returns are close to zero. On the announcement date, target stocks experience sharp negative abnormal returns, reaching -10% two weeks after the announcement. Panel A of Table 8 shows that the negative abnormal returns are statistically significant and differ from CARs associated with large changes in short interest.

[Insert Figure 4 here]

The light line in Figure 4 corresponds to CARs for campaigns with general overvaluation allegations. Price dynamics for these campaigns are strikingly different. Targets of these campaigns experience large positive abnormal returns prior to campaign announcement. Specifically, abnormal returns reach 10% during the [t-100,t-1] period, consistent with the allegation that targets are overvalued. During the two months after a campaign announcement, targets experience abnormal returns of about -5%. Panel B of Table 8, however, shows that these abnormal returns are statistically insignificant and are not statistically different from CARs for large increases in short interest.

We next investigate whether changes in short interest depend on allegation types of allegations. Table 9 repeats the analysis of changes in short interest around campaign

announcements in two sub-samples. Columns 1 and 2 consider the sub-sample of campaigns with general overvaluation allegations whereas columns 3 and 4 consider the sub-sample of campaigns with specific allegations.

[Insert Table 9 here]

We find no significant changes in short interest for campaigns with general overvaluation allegations. By contrast, the estimates in columns 3 and 4 show that total short interest increases significantly after the announcement of a campaign with a specific allegation. The economic magnitude of the effect is sizable, corresponding to over an increase of 20% in short interest for the campaigns in our sample. The coefficient is significant at the 1% level when we control for time-invariant heterogeneity at the event level. Thus, the evidence is consistent with short sellers responding to short-selling campaigns only when hedge funds make specific allegations.

We now turn our attention to changes in litigation. Similarly to stock prices and short interest, we expect stronger effects for campaigns with specific allegations. Table 10 repeats the analysis of changes in litigation around short-selling campaign announcements, while considering the allegation type. Specifically, we replace $Target_{it}$ in regression (2) with $Target\ Specific_{it}$ and $Target\ General_{it}$. $Target\ Specific_{it}$ is an indicator equal to one in the year following the announcement of a campaign with specific allegations, $Target\ General_{it}$ is an indicator equal to one in the year following the announcement of a campaign with general overvaluation allegations.

[Insert Table 10 here]

Our findings indicate that active short selling is associated with a greater increase in litigation when specific allegations are made. Specifically, columns 2–4 report an increase in the likelihood of litigation (within firm) of approximately 6–7 percentage points for campaigns with general overvaluation allegations versus 14–16 percentage points for campaigns with specific allegations. Overall, the evidence shows that litigation against targets of short-selling campaigns is more likely when hedge funds make specific allegations.

Our findings highlight stark differences in CARs, short interest, and litigation based on the nature of allegations from short-selling campaigns. When allegations pertain to general overvaluation, changes in outcome variables are smaller than when allegations pertain to a specific problem with the target. These findings suggest that market participants perceive specific allegations as more credible.

5.3. Alternative Mechanisms

Next, we consider alternative mechanisms that may explain the findings. We specifically consider spillovers from short-selling campaigns to shareholder activism campaigns as well as hedging motivations for active short selling. We do not find evidence consistent with these alternative explanations.

5.3.1. Reputation Effects

We first consider spillovers from short-selling campaigns to shareholder activism campaigns. Successful short-selling campaigns may lead to higher returns for subsequent activism campaigns. This may be the case, for example, if successful campaigns lead to more support in subsequent campaigns from long-term investors (Appel et al., 2018). To test this idea, we regress long campaign CARs on CARs for previous short-selling campaigns. Specifically, we run the following regression:

$$CAR_{fe}^{long} = \alpha CAR_{fe}^{short} + X_e'\delta + \zeta_t + \zeta_f + \varepsilon_i, \tag{3}$$

where CAR_{fe}^{long} is the abnormal return for activist campaign e for activist hedge fund f, CAR_{fe}^{short} is the abnormal return for short-selling campaigns for fund f in the 12 months preceding activist campaign e, X_e is a vector of control variables, ζ_t are year fixed effects, and ζ_f are activist hedge fund fixed effects.

The results are reported in the Appendix Table A3. We find little evidence that CARs for short-selling campaigns are related to subsequent CARs for activism campaigns. If anything, the coefficients are positive across the different specifications, though only

statistically different from zero in two instances. Overall, our results suggest that there are no significant spillovers from active short selling to activism campaigns.

5.3.2. Hedging

Another possibility is that active short selling allows hedge funds to hedge existing long positions (i.e., a pair trade). To test this mechanism, we examine whether short selling campaigns are correlated with the weights of competitors in activists' portfolios. Specifically, we estimate the following regression:

$$Campaign_{ift} = \alpha CompetitorPortfolioWeight_{ift} + X'_{ift}\beta + \zeta_t + \zeta_i + \zeta f + \varepsilon_{ift}, \qquad (4)$$

where $Campaign_{ift}$ is an indicator for whether a firm is targeted by a short-selling campaign, $CompetitorPortfolioWeight_{ift}$ is the activists' portfolio weight in competitors, X_{ift} is a vector of control variables, ζ_t are year fixed effects, ζ_i are firm fixed effects, and ζ_f are fund fixed effects. We define competitor portfolio weights (and score weighted portfolio weights) based on classifications by Hoberg and Phillips (2010) and Hoberg and Phillips (2016). Table A4 in the Appendix reports the results. Overall, we find little evidence to support this mechanism; the coefficients across the different specifications are economically small and statistically indistinguishable from zero.

6. Conclusion

Recent years have seen the emergence of active short-selling campaigns by hedge funds. While such campaigns were rare prior to 2008, on average, nearly 30 have been launched per year since then. In this paper, we examine the role of strategic communication in facilitating the flow of negative information into prices via active short selling. CARs around announcements average -7%, suggesting that funds send credible signals to other market participants. This effect is larger than CARs associated with large changes in short interest, indicating that public engagements by hedge funds have an incremental effect. Also consistent with the idea that signals are credible, we document changes in the

behavior of other stakeholders. Specifically, short-selling campaigns are associated with an increase in total short interest and the likelihood of litigation against the target.

Consistent with the literature on strategic communication, the reputation of funds and credibility of their signals plays an important role in active short selling. Specifically, 82% of campaigns in our sample are undertaken by activist hedge funds, and activists that engage in campaigns have more experience and are more likely to use hostile tactics in shareholder activism campaigns. We also find evidence that strategic communication is more effective when campaigns feature specific allegations (e.g., fraud) rather than claims of general overvaluation. Specifically, CARs for campaigns featuring specific allegations average -9% in a [t-10, t+100] window, compared to -1% for campaigns that allege general overvaluation.

Overall, our findings highlight the difference between transmission of positive information (accompanied by long positions) and negative information (accompanied by short positions) into prices. While investors with positive information often communicate privately with managers, short sellers do not have such incentives because if such communication is successful (e.g., the firm stops engaging in fraud), this may limit the profitability of the short position. Rather, our findings indicate that strategic communication with other market participants enhances price efficiency when the transmission of information through trading is limited.

References

Agarwal, V., Fos, V., Jiang, W., 2013. Inferring reporting-related biases in hedge fund databases from hedge fund equity holdings. Management Science 59 (6), 1271–1289.

