

DISCUSSION PAPER SERIES

DP13788

ACTIVE SHORT SELLING BY HEDGE FUNDS

Ian Appel, Jordan Bulka and Vyacheslav Fos

FINANCIAL ECONOMICS

ACTIVE SHORT SELLING BY HEDGE FUNDS

Ian Appel, Jordan Bulka and Vyacheslav Fos

Discussion Paper DP13788

Published 09 June 2019

Submitted 01 June 2019

Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

This Discussion Paper is issued under the auspices of the Centre's research programme in **FINANCIAL ECONOMICS**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as an educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Ian Appel, Jordan Bulka and Vyacheslav Fos

ACTIVE SHORT SELLING BY HEDGE FUNDS

Abstract

Short selling campaigns by hedge funds have become increasingly common in the last decade. Using a hand-collected sample of 252 campaigns, we document abnormal returns for targets of approximately -7% around the announcement date. Firm stakeholders, including the media, plaintiffs' attorneys, and other short sellers, play an important role in campaigns. Changes in aggregate short interest do not drive the effects on firm value and stakeholder behavior. Campaigns are primarily undertaken by activist hedge funds. Evidence suggests disclosure costs and information are important channels through which activism technology affects short selling.

JEL Classification: N/A

Keywords: N/A

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

Jordan Bulka - jordan.bulka@bc.edu
Carroll School of Management, Boston College

Vyacheslav Fos - fos@bc.edu
Boston College, Carroll School of Management and CEPR

Active Short Selling by Hedge Funds[☆]

Ian Appel

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

Jordan Bulka

Carroll School of Management, Boston College
jordan.bulka@bc.edu

Vyacheslav Fos

Carroll School of Management, Boston College
vyacheslav.fos@bc.edu

First Version: March 2018

This Version: May 2019

[☆]We have benefited from comments by Alon Brav, Cliff Holderness, Robert Jackson, Wei Jiang, Peter Kelly, 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, and the 2019 American Law and Economics Association Meetings. We also thank Sourabh Banthia, Troy Heidenberg, Ryan Leary, Vinh Nguyen, Spencer Olson, Fisher Pressman, and Jonah Schumer for excellent research assistance. This paper previously circulated under the title “Public Short Selling by Activist Hedge Funds.”

Active Short Selling by Hedge Funds

Abstract

Short selling campaigns by hedge funds have become increasingly common in the last decade. Using a hand-collected sample of 252 campaigns, we document abnormal returns for targets of approximately -7% around the announcement date. Firm stakeholders, including the media, plaintiffs' attorneys, and other short sellers, play an important role in campaigns. Changes in aggregate short interest do not drive the effects on firm value and stakeholder behavior. Campaigns are primarily undertaken by activist hedge funds. Evidence suggests disclosure costs and information are important channels through which activism technology affects short selling.

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. Perhaps because of this sentiment, investors are often reluctant to disclose 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 dropped over 10% the following day, and by the next month its short interest increased six-fold. The SEC later launched an investigation into Allied that “zero[ed] in on many of the criticisms made by short sellers.”¹

In this paper, we undertake a comprehensive analysis of public short selling campaigns by hedge funds. We refer to these campaigns as “active” short selling because hedge funds take costly actions (e.g., public disclosure) to enhance the flow of negative information into prices. The costs associated with such campaigns can be substantial. First, disclosure invites regulatory scrutiny. For example, authorities investigated Bill Ackman for market manipulation related to his short position in Herbalife.² Second, firms can take various actions to impede short sellers. Such actions include encouraging investors to withdraw shares from the lending market, limiting access to conference calls, and litigation (Lamont, 2012). Third, to the extent that short sellers are informed, disclosures reduce information asymmetries and may limit future trading opportunities.³

A priori, the extent to which hedge funds engage in active short selling is unclear. On one hand, hedge funds may be likely candidates to undertake such campaigns because,

¹See “SEC Is Investigating Allied Capital,” *The Wall Street Journal* (6/24/2004)

²See “Prosecutors Interview People Tied to Ackman in Probe of Potential Herbalife Manipulation,” *The Wall Street Journal* 3/12/2015

³Consistent with short selling campaigns being costly, Jones et al. (2016) and Jank et al. (2016) find that mandatory disclosure of short positions leads to a decrease in short selling.

in contrast to other types of investors (e.g., mutual funds), they face few investment restrictions related to short selling. Moreover, many hedge funds engage in shareholder activism and are accustomed to taking hostile actions against firms. On the other hand, hedge funds, in aggregate, have trillions of dollars under management and use contractual provisions that mitigate risks associated with short selling (e.g., gate provisions). Thus, limits to arbitrage that motivate disclosure of short positions by small investors may not bind for hedge funds (Ljungqvist and Qian, 2016).

We manually construct a database of active short selling campaigns by hedge funds from media reports. We identify 252 campaigns over a twenty year period (1996–2015). Consistent with anecdotal evidence, the prevalence of active short selling campaigns has increased considerably in recent years. Prior to 2008, the average number of campaigns was fewer than 10 per year, but starting in 2008 the average number of campaigns approximately tripled, peaking with 45 in 2015 (see Figure 1). The campaigns feature a wide array of allegations; the most common are general overvaluation, problems with the industry/competitors, defective product/business model, and fraud.

We next turn to the central question we ask in this paper: What economic factors influence the decisions of hedge funds to engage in active short selling?

To shed light on this question, we first analyze the benefits of active short selling campaigns. Targets experience cumulative abnormal returns (CARs) of about -3% in a $[t-10, t+10]$ window around campaign announcements. This negative abnormal performance is not short-lived; CARs decrease to less than -7% for the $[t-10, t+100]$ window. The magnitudes of the effects are considerably larger than CARs associated with large changes in short interest, suggesting that active short selling has an incremental impact on targets. To mitigate concerns related to confounding events (e.g., negative news), we find similar results for campaigns announced at investment conferences, the timings of which are predetermined and likely orthogonal to other announcements.

We also find that active short selling is associated with changes in the behavior of other stakeholders, potentially to the benefit of hedge funds initiating campaigns. First,

campaigns are associated with approximately a 10% increase in aggregate short interest, perhaps reflecting strategic complementarities between speculators (Goldstein et al., 2013). Second, active short selling is associated with an increase in media coverage, particularly for articles with a negative tone. Finally, 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 media coverage and litigation are not driven by changes in aggregate short interest, suggesting that the public engagement aspect of campaigns has an incremental impact on stakeholder behavior.

Next, we examine the characteristics of hedge funds that engage in active short selling. We find that campaigns are predominately undertaken by activist hedge funds.⁴ Specifically, activists initiate 208 out of 254 campaigns in our sample (82%). 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 an active short selling campaign.

Our analysis of fund characteristics suggests that the distinction between activist and non-activist hedge funds is important for understanding what drives active short selling. Evidence points to two mechanisms that potentially explain this difference in behavior: costs of public engagement and information.

Perhaps the most salient costs associated with active short selling are those stemming from confrontations with the target, long shareholders, or regulators. Activist hedge funds may be uniquely suited to bear such costs. A fundamental difference between activist and non-activist investors is that activists often engage in confrontational long campaigns in order to influence the corporate policies of targets (Brav et al., 2008). Because activists already have reputations as confrontational investors, the incremental costs associated with active short selling campaigns may be lower. Consistent with this idea, we find that active

⁴We 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.

short selling is positively associated with activism experience (i.e., the number of previous long activism campaigns) as well as with the use of hostile tactics (e.g., proxy fights) in long activism campaigns.

We also consider the role of information in active short selling campaigns. While many equity investors base investment decisions on quantitative signals, the investment process for activists is fundamentally different. Specifically, activists identify problems at potential targets (e.g., ineffective management). If a problem is both priced and can be corrected (e.g., by changing the management team), the fund may initiate an activism campaign. If the problem is not priced, the economic incentives for long activism are absent as prices are likely to drop if an activist reveals the problem. There are, however, strong incentives to engage in active short selling in this case. We find two pieces of evidence consistent with this mechanism. First, two-thirds of campaigns feature specific allegations of problems for firms (e.g., fraud) rather than a general claim of overvaluation. Second, campaigns with specific allegations are associated with significantly lower announcement returns, suggesting that such information is conducive to active short selling campaigns.

We find less evidence supporting alternative mechanisms. First, benefits of active short selling (e.g., as measured by CARs) are similar for activist and non-activist hedge funds. Second, limits to arbitrage are unlikely to explain the differences in behavior between these types of investors. Third, we do not find reputational effects stemming from campaigns. Finally, active short selling is not used to hedge existing long positions.

While activist hedge funds are prominent in our sample, it is important to note key differences between shareholder activism and short selling campaigns. In a long activism campaign, an activist identifies a company whose future free cash flows can be increased if a particular action is taken. The 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). Short sellers, however, do not have the rights associated with equity ownership. Rather than trying to convince management to take a particular action, most active short selling campaigns instead seek to enhance the flow of negative information into

prices. We therefore do not generally consider such campaigns a form of activism.

