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Power Tussle: Hedge Fund Activists and Short Sellers

Finance Working Paper N° 1155/2026
August 2026

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Keywords: Hedge fund activism, short selling, short position disclosure, equity lending

JEL Classification: G12, G14, G15, G2, G34

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I Introduction

Activist hedge funds have become an important force in corporate decision-making (e.g., Becht et al. (2008), Brav et al. (2008), and Gantchev (2013)). These sophisticated investors purchase shares in underperforming firms and seek to increase value through direct intervention or "voice." Another group of sophisticated investors, large short sellers, often target underperforming firms as well, earning superior returns (Jank & Smajlbegovic (2015) and Jank et al. (2021)). However, large short sellers hold views that run counter to those of activist hedge funds, believing that shares are overvalued and expecting prices to decline further (e.g., Asquith et al. (2005) and Boehmer et al. (2022)). Although both types of investors have the resources to uncover private information and analyze potential target firms, activist hedge funds and large short sellers often target the same firm.[1]

Given the prominent role of activist hedge funds and large short sellers in stock markets, this paper addresses three main questions: How do these sophisticated investors react to each other's presence? Do their investment decisions change accordingly? How is their profitability affected? To our knowledge, we provide one of the first large-sample analyses of events in which activist hedge funds and large short sellers simultaneously target the same company. Our study builds on a sample of 684 activist campaigns in Europe between January 2010 and December 2019, merged with hand-collected disclosure data on large short positions.

Our paper's central hypothesis is that information channels matter. Large short sellers generate information through private information acquisition (Karpoff & Lou (2010)) and superior interpretation of public information (Engelberg et al. (2018)), while mandatory disclosure helps to transmit that information to the market. Public disclosures of large short positions reveal not only that a stock is heavily shorted, but also which sophisticated investors are shorting it and

[1] In the European context, a notable case involved activist fund Elliott Management and short seller WorldQuant LLC. In April 2018, Elliott Management revealed a 5.1% stake in Micro Focus International PLC, a UK software company. It argued that the company should be sold to a private equity firm and that its SUSE Linux division should be carved out. The announcement came only weeks after WorldQuant LLC disclosed a 0.53% short position in Micro Focus, which fell below the regulatory disclosure threshold of 0.5% in early May 2018. The company sold the SUSE division in July 2018 for $2.5 billion before it was eventually sold to OpenText.

how concentrated short-selling demand is. For activist hedge funds, whose targeting decisions involve a multi-step screening process that draws on market cues (Gantchev & Jotikasthira (2018)), such disclosures can provide an incremental signal that a firm is underperforming and warrants closer investigation into whether there is scope for value improvement.

Large short sellers may also affect activism through two additional channels. First, under a "bargaining channel," the negative effect of short selling on share prices could increase an activist's bargaining power (De Angelis et al. (2017)), making corporate managers more receptive to the activist's demands and more likely to implement the activist's proposals. Second, under a "cost channel," short-seller-induced price declines may reduce an activist's cost of acquiring a sizable block of shares. While our evidence suggests that all three mechanisms likely operate simultaneously, it is most consistent with the information channel, through which large short sellers' disclosures convey actionable information to activists.

The European short-selling disclosure regime provides a unique setting to test these mechanisms. Beginning in November 2012, European Union (EU) regulation required investors with net short positions exceeding 0.5% of shares outstanding to disclose those positions across all member states publicly. These disclosures allow market participants to observe both the identity and size of large short positions, enabling them to revise their portfolio decisions accordingly.

Using hand-collected data on individual short positions from EU member states, we find that the presence of large short sellers is positively associated with the likelihood of activist targeting, controlling for aggregate short selling and other firm characteristics. This is consistent with the hypothesis that activist hedge funds pay attention to large short sellers' disclosures beyond the information contained in aggregate short-selling data. This result is also consistent with the dynamic trading model proposed by Cetemen et al. (2026), in which two informed investors (e.g., an activist hedge fund and a large short seller) adjust their trading behavior in response to each other's actions.