Amihud, Y., January 2002. Illiquidity and stock returns: Cross-section and time-series effects. Journal of Financial Markets 5 (1), 31–56.

Appel, I., Gormley, T., Keim, D., 2018. Standing on the shoulders of giants: The effect of passive investors on activism. Review of Financial Studies forthcoming.

Bebchuk, L. A., Brav, A., Jiang, W., 2015. The long-term effects of hedge funds activism. Columbia Law Review 115, 1085–1155.

Becht, M., Franks, J., Mayer, C., Rossi, S., 2008. Returns to shareholder activism: Evidence from a clinical study of the Hermes UK Focus Fund. Review of Financial Studies 22 (8), 3093–3129.

Benabou, R., Laroque, G., 1992. Using privileged information to manipulate markets: Insiders, gurus, and credibility. The Quarterly Journal of Economics 107 (3), 921–958.

Boehmer, E., Jones, C. M., Zhang, X., 2008. Which shorts are informed? Journal of Finance 63 (2), 491–527.

Boehmer, E., Jones, C. M., Zhang, X., 2013. Shackling short sellers: The 2008 shorting ban. Review of Financial Studies 26 (6), 1363–1400.

Bommel, J. V., 2003. Rumors. The Journal of Finance 58 (4), 1499–1519.

Boyson, N. M., Gantchev, N., Shivdasani, A., 2017. Activism mergers. Journal of Financial Economics 126 (1), 54–73.

Brav, A., Jiang, W., Kim, H., 2010. Hedge fund activism: A review. Foundations and Trends in Finance 4 (3), 1–66.

Brav, A., Jiang, W., Kim, H., 2015. The real effects of hedge fund activism: Productivity, asset allocation, and labor outcomes. Review of Financial Studies 28 (10), 2723–2769.

Brav, A., Jiang, W., Ma, S., Tian, X., 2018. How does hedge fund activism reshape corporate innovation? Journal of Financial Economics 130 (2), 237–264.

Brav, A., Jiang, W., Partnoy, F., Thomas, R., 2008. Hedge fund activism, corporate governance, and firm performance. Journal of Finance 63 (4), 1729–1775.

Che, Y.-K., Dessein, W., Kartik, N., February 2013. Pandering to persuade. American Economic Review 103 (1), 47–79.

Christophe, S. E., Ferri, M. G., Angel, J. J., 2004. Short-selling prior to earnings announcements. Journal of Finance 59 (4), 1845–1876.

Christophe, S. E., Ferri, M. G., Hsieh, J., 2010. Informed trading before analyst downgrades: Evidence from short sellers. Journal of Financial Economics 95 (1), 85–106.

Clifford, C. P., 2008. Value creation or destruction? Hedge funds as shareholder activists. Journal of Corporate Finance 14 (4), 323–336.

Cohen, L., Diether, K. B., Malloy, C. J., 2007. Supply and demand shifts in the shorting market. Journal of Finance 62 (5), 2061–2096.

Crawford, V., Sobel, J., 1982. Strategic information transmission. Econometrica 50 (6), 1431–1451.

Denes, M. R., Karpoff, J. M., McWilliams, V. B., 2017. Thirty years of shareholder activism: A survey of empirical research. Journal of Corporate Finance 44, 405–424.

Desai, H., Ramesh, K., Thiagarajan, S. R., Balachandran, B. V., 2002. An investigation of the informational role of short interest in the Nasdaq market. Journal of Finance 57 (5), 2263–2287.

Edmans, A., Goldstein, I., Jiang, W., December 2015. Feedback effects, asymmetric trading, and the limits to arbitrage. American Economic Review 105 (12), 3766–97.

Einhorn, D., 2010. *Fooling Some of the People All of the Time: A Long Short Story*. Wiley.

Engelberg, J. E., Reed, A. V., Ringgenberg, M. C., 2012. How are shorts informed? Short sellers, news, and information processing. Journal of Financial Economics 105 (2), 260–278.

Farrell, J., Gibbons, R., 1989. Cheap talk with two audiences. The American Economic Review 79 (5), 1214–1223.

Fich, E., Shivdasani, A., 2007. Financial fraud, director reputation, and shareholder wealth. Journal of Financial Economics 86 (2), 306–336.

Fotak, V., Raman, V., Yadav, P. K., 2014. Fails-to-deliver, short selling, and market quality. Journal of Financial Economics 114 (3), 493 – 516.

Gillan, S. L., Starks, L. T., 2007. The evolution of shareholder activism in the United States. Journal of Applied Corporate Finance 19 (1), 55–73.

Goldstein, I., Guembel, A., 2008. Manipulation and the allocational role of prices. The Review of Economic Studies 75 (1), 133–164.

Goldstein, I., Ozdenoren, E., Yuan, K., 2013. Trading frenzies and their impact on real investment. Journal of Financial Economics 109 (2), 566–582.

Greenwood, R., Schor, M., 2009. Investor activism and takeovers. Journal of Financial Economics 92 (3), 362–375.

Hoberg, G., Phillips, G., 2010. Product market synergies and competition in mergers and acquisitions: A text-based analysis. Review of Financial Studies 23 (10), 3773–3811.

Hoberg, G., Phillips, G., 2016. Text-based network industries and endogenous product differentiation. Journal of Political Economy 124 (5), 1423–1465.

Jank, S., Roling, C., Smajlbegovic, E., October 2016. Flying under the radar: The effects of short-sale disclosure rules on investor behavior and stock prices, working paper.

Jones, C. M., 2012. Shorting restrictions: Revisiting the 1930s. Financial Review 47 (1), 1–35.

Jones, C. M., Lamont, O. A., 2002. Short-sale constraints and stock returns. Journal of Financial Economics 66 (2-3), 207–239.

Jones, C. M., Reed, A. V., Waller, W., 2016. Revealing shorts an examination of large short position disclosures. Review of Financial Studies 29 (12), 3278–3320.

Karpoff, J. M., Lou, X., 2010. Short sellers and financial misconduct. The Journal of Finance 65 (5), 1879–1913.

Khanna, N., Mathews, R. D., 2012. Doing battle with short sellers: The conflicted role of blockholders in bear raids. Journal of Financial Economics 106 (2), 229 – 246.

Klein, A., Zur, E., 2009. Entrepreneurial shareholder activism: Hedge funds and other private investors. The Journal of Finance 64 (1), 187–229.

Kyle, A. S., 1985. Continuous auctions and insider trading. Econometrica 53, 1315–1335.

Lamont, O. A., 2012. Go down fighting: Short sellers vs. firms. Review of Asset Pricing Studies 2 (1), 1–30.

Levit, D., 11 2018. Soft Shareholder Activism. The Review of Financial Studies 32 (7), 2775–2808.

Ljungqvist, A., Qian, W., 2016. How constraining are limits to arbitrage? Review of Financial Studies 29 (8), 1975–2028.

McCahery, J., Sautner, Z., Starks, L., 2016. Behind the scenes: The corporate governance preferences of institutional investors. The Journal of Finance 71 (6), 2905–2932.

Mitts, J., January 2019. Short and distort, columbia Law and Economics Working Paper No. 592.

Rapach, D. E., Ringgenberg, M. C., Zhou, G., 2016. Short interest and aggregate stock returns. Journal of Financial Economics 121 (1), 46–65.

Reed, A. V., 2013. Short selling. Annual Review of Financial Economics 5 (1), 245–258.