Our paper is related to multiple strands of literature. First, we contribute to the literature on short selling. A number of papers show short interest is associated with weaker future performance at both the market and individual stock levels.⁵ A related strand of literature studies informational advantages of short sellers, including the detection of financial misconduct (Karpoff and Lou, 2010), anticipation of 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, we examine active short selling campaigns in which positions are voluntarily disclosed. While such campaigns have been rare historically, they have become increasingly common in recent years.

Second, our paper is related to recent work on public short selling by different market participants. Ljungqvist and Qian (2016) show that negative 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) studies the relation between accounting opacity and public short selling by financial institutions, research firms, and individual investors. In contrast to this other work, we highlight the presence of economic synergies between short selling and access to activism technology. These synergies not only affect the manner in which hedge funds engage in short selling, but ultimately have implications for the effects of short selling on targeted firms.

Third, 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).⁶ While this literature focuses on

⁵For 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.

⁶Other papers examine the effect of activists on various outcomes, including innovative activities (Brav

the long positions of activist hedge funds, we provide some of the first evidence on public disclosure of short positions by this class of investors.

1. Data

Our sample consists of active 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 contains 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 of the form “Hedge Fund Name” and (“short position” or “short selling”), as well as other variants of these phrases 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 1996–2015.

We merge data from several other sources to 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.⁷

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.

⁷Form 13F, which discloses 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,”

Analyst coverage is from IBES, and litigation data are from Audit Analytics. Measures of the quantity and tone of media coverage are from RavenPack News Analytics. All variables used in our analysis are defined in Table A1.

2. Campaign and Target Characteristics

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

2.1. Campaign Characteristics

Figure 1 shows the time series distribution of active short selling campaigns. Prior to 2008, the number of campaigns averaged approximately 5 per year. In later years, however, the number of campaigns increased substantially, averaging 25 per year from 2008–2015. While some of campaigns launched in 2007–2008 were in direct response to the financial crisis (e.g., Bill Ackman’s campaign against Lehman Brothers), the number of short selling campaigns by hedge funds has remained elevated in the post-crisis period.⁸ 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 the allegations of active short selling campaigns. For each campaign in our sample, we classify the allegations into six categories: financials/capital structure,

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. We thank Baozhong Yang for providing data on Form 13F long positions in exchange-traded call and put options.

⁸There were two major rule changes related 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.

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 the types of allegations.

Approximately 37% of the campaigns allege that the target is generally overvalued but do not make a specific allegation. The remainder of the 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%).

[Insert Table 1 here]

Panel B reports the distribution of disclosure methods for active 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 active short selling campaigns. Another 22.6% of positions are announced at investor conferences. Approximately 13% of campaigns are disclosed in a letter to the fund's investors. The remaining 10.3% are disclosed through a white paper or other methods.

2.2. Target Selection

Table 2 reports characteristics of active short selling targets as well as the difference with matched firms. The firm characteristics and matching methodology used in this table follow Brav et al. (2008). Targets differ from the matched sample along a number of dimensions. The starkest difference is in terms of size: on average the market cap for targets is close to \$11 billion larger than matched firms. One potential explanation for this finding is that we construct our sample based on media coverage of campaigns. The media, of course, is more likely to cover large 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 active 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 variables predict active short selling campaigns using 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 1996-2015. Similar to Table 2, we find robust evidence that the likelihood of targeting is positively associated with firm size across the different specifications. Targeting is also positively associated with leverage (as in Table 2), but negatively associated with institutional ownership (in contrast to Table 2). Short interest also predicts campaigns. Specifically, the estimates in column 4 indicate that a 5 percentage point increase in short interest 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.

[Insert Table 3 here]

3. Shareholder Wealth Effects

We next turn attention to the potential benefits of active short selling. One such benefit is to enhance the flow of negative information into prices. To explore this idea, we examine the cumulative abnormal returns (CARs) associated with the announcement of active 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 an active short selling campaign. We calculate CARs using a one, three, and five-factor model for each interval. Panel A reports CARs for active 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 (i.e., more than 5 percentage points). The economic magnitudes of these effects are considerably smaller (and in some cases positive).⁹ Panel C reports the difference between CARs for active short selling campaigns and large changes in short interest. The differences are economically large and statistically significant at conventional levels across all of the specifications.

[Insert Table 4 here]

We next examine return dynamics around the announcement of active short selling campaigns. Figure 2 plots CARs for the $[t-100, t+100]$ period using the three-factor model. Results are qualitatively similar with other models. The black line in Panel A plots the CARs associated with active 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 campaigns may partially be 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%.¹⁰ The economic magnitude of this effect is similar to abnormal returns associated with litigation related to financial fraud (Fich and Shivdasani, 2007).

⁹The 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).

¹⁰Untabulated results indicate no reversal in abnormal returns when we consider $[-100, 200]$ period around the announcement of short selling campaign by hedge funds.

[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 active short selling campaigns. While CARs decrease following large changes in short interest, the economic magnitude of this effect is considerably smaller than for active short selling campaigns.

Panel A also provides insights into abnormal turnover around active short selling 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 $[t-10, t+30]$ 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 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 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), active short selling campaigns by hedge funds are associated with strongly negative abnormal returns. This finding validates our empirical setting by indicating 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

Active short selling potentially entails significant costs. In equilibrium, hedge funds will undertake campaigns only if their expected benefits outweigh these costs. In the previous section, we reported evidence of one such benefit: the flow of negative information into prices as captured by CARs. Next, we examine whether campaigns affect the behavior of other stakeholders in ways that may be detrimental to firms. Anecdotal evidence suggests other stakeholders play important roles in active 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, media coverage, and litigation by shareholders and other parties. We hypothesize that active short selling campaigns lead to changes in the behavior along these dimensions that may have a negative effect on firm value.

4.1. Short Interest

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

$$y_{it} = \alpha Target_{it} + \zeta_i + \varepsilon_{it}, \quad (1)$$

where y_{it} is aggregate short interest (normalized by shares outstanding) for event i and period t , where a period is two weeks (due to the bi-weekly reporting of short interest). $Target_{it}$ is an indicator equal to one following the announcement of an active short selling

campaign, and ζ_i are event fixed effects.¹¹ 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 an active short selling campaign. There is an upward trend in short interest prior to the announcement, potentially a consequence of hedge funds accumulating their positions. Following the announcement, average short interest continues to increase for approximately 5 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 (FTD). A FTD 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

¹¹In 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 drops in prices for heavily shorted securities, though some studies dispute this claim (Fotak et al., 2014).

Panel B of Figure 3 plots the percentage fails-to-deliver from 100 days before the announcement of a campaign to 100 days after. The solid line plots the percentage fails-to-deliver for the full sample and the dashed dark line plots the percentage fails-to-deliver for short selling campaigns revealed at investment conference. The percentage of FTD increases sharply during the ten day period prior to campaign announcement. The percentage of FTD 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 active short selling campaigns are associated with changes in trading behavior by other market participants. To the extent that an increase in short selling leads to price declines, this effect may benefit hedge funds undertaking campaigns. Moreover, the findings shed light on factors that influence the timing of announcements. The sharp increase in FTDs for the full sample suggest that a decline in the number of shares available to borrow might be a factor that triggers the announcement of an active short selling campaign. However, when we consider campaigns announced at investor conferences, we find no changes in the percentage of FTD around campaign announcements, suggesting the strategic motives for the disclosure of active short selling campaigns at investment conferences differ from those disclosed through other channels.

4.2. Media Coverage

We next turn attention to the relation between short selling campaigns by hedge funds and media coverage. Previous work finds that media coverage mitigates informational frictions (e.g., Fang and Peress, 2009; Engelberg and Parsons, 2011), and the tone of such coverage affects returns and volume (e.g., Tetlock, 2007). One potential benefit of public disclosure of short positions is that it may influence the likelihood or tone of media coverage of a firm. Such changes may, in turn, further reduce prices and therefore increase the value

of funds' short positions.

To study media coverage around short selling campaigns, we estimate the following OLS regression at the quarterly frequency:

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

where y_{it} is outcome variable related to media coverage for firm i and year-quarter t , $Target_{it}$ is an indicator equal to one for one year (4 quarters) if a firm is targeted by an active short selling campaign. X_{it} is a vector of control variables, ζ_t are year-quarter fixed effects, and ζ_i are firm fixed effects.

Table 6 reports results for the tone of media coverage. In this table, we report estimates of regression (2), while considering only strongly negative articles (columns 1 through 4) and strongly positive articles (columns 5 through 8). The sentiment of media coverage as measured by the Event Sentiment Score (ESS) assigned by Ravenpack. We define an article as strongly negative if $ESS < 30$ and as strongly positive is $ESS > 70$.

[Insert Table 6 here]

Columns 1–4 indicate that active short selling campaigns are associated with an increase in the number of strongly negative articles. The estimates are statistically significant at the 1% level when we control for short interest (column 3) and other firm characteristics (column 4), suggesting changes in media coverage are not explained by aggregate short interest. Similarly, columns 5–8 indicate a corresponding increase in strongly positive articles. One potential explanation for this findings is that firms initiate positive coverage to counter short sellers.