Conversely, activism affects short sellers through competing forces: lower prices increase shorting opportunities, but the risk of a short squeeze from activist "wolf packs" (Brav et al. (2022)) and reduced lending supply (Porras Prado et al. (2016)) can discourage new short positions. We find that both the amount shorted by reporting large short sellers and aggregate short-selling activity decrease following the launch of an activist campaign, suggesting that the risk of a short squeeze outweighs the opposing effect of increased short-selling opportunities.

One potential concern is that an activist's decision to target a particular company may be influenced by omitted firm characteristics that short sellers also consider when deciding whether to short the stock. Establishing a causal effect of the presence of large short sellers on hedge fund activists' targeting decisions, therefore, requires an identification strategy that addresses endogeneity concerns. To this end, we exploit the EU's harmonization of short-sale disclosure rules, which became effective in November 2012. Our identification assumption is that this regulatory harmonization constitutes a plausibly exogenous change in the information available to hedge fund activists regarding the composition of short-selling demand in a particular stock. This setting allows us to estimate the causal effect of mandatory short-position disclosure on activist targeting decisions.

More specifically, before regulatory harmonization, several EU countries—France, Spain, and the United Kingdom—already had short-sale disclosure regimes in place (Jones et al., 2016).[2] After November 2012, all stocks in the EU became subject to the same large short-sale disclosure rules. We therefore expect stocks that were not subject to disclosure requirements before November 2012 (i.e., our "treatment" group) to exhibit an increase in the likelihood of activist campaigns as a result of the increased availability of short sellers' signals, relative to stocks in countries that already had disclosure requirements in place (i.e., our "control" group).[3]

[2]Since January 2009, the United Kingdom has required short sellers of financial sector stocks and any stock in a rights issue period to disclose positions exceeding 0.25%. Since February 2011, France has required disclosure of all short positions exceeding 0.5% the following day. Spain also had a regime similar to France's, with disclosure requirements beginning on June 10, 2010. The EU-wide regulations superseded all national regimes after November 2012.

[3]In the Internet Appendix, we use propensity score matching to create a matched sample based on observed covariates and repeat our analysis. Our main results remain qualitatively similar in the matched sample.

We find that after November 2012, EU stocks previously not subject to disclosure requirements became more likely to face activist campaigns than those already subject to such requirements. The change in disclosure requirements is consistent with activist hedge funds using information about the composition of short positions to determine which firms to target.

We next examine whether returns to activists and the likelihood of campaign success are higher when large short sellers are present. This is motivated by the underperformance of stocks following an increase in short-selling activity (e.g., Jones & Lamont (2002)), which may prompt managers to become more receptive to activists' demands to counter the effects of short selling, such as a reduced ability to raise capital (Goldstein & Guembel (2008) and Campello et al. (2026)) and lower managerial compensation due to lower share prices.

We employ a calendar-time portfolio approach to analyze the effect of large short sellers' presence on the profitability of hedge fund activism. We calculate the abnormal returns of portfolios that buy all stocks with an unresolved activist campaign on a given day across alternative sample splits. The portfolio that buys all target stocks *with* large short sellers in the previous quarter earns a value-weighted abnormal return of 12.1% per year, based on Carhart (1997)'s four-factor model. In contrast, the portfolio that buys target stocks *without* any large short positions generates an annualized return of only 3.9%. Overall, activism is associated with positive abnormal returns, predominantly when large short sellers are present.

We also form double-sorted portfolios, conditional on campaign outcomes and the presence of large short positions. While this is not an implementable trading strategy, our results suggest that activist hedge funds are associated with some short sellers exiting or covering their positions, thereby increasing abnormal returns to hedge fund activism, particularly when the campaign achieves its stated goals.