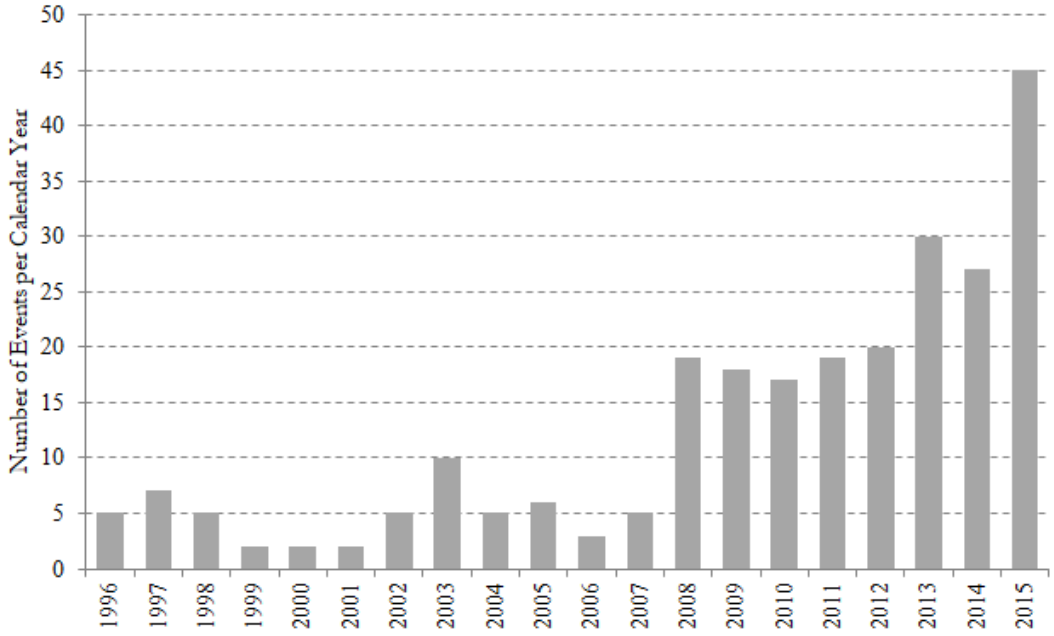
Senchack, A. J., Starks, L. T., 1993. Short-sale restrictions and market reaction to short-interest announcements. Journal of Financial and Quantitative Analysis 28 (2), 177–194.

Seneca, J. J., 1967. Short interest: Bearish or bullish? Journal of Finance 22 (1), 67–70.

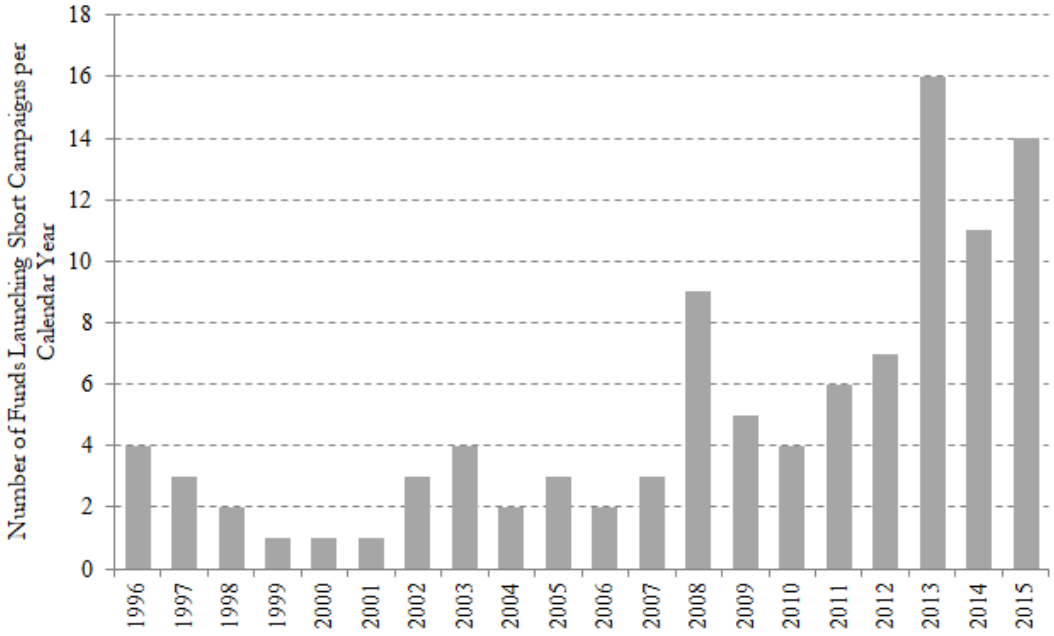
Sobel, J., 10 1985. A Theory of Credibility. The Review of Economic Studies 52 (4), 557–573.

Zhao, W., 2019. Activist short-selling and corporate opacity, working paper.

Zuckerman, R., 2011. Synchronized arbitrage and the value of public announcements, working paper.