Interpreting the relative economic magnitudes of the effects on positive and negative articles is challenging because we use the natural logarithm of one plus the dependent variable (due to some firms having zero positive or negative articles). To facilitate the interpretation of the magnitudes, Figure 4 plots the percentage increase relative to the sample mean for each ESS bin. The largest changes in the tone of media coverage are

driven by negative articles. While there is a statistically significant increase in coverage for 8 of the 10 bins, the three largest increases—ranging from 90% to 110%—are observed for the most negative ESS bins.

[Insert Figure 4 here]

Overall, active short selling campaigns by hedge funds are associated with an increase in media coverage, particularly for articles with a negative tone. This finding is consistent with the idea that hedge funds may use the media as a platform to disseminate negative information about targets. Indeed, the majority of campaigns (57.1%) in our sample are initially announced via TV or newspaper. Thus, changes in the behavior of the media may play an important role in active short selling campaigns.

4.3. Lawsuits

Finally, we consider whether active short selling campaigns are associated with changes in the likelihood of litigation. The disclosure of 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 2008.¹² 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 7. The outcome variables are an indicator for litigation in the year following a short selling campaign (columns 1–4) and the natural log of one plus the total number of cases in the year following a short selling campaign (columns 5–8).¹³ The table reports estimates of the following OLS regression at

¹²See http://www.uscourts.gov/sites/default/files/litigation_cost_survey_of_major_companies_0.pdf.

¹³The types of lawsuits considered include shareholder litigation, fraud or accounting suits (potentially initiated by the SEC or other regulators), IP suits, product liability suits, and antitrust suits.

the annual frequency:

$$y_{it} = \alpha Target_{it} + X'_{it}\beta + \zeta_t + \zeta_i + \varepsilon_{it}, \quad (3)$$

where y_{it} is the litigation-related outcome for firm i in year t , $Target_{it}$ is an indicator equal to one in the year following the announcement of an active 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 7 here]

Our findings indicate 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%. We find similar results for the number of lawsuits faced by firms in columns 5–8. 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 and 7–8). Thus, while previous research indicates short interest is associated with litigation or regulatory enforcement (e.g., Karpoff and Lou, 2010), this effect does not drive our findings.

In sum, our findings indicate that active 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.

5. Discussion of Economic Mechanisms

5.1. Fund Characteristics

To shed light on the question of why hedge funds engage in active short selling, we first analyze the characteristics of investors that undertake campaigns. We estimate the

following OLS regression at the fund-quarter level:

$$Campaign_{ft} = X'_{ft}\alpha_2 + \zeta_t + \zeta_f + \varepsilon_{ft}, \quad (4)$$

where the dependent variable $Campaign_{ft}$ is a dummy variable equal to one if fund f initiates a short selling campaign during year-quarter t , X_{ft} is a vector of fund characteristics from Schedule 13F filings, ζ_t are year-quarter fixed effects, and ζ_f are fund fixed effects. Table A2 reports descriptive statistics for the fund-level variables used in this analysis. Regressions cover Schedule 13F fund-quarter observations for all hedge funds from 1999 through 2012.¹⁴ Table 8 reports the results.

[Insert Table 8 here]

Columns 1 and 2 of Table 8 use the full sample of active short selling campaigns (both with and without fund fixed effects). Column 1 indicates the likelihood of undertaking a campaign is 0.56% higher for activist hedge funds than for non-activist hedge funds. The economic magnitude of this coefficient is approximately three times the unconditional likelihood of an active short selling campaign. This finding is consistent with the fact that activists 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; in terms of economic magnitudes, a 10% increase in assets under management is associated with approximately a 5% increase in the likelihood of an active short selling campaign. 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

¹⁴We end the sample for this test in 2012 due to coverage of the data on options use. In untabulated results, we find qualitatively similar results for the other fund characteristics using the full sample.

illiquidity, number of holdings, use of put options, etc.) are associated with active short selling. We obtain similar results for the sample of campaigns undertaken by activist hedge funds (columns 3 and 4 in Table 8).

In sum, our findings indicate that shareholder activism experience plays a critical role in understanding active short selling. In the remainder of this section, we examine economic factors that potentially explain this behavior.

5.2. Active Short Selling and Activism Technology

The dominance of activist hedge funds in our sample (82% of campaigns) suggests that the distinction between activists and non-activists is important for understanding active short selling. We next consider economic factors that may explain this difference in behavior.

Our analysis focuses on three potential channels: benefits of active short selling, costs of active short selling, and the information sets of investors. First, campaigns are associated with benefits including negative announcement returns and changes in stakeholder behavior. One possibility is that differences between activists and non-activists lead to heterogeneity in these benefits. For example, activists may have more skill in obtaining media exposure, thus facilitating campaigns. Second, we consider the costs associated with active short selling. It is possible that these costs differ for activist and non-activist hedge funds. For example, activists often engage in hostile activism campaigns, so the additional costs of public confrontation may be relatively low. Finally, differences in the information sets of activist and non-activist hedge funds may explain this behavior. Specifically, the ability to engage in activism incentivizes investors to uncover problems at firms. If such problems are not priced, this creates an incentive to undertake an active short selling campaign.

5.2.1. Campaign Benefits

Our previous findings highlight potential benefits associated with active short selling. We begin our analysis by asking whether these benefits differ for activist and non-activist

hedge funds. One caveat of this analysis, however, is that activists undertake most campaigns in our sample. Consequently, the statistical power of our tests is limited.

Appendix Table A3 reports the difference in announcement CARs for campaigns initiated by activists and non-activists. Overall, the estimates are economically small and statistically indistinguishable from zero. In untabulated analysis, we also find little evidence of differences in the behavior of other stakeholders (short selling, media coverage, and litigation) for campaigns undertaken by activists versus non-activists. Overall, these findings suggest that differences in the expected benefits of active short selling are not likely to explain the relation between activism technology and active short selling campaigns.

5.2.2. Campaign Costs

We next consider the possibility that the costs associated with active short selling differ for activist and non-activist hedge funds. It is important to separately consider two distinct types of costs related to campaigns. First, there are costs associated with retaining short positions. If short sale constraints are more binding for activists than for non-activists, this may serve as an explanation for why activists engage in active short selling. Consistent with this idea, Ljungqvist and Qian (2016) show that small, constrained investors release research reports to mitigate limits to arbitrage. However, it is unlikely that such costs explain our findings. For one, while both activists and non-activists incur costs associated with retaining short positions, campaigns are predominately undertaken by activists. Indeed, activists in our sample average 0.59 campaigns each, while non-activists average 0.03. Moreover, Table 8 shows that the likelihood of undertaking a campaign is positively related to assets under management, the opposite effect predicted by the limits to arbitrage channel.

Active short selling is also potentially costly due to the scrutiny, investigations, and litigation that may accompany campaigns. 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 such costs. That is, because many activists already have a reputation for being hostile, the incremental costs associated with further confrontations

may be relatively low.

To test this idea, we examine the characteristics of activists that undertake active short selling campaigns. We first examine the relationship between previous experience with long shareholder activism and active short selling. We hypothesize that the costs associated with active short selling are lower for investors that have previously engaged in more activism campaigns. Panel A of Table 9 sorts activist hedge funds into quartiles based on their number of previous long activism campaigns. There is a wide range of experience among the activist hedge funds in our sample; those in the first quartile have undertaken just one activism campaign, while those in the fourth have undertaken 22.6 activism campaigns on average.

[Insert Table 9 here]

For each quartile, we report the average number of active short selling campaigns in column 4. Activists in quartiles 1 and 2 (i.e., those with the least activism experience) initiated 0.37 and 0.32 campaigns, respectively. However, those in quartiles 3 and 4 (with the most activism experience) initiated 1.15 and 0.76 campaigns, respectively. Thus, the evidence indicates that experience with long shareholder activism is positively correlated to active short selling.

Panel B examines whether there are differences in the tactics used for long activism campaigns by hedge funds with and without active short selling experience. Activist hedge funds that undertake active short selling campaigns tend to be more hostile in long activism campaigns than those that do not.¹⁵ Specifically, the likelihood of initial hostility is 4.8 percentage points higher for activist hedge funds with short selling campaign experience, while the likelihood of hostility at any point during activism campaign is 4.4 percentage points higher. In addition, there is evidence that funds that engage in active short selling have more ambitious goals in activism campaigns; the likelihood of seeking a sale is 5.7

¹⁵Brav et al. (2008) define hostile campaigns that includes actions such as threatening/initiating a proxy fight, suing the company, or intending to take control of the company.

percentage points higher and the likelihood of seeking a change in business strategy is 4.4 percentage points higher for activist hedge funds with active short selling experience.