Consistent with the finding that activists generate superior returns in the presence of large short sellers, we find that the involvement of large short sellers is positively associated with the probability of activist success. Activist success is also more sensitive to the presence of short sellers when blockholder ownership or the Herfindahl-Hirschman index (HHI) of institutional

ownership is higher. Our results are consistent with the interpretation that, when facing pressure from large short sellers, management tends to accept the demands of activist investors backed by institutional shareholders. These results also rationalize activists' initial targeting decisions: conditional on interventions, activists are more likely to achieve their goals and earn higher abnormal returns when large short sellers target the stock as well.

These results are consistent with De Angelis et al. (2017), which find that the threat of short selling leads firms to modify their managerial contracts to mitigate its adverse effects. Goldstein & Yang (2015) and Campello et al. (2026) develop models in which competing investors produce information and acquire expertise, akin to the actions of short sellers and activist hedge funds. As investors interact and condition their decisions on security prices, strategic complementarity can arise, amplifying the effects of trading decisions.

Finally, we directly test the three mechanisms discussed above that may explain why activists are attracted to firms targeted by large short sellers. We first examine the "information channel" and find that only large hedge fund short sellers predict activist targeting, while short positions held by asset managers or proprietary trading desks do not. One explanation is that event-driven short sellers, such as hedge funds, specialize in identifying firms with operational weaknesses or governance problems. Their disclosed short positions may therefore provide informative signals to activists seeking value-creation opportunities, increasing the likelihood of investigation and campaign initiation. The effect is stronger when disclosures aggregate information from multiple short sellers and when the disclosure is novel, such as the first public disclosure of a short position in a stock. Qualitative and anecdotal evidence from practitioners is also consistent with this interpretation. In conversations with European activist hedge fund managers and short sellers, several noted that mandatory short-position disclosures serve as a valuable screening signal when identifying potential targets. Overall, the evidence supports the information channel as an important mechanism linking large short-position disclosures to activists' targeting decisions.

We then examine the "bargaining channel," whereby short-selling pressure strengthens activists' bargaining power by imposing costs on managers and firms, such as lower performance-based pay and reduced access to capital. Consistent with this channel, we find that, in the presence of large short sellers, activists are less likely to seek board seats or launch proxy contests, campaigns are shorter, CEO compensation grows more slowly, and target firms are more likely to be acquired.[4] Finally, the cost channel appears limited in the short run but may contribute to activists' targeting decisions over longer horizons.

Our study contributes to several strands of the literature. First, the paper adds to a growing body of work on hedge fund activism that examines the short- and long-term performance of target firms (e.g., Brav et al. (2008), Klein & Zur (2009), and Becht et al. (2017)) and various drivers of activists' targeting decisions (Appel et al. (2018), Gantchev & Jotikasthira (2018), Kedia et al. (2021), and Brav et al. (2024)). However, little is known about whether and how the presence of large short sellers influences activists' targeting decisions, their success, and profitability.

Second, our work also relates to studies showing a negative relation between short selling and stock performance (e.g., Asquith & Meulbroek (1995), Jones & Lamont (2002), Asquith et al. (2005), Boehme et al. (2006), Cohen et al. (2007), and Diether et al. (2009)). Jiao et al. (2016) examine joint movements of aggregate short interest and hedge funds' holdings to identify informed demand shocks and the ability of short sellers and hedge funds to forecast stock returns. Jank & Smajlbegovic (2015) find that large short positions disclosed by hedge funds exhibit abnormal risk-adjusted performance of 5% per year, with an even higher return if a hedge fund has a first-mover advantage. Ljungqvist & Qian (2016) and Appel & Fos (2023) find that activist short-selling campaigns are associated with negative abnormal returns for targets.

[4]We also test whether the effect is stronger when managers have more equity-based compensation, but find no significant difference. This limits our ability to distinguish the bargaining channel from other mechanisms in our European setting.

Finally, our work links to the literature on investor disagreement (Miller (1977); Cookson et al. (2022)). While prior work examines how retail-investor disagreement facilitates informed trading, we focus on how two types of sophisticated investors—activists and short sellers—condition on each other's publicly disclosed positions, and we test the information, bargaining, and cost channels as driving forces.