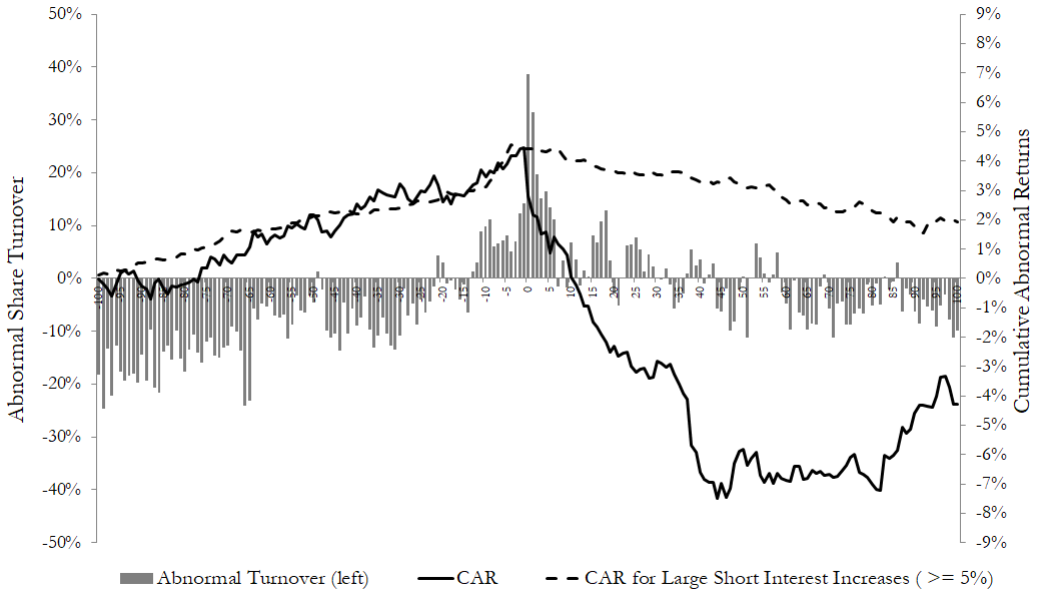


(a) Time Series Distribution of Campaigns

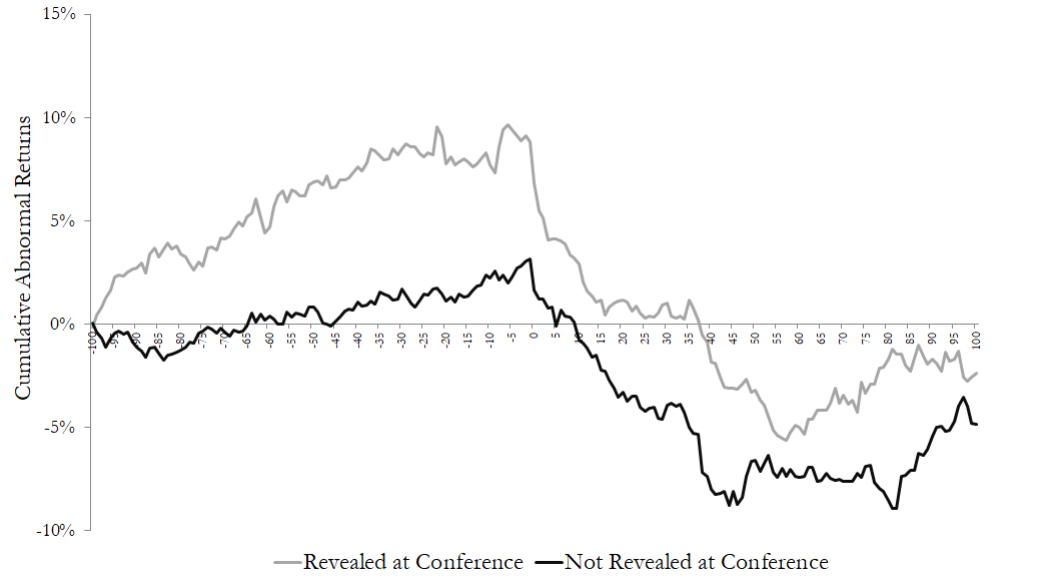


(b) Time Series Distribution of Hedge Funds Initiating Campaigns

Figure 1: **The Prevalence of Short-Selling Campaigns by Hedge Funds.** Panel (a) plots the number of short-selling campaigns initiated by hedge funds for each year in our sample. Panel (b) plots the number of hedge funds that initiate campaigns in each year. The data are described in Section 1.

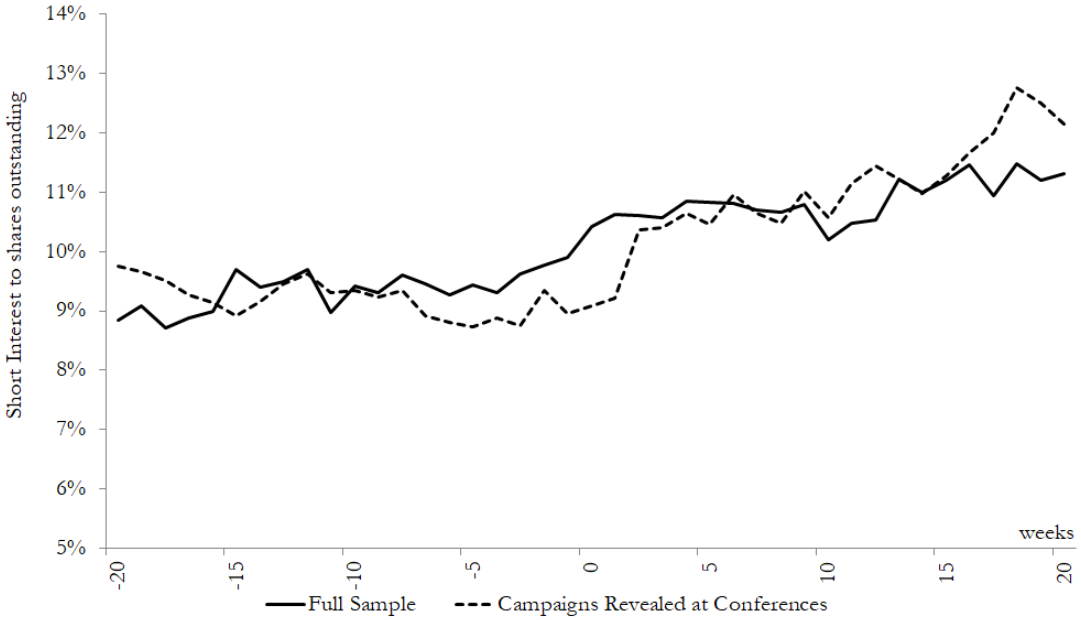


(a) Full Sample

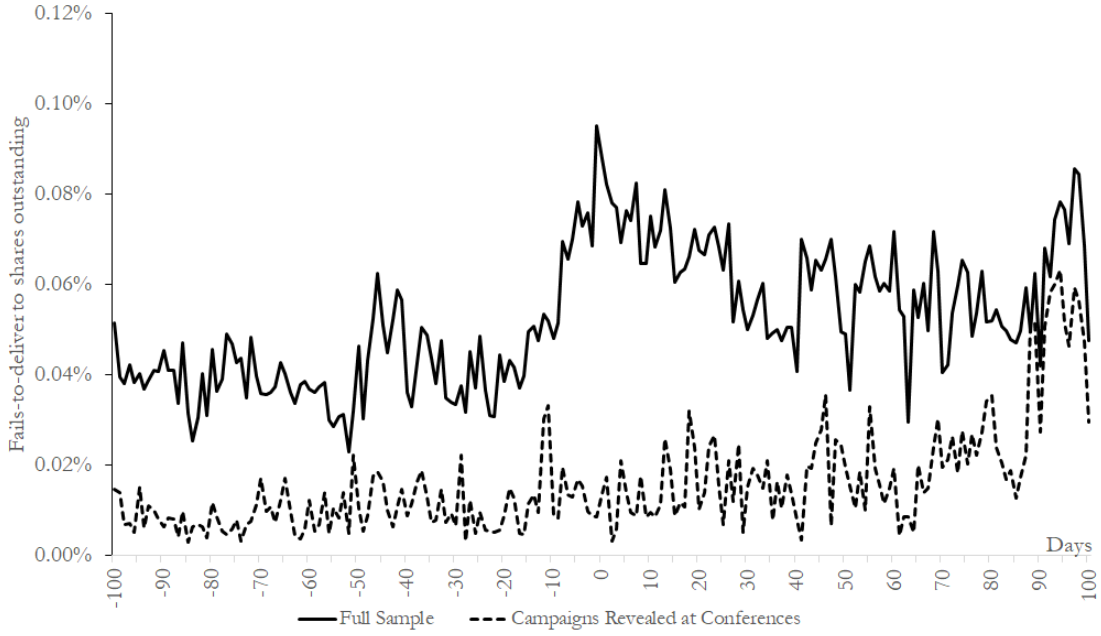


(b) Revelation Method Subsamples

Figure 2: **Cumulative Abnormal Returns and Turnover.** In panel (a), the solid line plots the cumulative abnormal returns from the three-factor (market, size, and book-to-market) model from 100 days before the announcement of a campaign to 100 days after. The dashed line plots the cumulative abnormal returns for large (i.e., more than 5% of shares outstanding) increases in short interest. The histogram plots abnormal share turnover from 100 days before the announcement of a campaign to 100 days after the announcement. In panel (b), the gray and black lines plot the cumulative abnormal returns for campaigns disclosed at investment conferences and through other means, respectively.