Overall, the evidence suggests costs associated with active short selling are an important factor for understanding differences in the behavior between activist and non-activist hedge funds. Specifically, active short selling campaigns are undertaken by hedge funds with more activism experience as well as those that employ hostile tactics and have more ambitious (and potentially contentious) goals. To the extent that these characteristics limit the costly nature of public scrutiny, the findings suggest a reason why access to activism technology facilitates active short selling.

5.2.3. Information

Finally, we consider the role of information in explaining the sharp difference in active short selling engagement for activist and non-activist hedge funds. The investment strategy of activist investors focuses on identifying problems with firms. This is a fundamental difference between activists and other investors. David Einhorn, an activist who undertakes 26 campaigns in our sample, highlights this 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).

Once an activist identifies a problem at a target, they must then determine if (1) the problem is priced and (2) the problem can be corrected. If the problem is priced and can be fixed via an intervention, the activist may initiate an activism campaign. The literature on hedge fund activism has studied these campaigns.

Our findings indicate that when a problem is not priced, activists may initiate an

active short selling campaign. For example, activists often undertake a campaign when there is a problem related to a targets business model (see Table 1). The fact that activists engage in active short selling after identifying this problem indicates that they believe the problem is not priced. For some accusations (e.g., fraud) the economic incentives for long shareholder activism are absent because revealing private information will negatively affect the targets value. However, there are strong economic incentives to establish a short position and engage in a short selling campaign in such instances.

We conjecture that activism technology may facilitate active short selling because activists have more information on firms specific problems. Of course, testing for differences in information sets is an inherently difficult task. To shed some light on this economic mechanism, we undertake further analysis of CARs associated with active short selling campaigns. Specifically, we investigate whether stock price reactions depend on allegations of short selling campaigns. 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.

The dark line in Figure 5 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 10 shows that the negative abnormal returns are statistically significant and differ from CARs associated with large changes in short interest.

[Insert Figure 5 here]

The grey line in Figure 5 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 $[t-100, t-1]$ period, consistent with the allegation that targets are overvalued. During two months after campaign announcement, targets experience abnormal return of about -5%. Panel B of

Table 10, however, shows that these abnormal returns are statistically insignificant and are not statistically different from CARs for large increases in short interest.

Our findings highlight stark differences in CARs based on the nature of allegations from active short selling campaigns. When allegations pertain to general overvaluation, stock price reactions are similar to those for large increases in short interest. In contrast, if allegations pertain to a specific problem with the target, CARs are significantly negative. Thus, our findings are consistent with the idea that differences in the information sets of activists and non-activists may explain, at least in part, why activism technology facilitates active short selling. Specifically, because the investment strategy of activists focuses on identifying problems at firms, activists are more likely uncover private information associated with large price reactions.

In sum, the evidence suggests two factors play an important role in explaining why access to activism technology plays an important role in active short selling campaigns. First, costs of public confrontation with targets may be lower for activist hedge funds than for non-activist hedge funds. Second, because the investment strategy of activists focuses on identifying specific problems (e.g., rather than using quantitative signals), they are more likely to find information that is conducive to active short selling.

5.3. Alternative Mechanisms

Next, we consider alternative mechanisms that may explain the findings. We specifically consider reputational effects and hedging motivations for active short selling. We do not find evidence consistent with these alternative explanations.

5.3.1. Reputation Effects

We first consider if active short selling is associated with reputational effects. Specifically, successful campaigns may improve the reputation of activist hedge funds and lead to higher returns for subsequent long 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 active short selling campaigns. Specifically, we run the following regression:

$$CAR_{fe}^{long} = \alpha CAR_{fe}^{short} + X_e' \delta + \zeta_t + \zeta_f + \varepsilon_i, \quad (5)$$

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 A4. We find little evidence that CARs for active short selling campaigns are related to subsequent CARs for long 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 not strong reputation effects associated with active short selling.

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 active short selling campaigns are correlated with the weights of competitors in activists' portfolios. Specifically, we estimate the following regression:

$$Campaign_{ift} = \alpha CompetitorPortfolioWeight_{ift} + X_{ift}' \beta + \zeta_t + \zeta_i + \zeta_f + \varepsilon_{ift}, \quad (6)$$

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 A5 in the Appendix reports the results. Overall, we find little evidence supporting 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, there have been an average of nearly 30 per year since. In this paper, we examine economic factors that influence the decisions of hedge funds to undertake active short selling campaigns. We find that there are considerable benefits associated with active short selling. CARs around announcements average -7%. This effect is larger than CARs associated with large changes in short interest, suggesting that public disclosure by hedge funds has an incremental effect. We also document changes in the behavior of other stakeholders—short interest, media coverage, and litigation—that potentially have a negative effect on firms.

There is a stark difference in active short selling between activist and non-activist hedge funds. In our sample, activists undertake 82% of campaigns. Evidence points to two channels through which access to activism technology affects active short selling. First, campaigns are undertaken by more experienced activists as well as those that employ hostile tactics in long campaigns, suggesting that costs associated with active short selling may be lower for activists than other investors. Second, the negative CARs associated with active short selling are driven by campaigns making specific allegations (rather than those alleging general overvaluation). This finding suggests that the focus of activists on identifying potential problems at targets may facilitate active short selling.

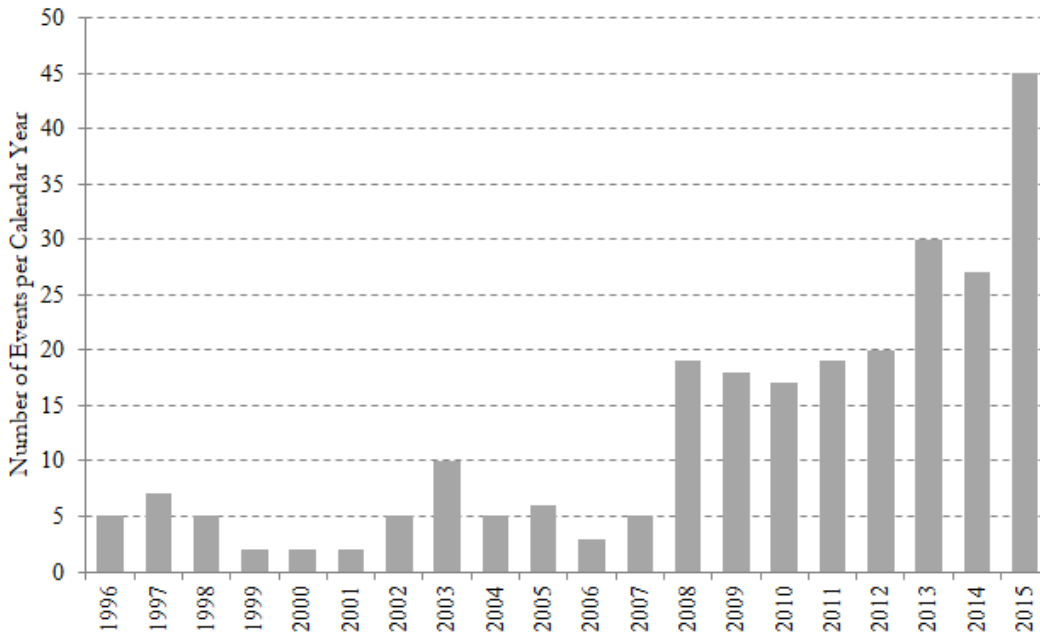
Overall, our findings highlight the importance of activism technology for active short selling. This idea potentially has broader implications for the governance literature. Beginning with Admati and Pfleiderer (2009) and Edmans (2009), a series of recent articles has shown that the threat of exit by blockholders can serve as a disciplinary device for managers. Specifically, if managers destroy value, blockholders can sell their stake ex post, resulting in a lower share price. Our paper shows that, similar to existing blockholders, short sellers also sell shares in response to specific firm problems. Importantly, active engagement with the target or other market participants amplifies the valuation consequences of this action.