II Data

A Hedge Fund Activism

We rely on several sources to identify activist hedge fund campaigns in Europe. Our data collection process consists of three steps. First, we obtain a list of all European campaigns from Activist Insight, which provides data on activist campaigns launched between January 2010 and December 2019. The data are collected from company disclosures through their investor relations webpages and/or stock exchanges in the EU.[5] This yields a preliminary list of 1,135 activist campaigns involving 601 unique stocks. For each event, we obtain information on the activist's name, the name and country of the target, the initial disclosure date, the size of the activist's investment, the activist's demands and tactics, and the campaign's starting date and outcome (i.e., whether activists achieved their stated goals). To obtain the International Securities Identification Number (ISIN) for each target firm, we manually search Compustat Global.

In the second step, we supplement this initial list with European activism events from SharkRepellent, another data provider specializing in corporate governance, and from Bloomberg. This step yields 279 additional campaigns that Activist Insight does not report. For each of the 1,414 events, we compare the disclosure dates, outcome dates, and activist ownership for campaigns reported in multiple databases. We review the original company disclosures and, when

[5]The EU Transparency Directive of 2004 requires disclosure of significant holdings in companies listed in Europe. However, blockholder disclosure thresholds differ across EU countries. For example, the United Kingdom and Germany currently have a threshold of 3%, while France's cutoff is 5%.

we identify discrepancies, conduct news searches in Factiva. We use the activist's and target company's names as keywords when company disclosures are unavailable.

In the final step, we identify the campaigns launched by hedge funds. To determine whether an investment fund is a hedge fund, we rely on Bloomberg, the fund's website, news searches, and a list of U.S. hedge fund names identified by Agarwal et al. (2013). Our final sample comprises the 684 events launched by 276 unique hedge funds.[6]

To our knowledge, the list of European hedge fund activism events is the most comprehensive for the post-financial-crisis period. In an international study on hedge fund activism, Becht et al. (2017) collect 380 European hedge fund interventions initiated between January 2000 and December 2010. Our larger sample of events suggests that European activist activity has increased substantially in recent years.[7]

B European Short-Selling Disclosures

During the 2008 financial crisis, regulators worldwide became concerned about the role of short sellers in exacerbating price movements and adopted various measures to restrict or prohibit short selling for a limited period (e.g., Beber & Pagano (2013)). In the EU, each member state could set its own regulations because no specific common regulatory framework existed. In March 2012, the European Parliament enacted Regulation (EU) No. 236/2012 to harmonize short-selling regulation and disclosure across member states. Article 6 states that from November 2012 onward, any investor (excluding market makers) with a net short position exceeding 0.5% of shares outstanding in a stock traded on European exchanges must publicly disclose details of the position once and for each additional 0.1% above that. The notification must be made no later than 15:30 on the following trading day. It must include the name of the shorted stock, its ISIN code, the size of the short position as a fraction of outstanding shares, and the investor's identity.

[6] In Appendix Tables A1 and A2, we repeat our primary analysis using the remaining events launched by individual investors, corporations, and other entities, and compare the results with our main findings.

[7] In compiling our dataset, we also conducted informal conversations with European activist hedge fund managers and short sellers. Several practitioners confirmed that mandatory short-position disclosures under EU Regulation 236/2012 serve as a useful screening tool for identifying potential activist targets, consistent with the information channel we examine in Section VI.A.

One of the reasons cited by the European Parliament in support of the disclosure requirement is that "Enhanced transparency relating to significant net short positions in specific financial instruments is likely to be of benefit to both the regulator and market participants [...] positions should be publicly disclosed to the market to provide useful information to other market participants about significant individual short positions in shares."[8] The disclosure requirement provides a unique setup that allows researchers to investigate the information conveyed by the presence of large short sellers in financial markets (e.g., Jank & Smajlbegovic (2015) and Jank et al. (2021)).