(a) Short Interest



(b) Fails-to-Deliver

Figure 3: **Short Interest and Fails-to-Deliver.** In panel (a), the solid line plots the percentage short interest from 20 two-week periods before the announcement of a short-selling campaign to 20 two-week periods after. The dashed line plots the percentage short interest for campaigns announced at investment conferences. In panel (b), the solid and dashed lines plot the percentage of fails-to-deliver from 100 days before the announcement of a campaign to 100 days after for the full and conference samples, respectively.

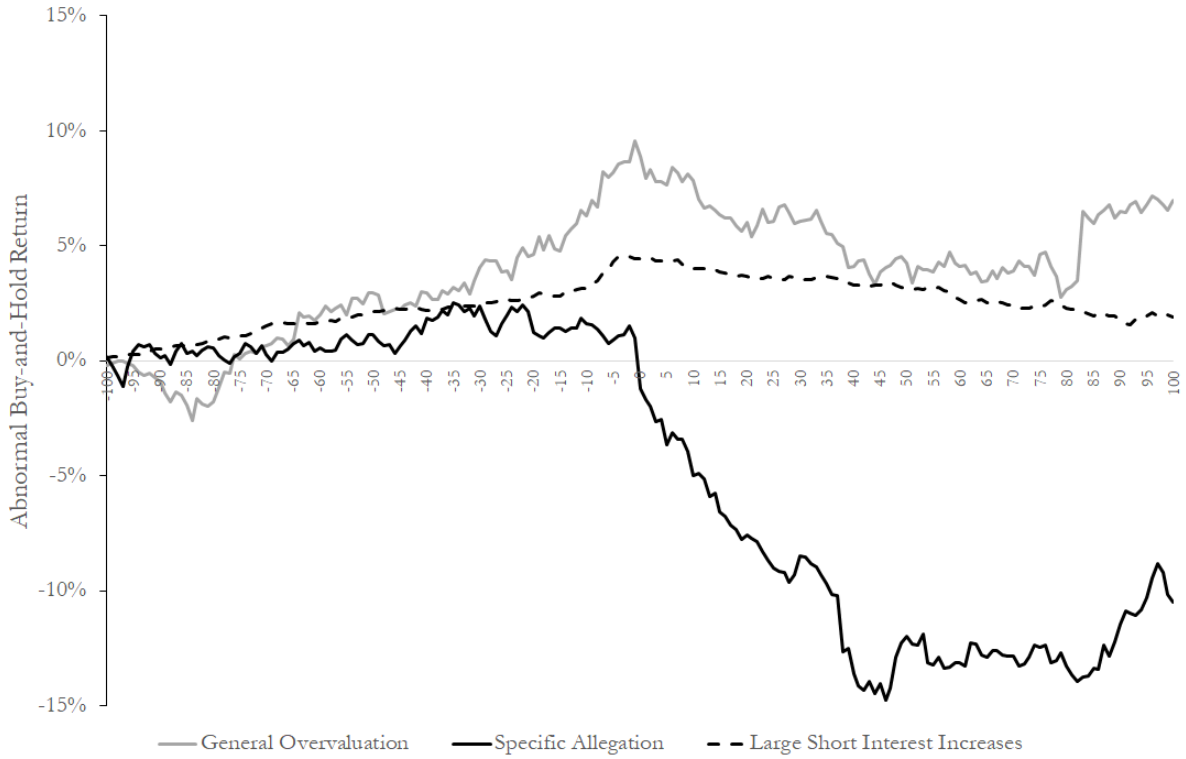


Figure 4: **Abnormal Returns for Specific Allegations vs. General Overvaluation.** This figure plots the cumulative abnormal returns from the three-factor (market, size, and book-to-market) model from 100 days before an event to 100 days after. The light gray line plots the cumulative abnormal returns for short-selling campaigns with general overvaluation allegations. The black line plots the cumulative abnormal returns for short-selling campaigns with specific allegations. Specific allegations include financials/capital structure, industry/competitors, fraud/accounting, product/business model, and management/insider selling. The dashed line plots the cumulative abnormal returns for large (i.e., more than 5% of shares outstanding) increases in short interest. Table 1 reports the frequency of different types of allegations.

Table 1: **Allegations and Disclosure Methods**
Panel A reports allegations made by hedge funds in short-selling campaigns. Allegations are not mutually exclusive. Panel B reports disclosure methods for campaigns. The data are described in Section 1.

	Number of campaigns (1)	Percentage of campaigns (2)
Panel A: *Allegations*		
General Overvaluation	94	37.3%
Industry/Competitors	63	25.0%
Product/Business Model	41	16.3%
Fraud/Accounting	34	13.5%
Financials/Capital Structure	33	12.1%
Management/Insider Selling	11	4.4%
Panel B: *Disclosure Methods*		
Newspaper/TV	136	54.0%
Conference	57	22.6%
Letter to Investors	33	13.1%
White Paper/Other	26	10.3%
Total Campaigns:	*252*	

Table 2: **Target Characteristics**
This table reports summary statistics for the targets of short-selling campaigns. Columns (1)–(3) report mean, median, and standard deviation of each variable. Column (4) reports the average difference with a matched firm and column (5) reports the t-statistic of the difference. Following Brav et al. (2008), matched firms are chosen based on 3-digit SIC code and MV and BM deciles. If no match is found, we change the matching criteria to 2-digit SIC code and MV and BM quintiles, and 2-digit SIC code and MV and BM terciles if necessary. Columns (6) and (7) report the median difference and the corresponding Wilcoxon signed-rank test statistics. All variables are defined in Table A1.

	Summary Statistics			Difference with Matched Firms			
	Mean	Median	SD	Avg. Diff.	t-stat of Diff.	Median Diff.	Wilcoxon
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MV (log)	8.63	8.71	1.62	2.46	16.08	2.36	10.82
BM	0.36	0.31	1.00	-0.14	-1.82	-0.10	-2.98
Q	2.84	1.86	2.43	0.47	2.95	0.00	1.87
GROWTH	0.13	0.11	0.44	0.01	0.30	-0.02	-0.90
ROA	0.14	0.14	0.35	0.16	6.20	0.16	9.68
CF	0.07	0.09	0.36	0.15	5.93	0.17	9.51
LEV	0.59	0.61	0.23	0.06	3.71	0.08	3.61
CASH	0.19	0.13	0.19	-0.004	-0.33	-0.06	-2.64
DIVYLD	0.02	0.00	0.03	0.002	0.70	-0.015	-2.28
PAYOUT	0.30	0.00	0.65	0.05	0.94	-0.25	-3.54
# ANALYSTS (log)	1.92	2.05	0.78	1.19	21.16	1.32	11.38
INST	0.65	0.72	0.31	0.27	11.65	0.33	8.92
STKRET	0.31	0.07	0.83	0.13	2.29	-0.03	0.56
AMIHUD	0.03	0.02	0.06	-0.02	-4.97	-0.01	-7.87
SHORTINT (annual)	0.08	0.05	0.07	0.03	5.94	0.03	4.47
$\mathbb{1}_{\text{LAWSUIT}}$	0.53	1.00	0.50	0.17	4.68	0.64	6.90

Table 3: **Predicting Short-Selling Campaigns**
Panel A uses firm-level variables to predict short-selling campaigns. The dependent variable is an indicator defined at the firm-year level for whether a firm is targeted by a campaign. The sample includes all Compustat firms from 1996 through 2015, and standard errors are clustered at the firm level. Panel B uses fund-level variables to predict campaigns. The dependent variable is an indicator defined at the fund-year-quarter level for if a fund undertakes a short-selling campaign. The sample includes all hedge funds with Schedule 13F filings, and standard errors are clustered at the fund level. Both panels use a probit model in column (1) and OLS in the remaining columns. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All independent variables are defined in Table A1.