References

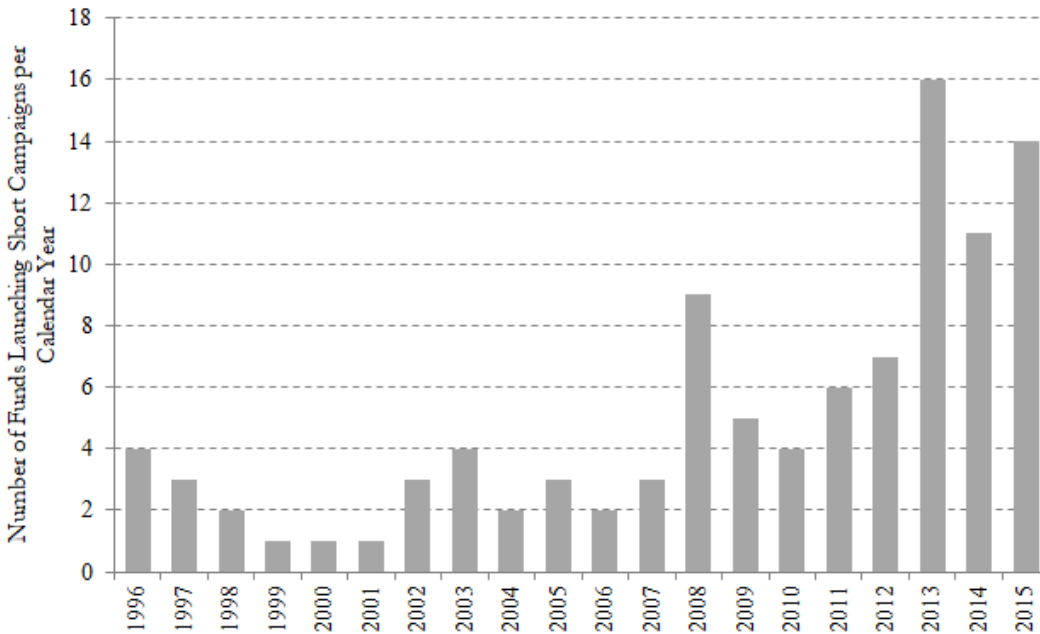
- Admati, A., Pfleiderer, P., May 2009. The “Wall Street walk” and shareholder activism: Exit as a form of voice. *Review of Financial Studies* 22 (7), 2645–2685.
- Agarwal, V., Fos, V., Jiang, W., 2013. Inferring reporting-related biases in hedge fund databases from hedge fund equity holdings. *Management 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.
- 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.
- 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.
- 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.
- 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., December 2009. Blockholder trading, market efficiency, and managerial myopia. *Journal of Finance* 64 (6), 2481–2513.
- Einhorn, D., 2010. *Fooling Some of the People All of the Time: A Long Short Story*. Wiley.
- Engelberg, J., Parsons, C., 2011. The causal impact of media in financial markets. *Journal of Finance* 66 (1), 67–97.
- 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.
- Fang, L., Peress, J., 2009. Media coverage and the cross-section of stock returns. *Journal of Finance* 64 (5), 2023–2052.
- 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., 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.
- Lamont, O. A., 2012. Go down fighting: Short sellers vs. firms. *Review of Asset Pricing Studies* 2 (1), 1–30.
- Ljungqvist, A., Qian, W., 2016. How constraining are limits to arbitrage? *Review of Financial Studies* 29 (8), 1975–2028.
- 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.
- Tetlock, P., 2007. Giving content to investor sentiment: The role of media in the stock market. *Journal of Finance* 62 (3), 1139–1168.
- Zhao, W., 2019. Activist short-selling and corporate opacity, working paper.
- Zuckerman, R., 2011. Synchronized arbitrage and the value of public announcements, working paper.