We begin by hand-collecting 15,123 firm-quarters with large short position disclosures involving 1,932 stocks from the websites of the National Competent Authorities (NCAs) for all 28 EU member states and two European Securities and Markets Authority observers (i.e., Iceland and Norway) from November 2012 to December 2019. Historical short positions are available for 20 developed countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, and the United Kingdom) and for four emerging markets (Bulgaria, Czech Republic, Hungary, and Poland).[9] Each country discloses data in a non-standardized fashion. Some regulators, such as the United Kingdom's Financial Conduct Authority, make their short position data readily accessible in spreadsheet format. Others, such as Spain's Comisión Nacional Del Mercado De Valores, do not disclose the ISIN codes but only the names of the shorted stocks. We develop country-specific Python algorithms to retrieve all relevant large short-selling position data for these markets and create a comprehensive dataset of European short-selling disclosures.[10]

[8]The full text can be found at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:086:0001:0024:en:PDF.

[9]For the remaining markets—Croatia, Cyprus, Estonia, Latvia, Romania, and Slovakia—there were no short-position disclosures during our sample period.

[10]These data are now available through Wharton Research Data Services (WRDS).

C Equity Lending and Aggregate Short Selling

The data used to measure aggregate short-selling activity are provided by S&P Securities Finance (formerly IHS Markit), which compiles statistics in the equity lending market from major participants in this market, such as custodians, lending agents, and prime brokers, for securities all over the world (see, e.g., Saffi & Sigurdsson (2011)). Short sellers must borrow shares for delivery in the equity lending market, with most stock loans being made to settle short sales (Aggarwal et al. (2015)). The data are available at a daily frequency. We observe the number of shares available for borrowing, the number of shares effectively borrowed, and the average loan fee for each stock. The proxy for aggregate short-selling activity in a given stock is *On Loan*, defined as the end-of-quarter quantity of shares borrowed as a percentage of shares outstanding.

D Other Data Sources

We merge data from several other sources with our sample. Financial accounting and stock return information are from Compustat Global. Institutional ownership data come from Thomson Eikon. CEO compensation, including pay components and turnover data, is from BoardEx. The European compensation data covers only a third of our sample. Merger and acquisition information comes from the Securities Data Company (SDC) database. Our final sample includes 4,480 firms with available stock prices and accounting measures for the sample period from January 2010 to December 2019. Of these 4,480 unique firms, 15.3% are targeted in at least one of the 684 activist events, and 30.3% have at least one large short seller position disclosure.

III Descriptive Statistics

A Activist Campaigns

Table 1 presents summary statistics for European activist campaigns. In Panel A, we present statistics on activist campaigns and several country-level activism metrics, categorized by target country. First, the 684 activist campaigns are unevenly distributed across countries, with 65% concentrated in the top three: the United Kingdom, Germany, and Italy. Second, in 59% of campaigns, the activist is a foreign hedge fund (based in other European countries or elsewhere), often from the United States (24.7%). For instance, nearly all campaigns in Italy are launched by foreign hedge funds, while the figure is only 38.4% in the United Kingdom. Third, success rates differ substantially across countries, even among those with the largest numbers of events (e.g., 70.8% in Italy and 60.3% in the United Kingdom). Although activist ownership varies across countries, it is typically below 10%, suggesting that activists are minority holders who require support from institutional investors.

Table 1 About Here

In Panel B, we report statistics on campaign outcomes grouped by activist demands. Following Greenwood & Schor (2009) and Brav et al. (2010), we classify activist demands into six major categories: (1) business strategy (excess diversification or investment, and poor operational efficiency), (2) capital structure (dividends or stock repurchases, equity issuance, restructuring debt, and recapitalization), (3) corporate governance (board declassification, replacing directors or management, removing takeover defense, management compensation, and a lack of disclosure or fraud), (4) opposing merger (either target or acquirer), (5) sale of firm or assets, and (6) general activism to maximize shareholder value. The objectives, except the last, are not mutually exclusive, as one activist campaign can target multiple issues.