Panel A: *Firm Characteristics*

Dependent Variable:	Target (Firm Level)			
Model:	Probit	OLS	OLS	OLS
	(1)	(2)	(3)	(4)
MV (log)	0.0002***	0.0009***	0.0010***	0.0010***
	(0.0000)	(0.0001)	(0.0002)	(0.0002)
Q	0.0000**	0.0002**	0.0001	0.0001
	(0.0000)	(0.0001)	(0.0001)	(0.0001)
GROWTH	0.0000	0.0000	-0.0001	0.0000
	(0.0001)	(0.0004)	(0.0004)	(0.0005)
ROA	-0.0001	0.0001	0.0001	0.0003
	(0.0001)	(0.0006)	(0.0006)	(0.0007)
LEV	0.0002	0.0011**	0.0019**	0.0013*
	(0.0001)	(0.0005)	(0.0008)	(0.0008)
DIVYLD	0.0008	-0.0040	0.0029	0.0008
	(0.0009)	(0.0045)	(0.0052)	(0.0055)
# ANALYSTS (log)	0.0000	0.0001	-0.0001	-0.0001
	(0.0000)	(0.0003)	(0.0003)	(0.0003)
INST	0.0002	-0.0023***	-0.0028***	-0.0027***
	(0.0001)	(0.0009)	(0.0009)	(0.0009)
SHORTINT (annual)	0.0047***	0.0466***	0.0452***	0.0400***
	(0.0013)	(0.0111)	(0.0112)	(0.0118)
Observations	91,448	91,448	91,448	90,930
Pseudo R^2 / R^2	0.1853	0.0060	0.0121	0.0673
Fixed Effects:				
Year FE	No	Yes	Yes	No
Industry FE	No	No	Yes	No
Industry-Year FE	No	No	No	Yes

Panel B: *Fund Characteristics*

Dependent Variable:	Campaign (Fund Level)		
Model:	Probit	OLS	OLS
	(1)	(2)	(3)
$\mathbb{1}_{\text{ACTIVIST}}$	0.0034***	0.0056***	
	(0.0010)	(0.0016)	
AUM (log)	0.0001	0.0008*	0.0010*
	(0.0001)	(0.0005)	(0.0005)
PORTFOLIO RETURN	-0.0065	-0.0209	-0.0209*
	(0.0048)	(0.0130)	(0.0125)
% PORTFOLIO SHORT INTEREST	-0.0143	-0.0570**	-0.0140
	(0.0136)	(0.0288)	(0.0358)
# HOLDINGS (log)	-0.0001	-0.0007	-0.0009*
	(0.0001)	(0.0006)	(0.0005)
PORTFOLIO TURNOVER	-0.0000	0.0003	-0.0001
	(0.0001)	(0.0004)	(0.0004)
PORTFOLIO CONCENTRATION	-0.0009	-0.0020	-0.0053
	(0.0007)	(0.0017)	(0.0033)
PORTFOLIO ILLIQUIDTY	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Observations	43,256	43,256	43,235
Pseudo R^2 / R^2	0.203	0.0072	0.0995
Fixed Effects:			
Year-Qtr FE	No	Yes	Yes
Fund FE	No	No	Yes

Table 4: **Cumulative Abnormal Returns**
Panel A reports cumulative abnormal returns for short-selling campaigns. Panel B reports cumulative abnormal returns for large changes in short interest (i.e., at least 5% of shares outstanding). Panel C reports the difference between cumulative abnormal returns in Panel A and B. In columns (1)–(3), the cumulative abnormal return is from 10 days before the event to 10 days after. In columns (4)–(6), the cumulative abnormal return is from 10 days before the event to 100 days after. Columns (1) and (4) reports abnormal returns from the market factor model, columns (2) and (5) reports abnormal returns from the three-factor (market, size, and book-to-market) model, and columns (3) and (6) reports abnormal returns from the five-factor model (market, size, book-to-market, profitability, and investment). ** and *** indicate statistical significance at the 5% and 1% levels, respectively.

Dependent Variable:	[t–10, t+10] CAR			[t–10, t+100] CAR		
Model:	one-factor	three-factor	five-factor	one-factor	three-factor	five-factor
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: *Short-Selling Campaigns*						
Event	-0.0339**	-0.0357***	-0.0340**	-0.0767***	-0.0787***	-0.0599**
	(0.0144)	(0.0132)	(0.0135)	(0.0244)	(0.0246)	(0.0270)
Observations	202	202	202	195	195	195
Panel B: *Large Increase in Short Interest*						
Event	0.0081***	0.0086***	0.0101***	-0.0200***	-0.0145***	-0.0054
	(0.00281)	(0.00284)	(0.00286)	(0.0046)	(0.0047)	(0.0050)
Observations	9,032	9,032	9,032	8,762	8,762	8,762
Panel C: *Difference (Panel A–Panel B)*						
	-0.0421***	-0.0443***	-0.0441***	-0.0566**	-0.0642**	-0.0545**
	(0.0146)	(0.0135)	(0.0138)	(0.0248)	(0.0250)	(0.0274)

Table 5: **Short Interest**

This table analyzes changes in short interest around short-selling campaigns. The table reports estimates of the following OLS regression: $y_{et} = \alpha Target_{et} + \zeta_e + \varepsilon_{et}$, where y_{et} is short interest for event e and period t, where a period is two weeks. $Target_{et}$ is an indicator equal to one following the announcement of a short-selling campaign. ζ_e are event fixed effects. The sample includes observation from 10 periods before the announcement of a campaign to 10 periods after. Columns (1) and (2) report full sample estimates and columns (3) and (4) report estimates for campaigns announced at investment conferences. Robust standard errors are clustered by event and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All independent variables are defined in Table A1.

Dependent Variable:	SHORTINT			
Sample:	Full		Conferences	
	(1)	(2)	(3)	(4)
Target	0.0104**	0.0141***	0.0126**	0.0131**
	(0.00519)	(0.00449)	(0.0053)	(0.00536)
Constant	0.0978***		0.0864***	
	(0.00722)		(0.0129)	
Observations	3,997	3,997	837	837
R^2	0.002	0.846	0.005	0.917
Fixed Effects:				
Event FE	No	Yes	No	Yes

Table 6: **Litigation**

This table reports changes in litigation against firms following short-selling campaigns. The table reports estimates of the following OLS regression at the annual frequency: $y_{it} = \alpha Target_{it} + X'_{it}\beta + \zeta_t + \zeta_i + \varepsilon_{it}$, where y_{it} is the indicator for a lawsuit for firm i in year t, $Target_{it}$ is an indicator equal to one in the year following the announcement of a short selling campaign, X_{it} is a vector of control variables, ζ_t are year fixed effects, and ζ_i are firm fixed effects. Lawsuits consists of shareholder litigation, fraud or accounting suits, IP suits, product liability suits, and antitrust suits from Audit Analytics. Standard errors are reported in parentheses and are clustered at firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All independent variables are defined in Table A1.