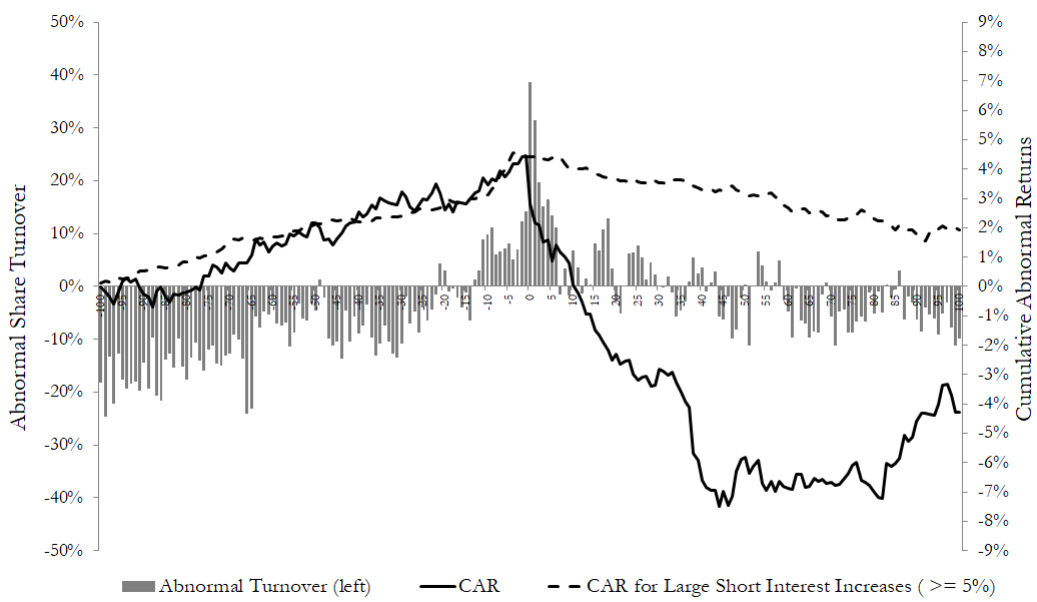


(a) Time Series Distribution of Campaigns

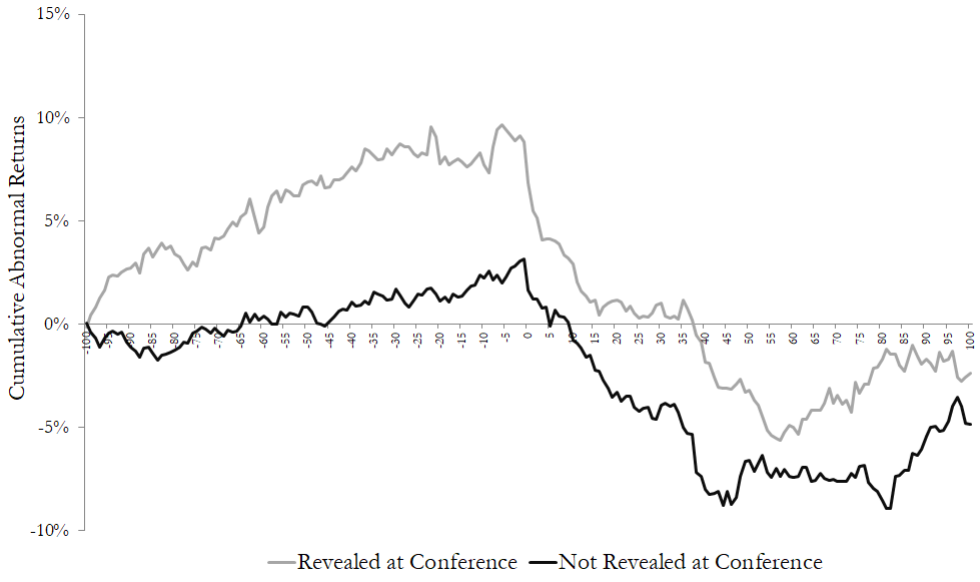


(b) Time Series Distribution of Hedge Funds Initiating Campaigns

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

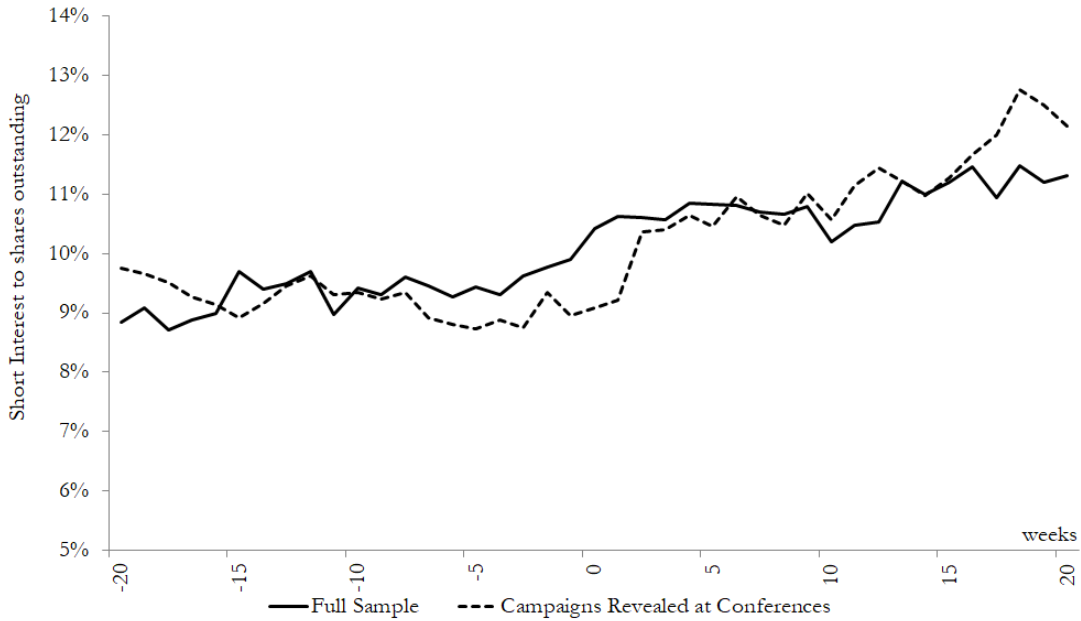


(a) Full Sample

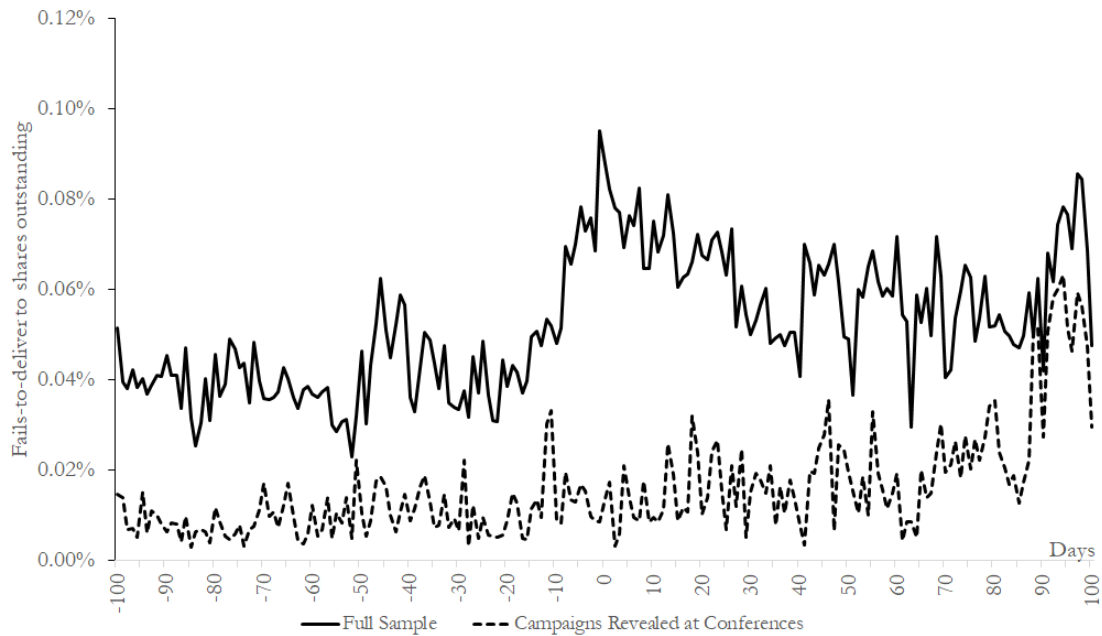


(b) Revelation Method Subsamples

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 an active 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.

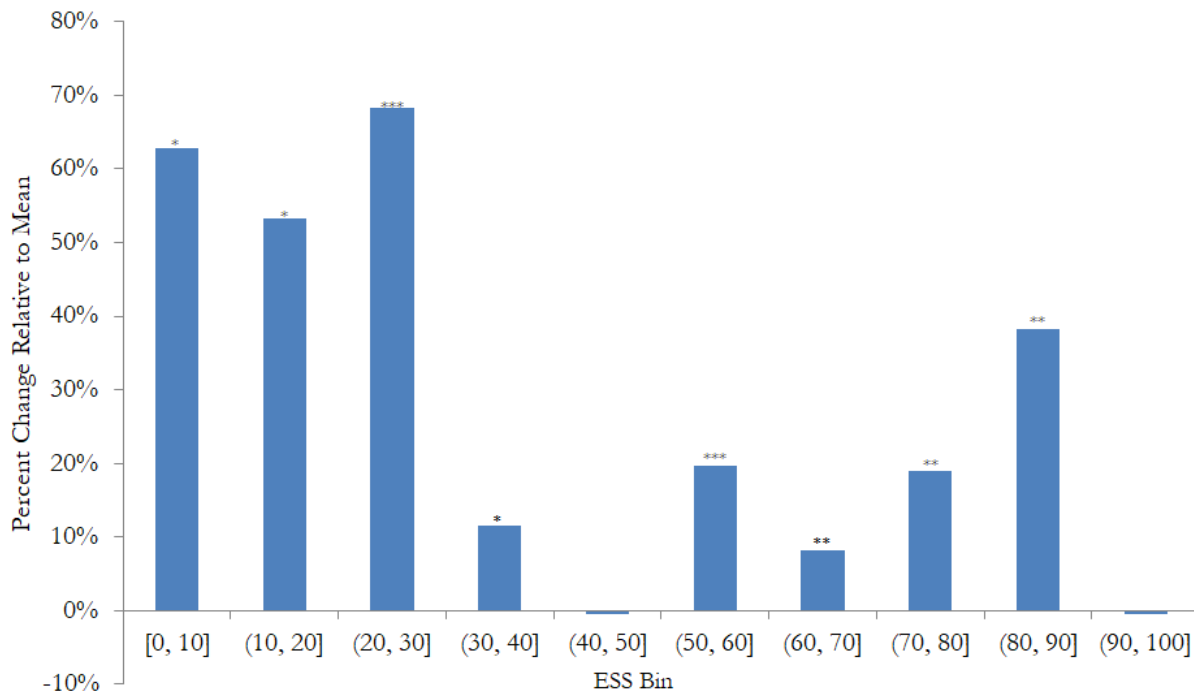


Figure 4: **Media Coverage by Sentiment Bin.** The histogram plots the percentage change in the number of articles (relative to the mean) for each Event Sentiment Score (ESS) bin following an active short selling campaign. ESS ranges from 0 to 100, with 50 corresponding to a neutral sentiment. Lower ESS corresponds to more negative sentiment. The figure is constructed by estimating the following OLS regression for each bin: $y_{it} = \alpha Target_{it} + X'_{it}\beta + \zeta_t + \zeta_i + \varepsilon_{it}$, where y_{it} is outcome variable of interest for firm i and year-quarter t , $Target_{it}$ is an indicator equal to one for 1 year (4 quarters) following the announcement of an active short selling campaign, X_{it} is a vector of control variables, ζ_t are year-quarter fixed effects, and ζ_i are firm fixed effects. Media coverage data are from RavenPack News Analytics and cover 2000-2015 period. The bars report the ratio of α to sample average, minus one. Standard errors are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

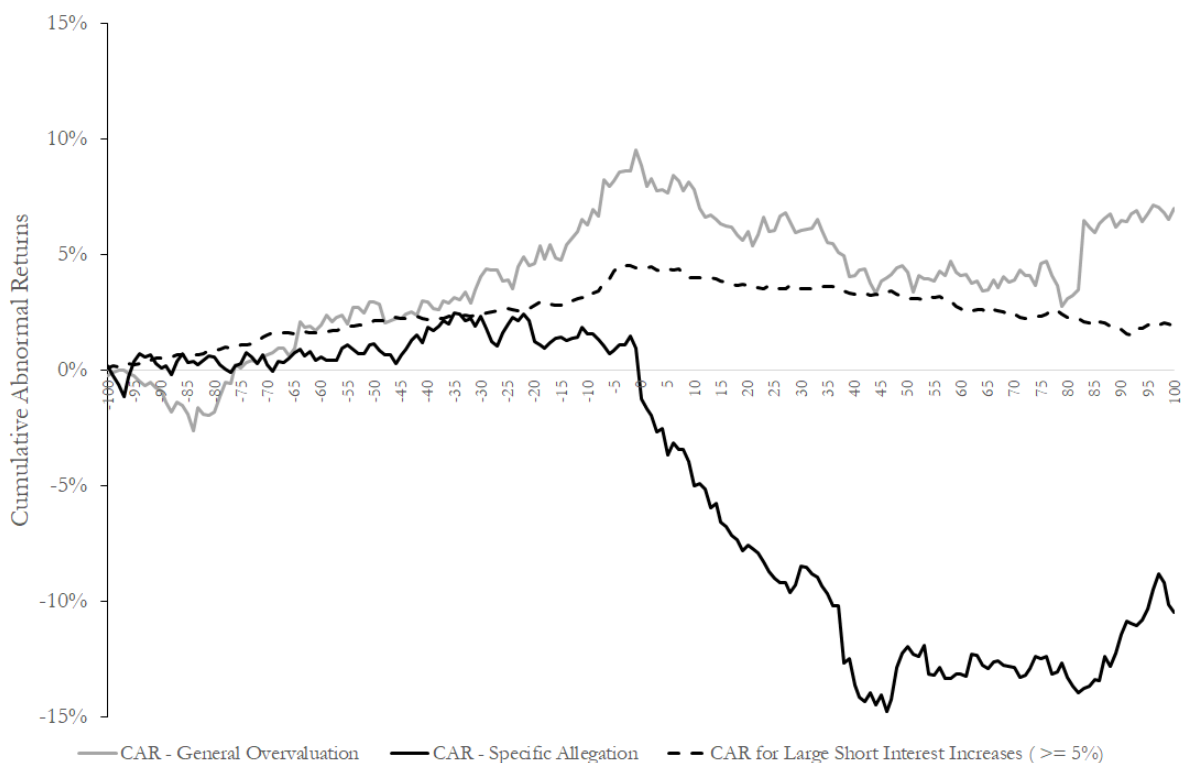


Figure 5: Abnormal Returns for Specific Allegations vs. General Overvaluation. This figure plots the cumulative abnormal returns from the three-factor (market, size, and book-to-market) model from 100 days before an event to 100 days after. The light gray line plots the cumulative abnormal returns for 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 active short selling campaigns. Allegations are not mutually exclusive. Panel B reports disclosure methods for campaigns. Active short selling campaign data are described in Section 1.