Furthermore, 57.3% of all campaigns are related to corporate governance, with a full or partial sale of the firm ranking second (21.5%). Approximately 60.7% of the campaigns are successful, meaning that activists achieve at least one of their stated goals. The overall success rate is

comparable to that found for campaigns in the United States (Brav et al. (2008) and He & Li (2022)).

In an untabulated analysis, we find that the average dollar investment is $195 million, substantially greater than the median of $40 million. In contrast, the difference between the average and median ownership fractions is smaller (9.8% vs. 5.6%). This suggests that the distribution of target size is skewed towards large deals. Ownership levels are comparable to those reported in the U.S. sample (Brav et al. (2008) and Gantchev (2013)).

Figure 1 plots the annual number of activist campaigns and the associated success rates over our sample period. Activism has generally increased over the years, while success rates have decreased. This is consistent with the notion that as activism grows, activists target companies that are less likely to accept their demands.

FIGURE 1 ABOUT HERE

B Large Short Positions and Aggregate Short Interest

In Panel A of Table 2, we report summary statistics for large short-selling position disclosures across European markets after the EU Regulation was implemented, restricting the sample to stocks with data available on Compustat Global. From November 2012 through December 2019, 1,932 stocks were shorted by 1,317 unique large short sellers. The United Kingdom has the most disclosed positions, with 631 stocks shorted by 483 unique large short sellers. For the EU, the average (median) short position as a percentage of outstanding shares is 1.9% (1.09%). Panel B reports aggregate short interest for each European country, including firms with and without large short positions. The average short interest is 0.81%, and the median is 0.08%, with firms in larger markets exhibiting higher short interest.

TABLE 2 ABOUT HERE

C Target Company Characteristics

Panel A of Table 3 presents quarterly statistics for the target companies. Columns 1-3 report the averages, medians, and standard deviations across several firm characteristics, while columns 6-9 show the differences relative to two alternative sets of matched firms. In columns 6-7, each firm targeted by an activist is matched to other firms in the same two-digit GICS industry and year. Columns 8-9 compare target firms with similarly sized non-target firms, in the same two-digit GICS industry and year as well.

TABLE 3 ABOUT HERE

Compared with industry-year-matched companies, firms targeted by activist hedge funds are more likely to have large short positions disclosed and to be held by multiple large short sellers. Aggregate short selling is also higher in target companies. These differences are all significant at the 1% level. Target firms are held by more institutional owners, whose support is crucial for the activist to prevail (Jiang et al. (2018) and Brav et al. (2024)). Target companies are larger than non-targets in Europe, consistent with Becht et al. (2017). Compared to peers in the United States, European firms are owned by fewer institutional investors. They are less liquid, implying that activists target relatively large firms to increase the odds of a successful campaign. Targets have lower market-to-book ratios and Tobin's q, both of which are associated with undervaluation. These patterns are broadly consistent with those in Brav et al. (2008). In columns 8-9, the differences in short sales variables between target firms and the industry-year-size matched sample are similar to those in columns 6-7. Still, differences in other firm characteristics generally have lower statistical significance. In Internet Appendix Table A3, we present statistics on differences between activist targets that involve large short sellers and those without large shorts.[11]

[11] As expected, target firms involving large short sellers have higher aggregate short interest than targets involving no large short sellers. They also have higher institutional ownership. Target firms with large short sellers also exhibit lower stock returns in the 12 months before the announcement of an activist campaign, suggesting that stocks with large short sales have relatively lower prices when activists begin acquiring their shares.

Panel B of Table 3 reports summary statistics for campaign outcome variables, conditional on the firm being targeted by an activist. The unconditional success rate within this sample is 67.9%, with activists seeking board seats in 47.4% of campaigns and launching proxy contests in 15.8% of cases. Columns 6–7 of Panel B report the differences in means between campaigns with and without a concurrent large short position. Campaigns involving large short sellers are associated with fewer board-seat demands (−20.6 percentage points) and fewer proxy contests (−12.3 percentage points), consistent with reduced hostility under short-seller pressure. CEO compensation growth is lower (−91.5 percentage points), while the probability of a post-campaign acquisition is higher (+5.5 percentage points). There is no statistically significant difference in CEO turnover within three years after a campaign. These univariate patterns are consistent with the multivariate results discussed in Sections V and VI.