Dependent Variable:	$\mathbb{1}_{\text{LAWSUIT}}$			
	(1)	(2)	(3)	(4)
$Target_{it}$	0.386***	0.144***	0.124***	0.124***
	(0.0346)	(0.0310)	(0.0302)	(0.0301)
SHORTINT (annual)			0.846***	0.833***
			(0.0490)	(0.0493)
MV (log)				0.001
				(0.0012)
Q				-0.001***
				(0.0001)
GROWTH				-0.021***
				(0.0020)
Observations	135,239	133,529	133,529	133,529
R^2	0.025	0.334	0.337	0.338
Fixed Effects:				
Firm FE	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 7: **Activism Experience and Hostility**
This table examines the cross-sectional relation between short-selling campaigns and long-activism experience and hostility. The dependent variable is an indicator for whether an activist undertakes at least one short-selling campaign in our sample. The main explanatory variables are the natural logarithm of the total number of activism campaigns undertaken by an activist, an indicator for whether at least 10 percent of campaigns are hostile (e.g., involve proxy fights or litigation), and the success, failure, and settlement rates across all campaigns for an activist. The sample includes hedge funds with Schedule 13F filings between 1996 and 2015 from Brav et al. (2008). Robust standard errors are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All independent variables are defined in Table A1.

Dependent Variable:	$\mathbb{1}_{\text{ACTIVE SHORT SELLER}}$				
	(1)	(2)	(3)	(4)	(5)
log(# ACTIVISM CAMPAIGNS)	0.0548***		0.0362**		0.0352*
	(0.0191)		(0.0183)		(0.0184)
$\mathbb{1}_{\text{HOSTILE}}$		0.128***	0.106***		0.122***
		(0.0360)	(0.0360)		(0.0388)
SUCCESS RATE				0.0287	-0.0415
				(0.0504)	(0.0488)
FAILURE RATE				0.00388	-0.0432
				(0.0584)	(0.0540)
SETTLEMENT RATE				0.0799	-0.0482
				(0.0677)	(0.0666)
Constant	0.0218	0.0580***	0.00934	0.0952***	0.0193
	(0.0280)	(0.0157)	(0.0274)	(0.0185)	(0.0299)
Observations	369	369	369	369	369
R^2	0.026	0.041	0.051	0.004	0.053

Table 8: **Cumulative Abnormal Returns: Specific Allegations vs. General Overvaluation**
This table reports the average cumulative abnormal returns for different types of allegations. Panel A reports CARs for campaigns with specific allegations. Panel B reports CARs for campaigns with general overvaluation allegations. Both panels report the difference with CARs from large changes in short interest (from Panel B of Table 4). Columns (1)–(3) report cumulative abnormal return from 10 days before the event to 10 days after. Columns (4)–(6) report the cumulative abnormal return from 10 days before the event to 100 days after. Columns (1) and (4) report abnormal returns from the market factor model, columns (2) and (5) report abnormal returns from the three-factor (market, size, and book-to-market) model, and columns (3) and (6) report abnormal returns from the five-factor model (market, size, book-to-market, profitability, and investment). *** indicates statistical significance at the 1% level.

Dependent Variable:	[t–10, t+10] CAR			[t–10, t+100] CAR		
Model:	one-factor	three-factor	five-factor	one-factor	three-factor	five-factor
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: *Short-Selling Campaigns with Specific Allegations*						
Event	-0.0554***	-0.0630***	-0.0590***	-0.119***	-0.120***	-0.0907***
	(0.0211)	(0.0184)	(0.0189)	(0.0312)	(0.0305)	(0.0342)
Observations	125	125	125	120	120	120
Difference with large increases in short interest	-0.0636***	-0.0716***	-0.0691***	-0.0992***	-0.1060***	-0.0853**
	(0.0212)	(0.0186)	(0.0190)	(0.0314)	(0.0307)	(0.0345)
Panel B: *Short-Selling Campaigns with General Overvaluation Allegations*						
Event	0.00100	0.00859	0.00642	-0.00856	-0.0119	-0.0107
	(0.0152)	(0.0166)	(0.0172)	(0.0382)	(0.0404)	(0.0434)
Observations	77	77	77	75	75	75
Difference with large increases in short interest	-0.0071	0.0000	-0.0037	0.0115	0.0026	-0.0053
	(0.0154)	(0.0167)	(0.0173)	(0.0382)	(0.0404)	(0.0434)

Table 9: **Short Interest: Specific Allegations vs. General Overvaluation**
This table analyzes changes in short interest around short-selling campaigns for different types of allegations. The table reports estimates of the following OLS regression: $y_{et} = \alpha Target_{et} + \zeta_e + \varepsilon_{et}$, where y_{et} is short interest for event e and period t, where a period is two weeks. $Target_{et}$ is an indicator equal to one following the announcement of a short selling campaign. ζ_e are event fixed effects. The sample includes observation from 10 periods before the announcement of a campaign to 10 periods after. Columns (1) and (2) report estimates for the sub-sample of campaigns with general allegations and columns (3) and (4) report estimates for the sub-sample of campaigns with specific allegations. Robust standard errors are clustered by event and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable:	SHORTINT			
Allegation Type:	General		Specific	
	(1)	(2)	(3)	(4)
Target	0.0000	0.0053	0.0169***	0.0170***
	(0.0119)	(0.0081)	(0.0060)	(0.0060)
Constant	0.1110***		0.0873***	
	(0.0134)		(0.0094)	
Observations	1,360	1,360	2,329	2,329
R^2	0.000	0.844	0.006	0.835
Fixed Effects:				
Event FE	No	Yes	No	Yes

Table 10: **Litigation: Specific Allegations vs. General Overvaluation**
This table reports changes in litigation against firms following short-selling campaigns for different types of allegations. The table reports estimates of the following OLS regression at the annual frequency: $y_{it} = \alpha_1 Target\ Specific_{it} + \alpha_2 Target\ General_{it} + X'_{it}\beta + \zeta_t + \zeta_i + \varepsilon_{it}$, where y_{it} is the indicator for a lawsuit for firm i in year t, $Target\ Specific_{it}$ is an indicator equal to one in the year following the announcement of a short-selling campaign with specific allegations, $Target\ General_{it}$ is an indicator equal to one in the year following the announcement of a short-selling campaign with general overvaluation allegations, X_{it} is a vector of control variables, ζ_t are year fixed effects, and ζ_i are firm fixed effects. Lawsuits consists of shareholder litigation, fraud or accounting suits, IP suits, product liability suits, and antitrust suits from Audit Analytics. Standard errors are reported in parentheses and are clustered at firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All independent variables are defined in Table A1.