	Number of campaigns (1)	Percentage of campaigns (2)
<i>Panel A: Allegations</i>		
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%
<i>Panel B: Disclosure Methods</i>		
Newspaper/TV	136	54.0%
Conference	57	22.6%
Letter to Investors	33	13.1%
White Paper/Other	26	10.3%
<i>Total Campaigns:</i>	<i>252</i>	

Table 2: **Target Characteristics**

This table reports summary statistics for the targets of active short selling campaign targets. 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 (1)	Median (2)	SD (3)	Avg. Diff. (4)	t -stat of Diff. (5)	Median Diff. (6)	Wilcoxon (7)
MV (t-1, log)	8.63	8.71	1.62	2.46	16.08	2.36	10.82
BM (t-1)	0.36	0.31	1.00	-0.14	-1.82	-0.10	-2.98
Q (t-1)	2.84	1.86	2.43	0.47	2.95	0.00	1.87
GROWTH (t-1)	0.13	0.11	0.44	0.01	0.30	-0.02	-0.90
ROA (t-1)	0.14	0.14	0.35	0.16	6.20	0.16	9.68
CF (t-1)	0.07	0.09	0.36	0.15	5.93	0.17	9.51
LEV (t-1)	0.59	0.61	0.23	0.06	3.71	0.08	3.61
CASH (t-1)	0.19	0.13	0.19	-0.004	-0.33	-0.06	-2.64
DIVYLD (t-1)	0.02	0.00	0.03	0.002	0.70	-0.015	-2.28
PAYOUT (t-1)	0.30	0.00	0.65	0.05	0.94	-0.25	-3.54
# ANALYSTS (t-1, log)	1.92	2.05	0.78	1.19	21.16	1.32	11.38
INST (t-1)	0.65	0.72	0.31	0.27	11.65	0.33	8.92
STKRET (t-1)	0.31	0.07	0.83	0.13	2.29	-0.03	0.56
AMIHU (t-1)	0.03	0.02	0.06	-0.02	-4.97	-0.01	-7.87
SHORTINT (t-1)	0.08	0.05	0.07	0.03	5.94	0.03	4.47

Table 3: **Predicting Active Short Selling Campaigns**

Column (1) reports the probit regression: $Target_{it} = \Phi(X_{it}\alpha_1 + \zeta_t + \zeta_j + \varepsilon_{it})$, where the dependent variable $Target_{it}$ is a dummy variable equal to one if the company is targeted by a campaign during year t , Φ is the cumulative normal distribution, X_{it} is a vector of lagged covariates, ζ_t are year fixed effects, and ζ_j are industry fixed effects. Columns (2)–(4) report the OLS regression: $Target_{it} = X_{it}\alpha_2 + \zeta_t + \zeta_j + \varepsilon_{it}$. Standard errors are reported in the parentheses and are clustered at the firm level. The sample includes all Compustat firms from 1996 through 2015. All variables are defined in Table A1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

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

Table 4: **Cumulative Abnormal Returns**

Panel A reports cumulative abnormal returns for active 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: Model:	[t-10, t+10] CAR			[t-10, t+100] CAR		
	one-factor (1)	three-factor (2)	five-factor (3)	one-factor (4)	three-factor (5)	five-factor (6)
<i>Panel A: Active Short Selling Campaigns</i>						
Event	-0.0339** (0.0144)	-0.0357*** (0.0132)	-0.0340** (0.0135)	-0.0767*** (0.0244)	-0.0787*** (0.0246)	-0.0599** (0.0270)
Observations	202	202	202	195	195	195
<i>Panel B: Large Increase in Short Interest</i>						
Event	0.00814*** (0.00281)	0.00863*** (0.00284)	0.0101*** (0.00286)	-0.0200*** (0.0046)	-0.0145*** (0.0047)	-0.0054 (0.0050)
Observations	9,032	9,032	9,032	8,762	8,762	8,762
<i>Panel C: Difference (Panel A-Panel B)</i>						
	-0.0421*** (0.0146)	-0.0443*** (0.0135)	-0.0441*** (0.0138)	-0.0566** (0.0248)	-0.0642** (0.0250)	-0.0545** (0.0274)

Table 5: **Short Interest**

This table analyzes changes in short interest around active short selling campaigns. The table reports estimates of the following OLS regression: $y_{it} = \alpha Target_{it} + \zeta_i + \varepsilon_{it}$, where y_{it} is short interest for event i and period t , where a period is two weeks. $Target_{it}$ is an indicator equal to one following the announcement of an active short selling campaign. ζ_i 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 the parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All independent variables are defined in Table A1.

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

Table 6: **Tone of Media Coverage**

This table reports changes in the tone of media coverage following active short selling campaigns. The table reports estimates of the following OLS regression at the quarterly frequency: $y_{it} = \alpha Target_{it} + X'_{it}\beta + \zeta_t + \zeta_i + \varepsilon_{it}$, where y_{it} is outcome variable of interest for firm i and year-quarter t , $Target_{it}$ is an indicator equal to one for 1 year (4 quarters) following the announcement of an active short selling campaign, X_{it} is a vector of control variables, ζ_t are year-quarter fixed effects, and ζ_i are firm fixed effects. Media coverage data are from RavenPack News Analytics and cover 2000-2015 period. In columns (1)–(4) the outcome variable is the log-transformed number of articles with the Event Sentiment Score (ESS) assigned by Ravenpack between 0 and 30. ESS ranges from 0 to 100, and 50 corresponds to a neutral sentiment. In columns (5)–(8) the outcome variable is the log-transformed number of articles with the Event Sentiment Score (ESS) assigned by Ravenpack between 70 and 100. Standard errors are reported in the parentheses and are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All independent variables are defined in Table A1.

Dependent Variable: ESS Bin:	# ARTICLES (log)				# ARTICLES (log)			
	(1)	[0,30], Negative tone		[70,100], Positive tone		(6)	(7)	(8)
<i>Target_{it}</i>	0.508*** (0.0458)	0.157*** (0.0275)	0.115*** (0.0269)	0.116*** (0.0268)	0.645*** (0.0464)	0.112*** (0.0294)	0.099*** (0.0295)	0.0853*** (0.0288)
SHORTINT			1.312*** (0.0417)	1.326*** (0.0418)			0.381*** (0.0463)	0.166*** (0.0432)
MV (log)				-0.008*** (0.001)				0.0902*** (0.002)
Q				-0.002*** (0.001)				0.001 (0.001)
GROWTH				-0.007*** (0.002)				-0.001 (0.002)
Observations	370,847	370,524	370,524	370,524	370,847	370,524	370,524	370,524
R ²	0.049	0.326	0.335	0.335	0.057	0.450	0.451	0.465
<i>Fixed Effects:</i>								
Firm FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: **Litigation**

This table reports changes in litigation against firms following active 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 outcome variable of interest for firm i in year t , $Target_{it}$ is an indicator equal to one in the year following the announcement of an active short selling campaign, X_{it} is a vector of control variables, ζ_t are year fixed effects, and ζ_i are firm fixed effects. In columns (1)–(4) the outcome variable is the indicator for a lawsuit. In columns (5)–(8) the outcome variable is the log-transformed number of lawsuits. 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 the 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:	$\mathbb{1}_{LAWSUIT=1}$		# LAWSUITS (log)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Target_{it}$	0.386*** (0.0346)	0.144*** (0.0310)	0.124*** (0.0302)	0.124*** (0.0301)	0.478*** (0.0440)	0.207*** (0.0369)	0.188*** (0.0362)	0.188*** (0.0362)
SHORTINT			0.846*** (0.0490)	0.833*** (0.0493)			0.779*** (0.0473)	0.766*** (0.0476)
MV (log)				0.001 (0.00120)				0.001 (0.0011)
Q				-0.001*** (0.0001)				-0.001*** (0.0001)
GROWTH				-0.021*** (0.0020)				-0.019*** (0.0018)
Observations	135,239	133,529	133,529	133,529	135,239	133,529	133,529	133,529
R^2	0.025	0.334	0.337	0.338	0.028	0.389	0.392	0.393
<i>Fixed Effects:</i>								
Firm FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: **Predicting Active Short Selling Campaigns (Fund Level)**