Dependent Variable:	$\mathbb{1}_{\text{LAWSUIT}}$		
	(1)	(2)	(3)
$Target\ Specific_{it}$	0.1699***	0.1469***	0.1466***
	(0.0389)	(0.0382)	(0.0381)
$Target\ General_{it}$	0.0760	0.0631	0.0635
	(0.0529)	(0.0517)	(0.0518)
SHORTINT		0.8466***	0.8335***
		(0.0490)	(0.0493)
MV (log)			0.0007
			(0.0012)
Q			-0.0009***
			(0.0001)
GROWTH			-0.0211***
			(0.0020)
Observations	133,529	133,529	133,529
R^2	0.3340	0.3373	0.3381
Fixed Effects:			
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Supplemental Internal Materials for the paper

"Active Short Selling by Hedge Funds"

Appendix A. Supplemental Tables and Figures

Table A1: **Variable Definitions**

Variable	Definition
MV (log)	Log of the market capitalization.
BM	Market value of equity / Book value of equity.
Q	(Book value of debt + market value of equity) / (book value of debt + book value of equity).
GROWTH	Log sales growth.
ROA	EBITDA to lagged total assets.
CF	Net income + Deprectiation and amortization to lagged total assets.
LEV	Total Liabilities to total assets.
CASH	Cash and Short-term investments to total assets.
DIVYLD	(Common dividends + Preferred Dividends)/(Market value of common equity + Book value of preferred equity).
PAYOUT	Total dividend payments/Net income before extraordinary items.
# ANALYSTS (log)	Log of 1 + the number of analysts following the firm.
INST	Percentage of shares held by institutions.
STKRET	Stock return over the previous 12 months.
AMIHUD	Annual firm-level average (using daily data) of $1000 * (\|Return\|/Dollar\ trading\ volume)^{1/2}$.
SHORTINT	Short interest/Shares outstanding (biweekly).
SHORTINT (annual)	Annual firm-level average (using biweekly data) of Short interest/Shares outstanding.
$\mathbb{1}_{\text{LAWSUIT}}$	Dummy variable equal to one when a firm is sued in a given time period.
Campaign	Dummy variable equal to one when a fund launches a short selling campaign in a given time period.
$\mathbb{1}_{\text{ACTIVIST}}$	Dummy variable equal to one if a fund is an activist hedge fund
AUM (log)	Log of 1 + assets under management (in dollars)
PORTFOLIO RETURN	The value-weighted return of a fund's 13F holdings.
# HOLDINGS (log)	The number distinct long positions on a fund's 13F.
PORTFOLIO TURNOVER	The sum of the holding-level absolute dollar value change across all 13F portfolio holdings, divided by the sum of the holding-level average dollar value over the last two quarters across all 13F portfolio holdings.
PORTFOLIO CONCENTRATION	The Herfindahl-Hirschman Index (HHI) of a fund's long positions on its 13F.
PORTFOLIO ILLIQUIDITY	The value-weighted Amihud (2002) measure of illiquidity across a funds 13F portfolio holdings.

Table A2: **Fund-Level Descriptive Statistics**
This table reports descriptive statistics for fund characteristics. All variables are defined in Table A1.

	Mean (1)	Median (2)	SD (3)
CAMPAIGN	0.0016	0.0000	0.0405
$\mathbb{1}_{\text{ACTIVIST}}$	0.2499	0.0000	0.4329
AUM (log)	19.97	19.84	1.67
PORTFOLIO RETURN	0.0014	0.0000	0.0136
# HOLDINGS (log)	4.1581	4.1744	3.9235
PORTFOLIO TURNOVER	0.5750	0.4242	0.4952
PORTFOLIO CONCENTRATION	0.0863	0.0366	0.1469
% PORTFOLIO SHORT INTEREST	0.0012	0.0001	0.0035
PORTFOLIO ILLIQUIDITY	11.77	3.11	28.68

Table A3: **Long Campaign Returns Following Short-Selling Campaigns**
This table reports the relation between abnormal returns around activism campaign announcements and abnormal returns around short-selling campaign announcements. We report estimates of regression: $CAR_{fe}^{long} = \alpha CAR_{fe}^{short} + X_e'\delta + \zeta_t + \zeta_f + \varepsilon_e$, where CAR_{fe}^{long} is the abnormal return for long campaign e for activist hedge fund f, CAR_{fe}^{short} is the abnormal return for short-selling campaigns for fund f in the 12 months preceding long campaign e, X_e is a vector of control variables, ζ_t are year fixed effects, and ζ_f are activist hedge fund fixed effects. Columns (1)–(3) report abnormal returns from the one-factor model, columns (4)–(6) report abnormal returns from the three-factor (market, size, and book-to-market) model, and columns (7)–(9) report abnormal returns from the five-factor model (market, size, book-to-market, profitability, and investment). Standard errors are reported in parentheses and are clustered at the fund level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable:	CAR^{long}								
Model:	one-factor			three-factor			five-factor		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CAR^{short}	0.0264	0.358	0.404	0.0363	0.415	0.460	0.0618	0.454*	0.499*
	(0.189)	(0.256)	(0.265)	(0.195)	(0.275)	(0.288)	(0.193)	(0.274)	(0.285)
Observations	2,247	2,128	1,942	2,247	2,128	1,942	2,247	2,128	1,942
R^2	0.010	0.149	0.174	0.009	0.146	0.169	0.011	0.150	0.168
Controls and Fixed Effects:									
Controls	No	No	Yes	No	No	Yes	No	No	Yes
Fund FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A4: **Use Short-Selling Campaigns to Hedge Long Positions**
This table analyzes whether short-selling campaigns are used to hedge existing long positions of hedge funds. The table reports estimates of regression: $Campaign_{ift} = \alpha CompetitorPortfolioWeight_{ift} + X'_{ift}\beta + \zeta_t + \zeta_i + \zeta f + \varepsilon_{ift}$, where $Campaign_{ift}$ is an indicator for whether a firm is targeted by a short-selling campaign, $CompetitorPortfolioWeight_{ift}$ is the activists' portfolio weight in competitors, X_{ift} is a vector of control variables, ζ_t are year fixed effects, ζ_i are firm fixed effects, and ζ_f are fund fixed effects. We define competitor portfolio weights (and score weighted portfolio weights) based on classifications by Hoberg and Phillips (2010) and Hoberg and Phillips (2016). Standard errors are reported in parentheses and are clustered by fund-firm pairs. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable:	Campaign					
	(1)	(2)	(3)	(4)	(5)	(6)
Competitor Portfolio Weight	0.0006	0.0004	0.0003			
	(0.0004)	(0.0004)	(0.0005)			
Competitor Portfolio Weight (Score Weighted)				0.0070	0.0044	0.0023
				(0.0047)	(0.0048)	(0.0064)
Observations	12,438,357	12,438,357	6,956,963	12,438,357	12,438,357	6,956,963
R^2	0.000	0.001	0.001	0.000	0.001	0.001
Controls and Fixed Effects:						
Controls	No	No	Yes	No	No	Yes
Fund FE	No	Yes	Yes	No	Yes	Yes
Firm FE	No	Yes	Yes	No	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes

about ECGI

The European Corporate Governance Institute has been established to improve *corporate governance through fostering independent scientific research and related activities.*

The ECGI will produce and disseminate high quality research while remaining close to the concerns and interests of corporate, financial and public policy makers. It will draw on the expertise of scholars from numerous countries and bring together a critical mass of expertise and interest to bear on this important subject.

The views expressed in this working paper are those of the authors, not those of the ECGI or its members.

ECGI Working Paper Series in Finance

Electronic Access to the Working Paper Series

The full set of ECGI working papers can be accessed through the Institute's Web-site (https://ecgi.global/content/working-papers) or SSRN:

Finance Paper Series	http://www.ssrn.com/link/ECGI-Fin.html
Law Paper Series	http://www.ssrn.com/link/ECGI-Law.html