This table reports estimated coefficients of the OLS regression: $Campaign_{ft} = X'_{ft}\alpha_2 + \zeta_t + \zeta_f + \varepsilon_{ft}$, where the dependent variable $Campaign_{ft}$ is an indicator equal to one if a fund f initiates an active short selling campaign during quarter t , X_{ft} is a vector of fund characteristics, ζ_t are year-quarter fixed effects, and ζ_f are fund fixed effects. In columns (1) and (2), the sample includes all Schedule 13F fund-quarter observations for all hedge funds. In columns (3) and (4), regressions cover all Schedule 13F fund-quarter observations for activist hedge funds. The sample for all specifications runs from from 1999 through 2012. All independent variables are defined in Table A1. Standard errors are reported in the parentheses and are clustered at the fund level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Sample:	Campaign			
	All HFs (1)	(2)	Activist HFs (3)	(4)
$\mathbb{1}_{ACTIVIST}$	0.0056*** (0.0015)			
AUM (log)	0.0008* (0.0005)	0.0010* (0.0005)	0.0032* (0.0019)	0.0025 (0.0018)
PORTFOLIO RETURN	-0.0130 (0.0116)	-0.0176 (0.0130)	-0.0334 (0.0398)	-0.0547 (0.0441)
% PORTFOLIO SHORT INTEREST	-0.0978** (0.0438)	-0.0532 (0.0382)	-0.2846* (0.1552)	-0.1733 (0.1150)
$\mathbb{1}_{NAKED\ PUT}$	0.0006 (0.0012)	-0.0009 (0.0009)	0.0026 (0.0037)	-0.0012 (0.0025)
$\mathbb{1}_{HEDGED\ PUT}$	0.0003 (0.0018)	0.0005 (0.0009)	0.0003 (0.0044)	0.0021 (0.0023)
# Holdings (log)	-0.0007 (0.0006)	-0.0009* (0.0005)	-0.0021 (0.0022)	-0.0017 (0.0017)
PORTFOLIO TURNOVER	0.0002 (0.0004)	-0.0001 (0.0004)	-0.0006 (0.0019)	-0.0006 (0.0020)
PORTFOLIO CONCENTRATION	-0.0018 (0.0016)	-0.0051 (0.0033)	-0.0084 (0.0072)	-0.0143 (0.0139)
PORTFOLIO ILLIQUIDITY	-0.0028 (0.0095)	0.0111 (0.0128)	-0.0119 (0.0372)	0.0224 (0.0519)
Observations	43,256	43,235	10,809	10,808
R^2	0.0073	0.0995	0.0110	0.1035
<i>Fixed Effects:</i>				
Year-Quarter FE	Yes	Yes	Yes	Yes
Fund FE	No	Yes	No	Yes

Table 9: **Long Activism Experience and Tactics**

This table examines the relation between long activism and active short selling. Panel A assigns activist hedge funds into quartiles based on the number of long activism campaigns undertaken. For each quartile, column (2) reports the average number of long activism campaigns, column (3) reports the median number of long activism campaigns, and column (4) reports the average number of active short selling campaigns. Panel B examines the tactics and objectives of long activism campaigns. The samples in column (1) and (2) include activists that have and have not undertaken a active short selling campaign, respectively. Columns (3) and (4) report the differences and *t*-statistics of the differences.

Panel A: Long Activism Experience

Shareholder Activism Quartiles (1)	Average Number of Activism Campaigns (2)	Median Number of Activism Campaigns (3)	Average Number of Short Campaigns (4)
1	1	1	0.37
2	2.36	2	0.32
3	5.03	5	1.14
4	22.63	14	0.76

Panel B: Long Activism Tactics

	Activists with Short Selling Campaign Experience (43 funds) (1)	Activists without Short Selling Campaign Experience (291 funds) (2)	Difference (3)	<i>t</i> -statistic (4)
Communication	0.173	0.193	-0.019	0.95
Proposal	0.374	0.308	0.066	2.70
Proxy	0.084	0.101	-0.017	1.09
Lawsuit	0.036	0.035	0.001	0.14
Takeover	0.046	0.031	0.015	1.60
Threat	0.089	0.085	0.004	0.24
Seek Board Representation	0.173	0.188	-0.014	0.71
Hostile	0.251	0.207	0.044	2.05
Initially Hostile	0.137	0.089	0.048	3.09
Objective = Sale	0.223	0.167	0.057	2.85
Objective = Business Strategy	0.216	0.172	0.044	2.21
Objective = Governance	0.321	0.317	0.005	0.19

Table 10: **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: Model:	[t-10, t+10] CAR			[t-10, t+100] CAR		
	one-factor (1)	three-factor (2)	five-factor (3)	one-factor (4)	three-factor (5)	five-factor (6)
<i>Panel A: Active Short Selling Campaigns with Specific Allegations</i>						
Event	-0.0554*** (0.0211)	-0.0630*** (0.0184)	-0.0590*** (0.0189)	-0.119*** (0.0312)	-0.120*** (0.0305)	-0.0907*** (0.0342)
Observations	125	125	125	120	120	120
Difference with large increases in short interest	-0.0636*** (0.0212)	-0.0716*** (0.0186)	-0.0691*** (0.0190)	-0.0992*** (0.0314)	-0.106*** (0.0307)	-0.0853** (0.0345)
<i>Panel B: Active Short Selling Campaigns with General Overvaluation Allegations</i>						
Event	0.00100 (0.0152)	0.00859 (0.0166)	0.00642 (0.0172)	-0.00856 (0.0382)	-0.0119 (0.0404)	-0.0107 (0.0434)
Observations	77	77	77	75	75	75
Difference with large increases in short interest	-0.0071 (0.0154)	0.0000 (0.0167)	-0.0037 (0.0173)	0.0115 (0.0382)	0.00257 (0.0404)	-0.00529 (0.0434)

**Supplemental Internal Materials for the paper
“Active Short Selling by Hedge Funds”**

by Ian Appel, Jordan Bulka, and Vyacheslav Fos

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 + Depreciation 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.
# of 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.
AMIHU	Annual firm-level average (using daily data) of $1000 * (Return /Dollar\ trading\ volume)^{1/2}$.
SHORTINT	Annual firm-level average (using biweekly data) of Short interest/Shares outstanding.
% SHORT INTEREST	Short interest/Shares outstanding (biweekly).
FTD	Annual firm-level average (using daily data) of Fails-to-Deliver to Shares outstanding.
% FAILS-TO-DELIVER	Fails-to-Deliver/Shares outstanding (daily).
$\mathbb{1}_{LAWSUIT=1}$	Dummy variable equal to one when a firm is sued in a given time period.
# LAWSUITS (log)	Log of 1 + the number of lawsuits filed against the firm in a given time period.
# ARTICLES (log)	Log of 1 + the number of articles written about the firm in a given time period.
SENTIMENT SCORE	A text-based sentiment score for news articles, with a range of 0 to 100. A value of 50 is considered neutral sentiment.
<i>Campaign</i>	Dummy variable equal to one when a fund launches a short selling campaign in a given time period.
$\mathbb{1}_{ACTIVIST}$	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.
$\mathbb{1}_{NAKED\ PUT}$	A dummy variable equal to one if a fund discloses a position in a put option on a stock, without an offsetting long position in the stock.
$\mathbb{1}_{HEDGED\ PUT}$	A dummy variable equal to one if a fund discloses a position in a put option on a stock, with an offsetting long position in the stock.

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
$\mathbb{1}_{\text{NAKED PUT}}$	0.1145	0.0000	0.3184
$\mathbb{1}_{\text{HEDGED PUT}}$	0.0526	0.0000	0.2233

Table A3: **Cumulative Abnormal Returns: Activists vs. Non-Activists**

This table reports estimates of a regression of the average cumulative abnormal returns for short selling campaign on an indicator equal to one for activist hedge funds. In columns (1)–(3), the cumulative abnormal return is from 10 days before the event to 10 days after, where the event is either the announcement of a campaign or a large increase in short interest (at least 5% of shares outstanding). 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 one-factor model, columns (2) and (5) reports abnormal returns from the three-factor model, and columns (3) and (6) reports abnormal returns from the five-factor model. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Model:	[t-10, t+10] CAR			[t-10, t+100] CAR		
	one-factor (1)	three-factor (2)	five-factor (3)	one-factor (4)	three-factor (5)	five-factor (6)
$\mathbb{1}_{\text{ACTIVIST}}$	-0.00406 (0.0225)	-0.00186 (0.0216)	-0.00886 (0.0215)	-0.00182 (0.0598)	0.0234 (0.0580)	0.0227 (0.0609)
Constant	-0.0305** (0.0147)	-0.0341** (0.0149)	-0.0266* (0.0143)	-0.0751 (0.0532)	-0.0981* (0.0510)	-0.0787 (0.0526)
Observations	202	202	202	195	195	195

Table A4: Long Campaign Returns Following Active Short Selling Campaign

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 the parentheses and are clustered at the fund level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable: Model:	CAR^{long}								
	one-factor			three-factor			five-factor		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CAR^{short}	0.0264 (0.189)	0.358 (0.256)	0.404 (0.265)	0.0363 (0.195)	0.415 (0.275)	0.460 (0.288)	0.0618 (0.193)	0.454* (0.274)	0.499* (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
<i>Controls and Fixed Effects:</i>									
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 A5: Use of Active Short Selling to Hedge Long Positions

This table analyzes whether active 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 the 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)	0.0004 (0.0004)	0.0003 (0.0005)			
Competitor Portfolio Weight (Score Weighted)				0.0070 (0.0047)	0.0044 (0.0048)	0.0023 (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
<i>Controls and Fixed Effects:</i>						
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