IV Short-Selling Disclosures and Hedge Fund Activism

A Activism following Short-Selling Disclosures

We start our analysis by testing the hypothesis that the likelihood of activist campaigns increases with the presence of large short sellers. Our regression specification has the following form:

$$\textit{D(Activist Targeting)}_{i,c,s,t} = \alpha + \beta \times SS_{i,t-1} + \gamma' \times \mathbf{X}_{i,t-1} + \psi_c + \rho_s + \theta_t + \epsilon_{i,c,s,t}. \quad (1)$$

The dependent variable, *D(Activist Targeting)*, is an indicator variable equal to one if there is an activist campaign announcement targeting firm i, in country c, in sector s, in quarter t, and zero otherwise. We use two measures of short-selling activity (SS): (i) *D(Large Short)* is an indicator variable equal to one if there is at least one reported large short position in quarter *t-1* and zero otherwise, and (ii) *Large Short Interest* is the sum of disclosed short-selling positions at the end of quarter *t-1* as a fraction of outstanding shares. We include several firm-level controls in the matrix $\mathbf{X}$, as discussed in Section III. We also control for end-of-quarter *On*

Loan, which captures the effect of aggregate short interest on activist targeting decisions. The parameter ψ_c captures country fixed effects; industry fixed effects based on GICS Sub-Industries are captured by the parameter ρ_s; and year-quarter fixed effects by θ_t.

In Table 4, we report probit coefficients with standard errors double-clustered at the firm and country-quarter level.[12] Consistent with the results in Table 3, we find that controlling for observable characteristics, the presence of large short sellers is positively associated with the likelihood of activist targeting. The coefficient on *D(Large Short)* is 0.106, significant at the 5% level, indicating that the presence of a large short seller in the previous quarter is positively associated with activist targeting. This corresponds to an increase of 0.113 percentage points in the probability of activist targeting—a 20.5% increase relative to the unconditional sample mean of 0.55%. These results are incremental to the impact of a firm's aggregate short interest (proxied by *On Loan*), which also positively predicts activism.

TABLE 4 ABOUT HERE

The effects of the other firm controls largely confirm our univariate results reported in Table 3. Consistent with prior literature on hedge fund activism (e.g., Brav et al. (2008), Klein & Zur (2009), and Becht et al. (2017)), activists tend to target firms with low market-to-book ratios, low stock returns, and low dividend yields. This suggests that activists aim to reduce underperformance and seek higher payouts.[13]

To address concerns that firms targeted by activists might differ systematically from non-targeted firms, we use propensity score matching to control for observable differences between targeted and non-targeted firms (e.g., Cremers et al. (2018)). We detail the procedure in the

[12] We use probit models throughout the paper for binary dependent variables, with multi-way clustered standard errors following Cameron et al. (2011). The exceptions are the difference-in-differences specification (Table 6) and the pre-trend event study (Figure 2), which use linear probability models.

[13] We verify that the short-seller-activism link is specific to hedge fund activists by re-estimating the main specifications using non-hedge fund activist campaigns. Internet Appendix Table A1 reports the targeting probit regressions for non-hedge fund activism: the coefficient on *D(Large Short)* is −0.035, which is economically negligible and statistically insignificant. This stands in sharp contrast to the positive and significant coefficient of 0.106 in Table 4 for hedge fund activism.

Internet Appendix. Our main conclusions remain unchanged when we re-estimate Equation (1) using the matched sample.

B Changes in Short Positions following Hedge Fund Activism

The previous subsection shows that the likelihood of starting an activist campaign is higher when large short sellers are present. The decision to short a stock may also be associated with the presence of activist investors. In this section, we examine whether the likelihood of large short sellers closing their positions relates to the presence of an activist hedge fund. Our specification takes the following form:

$$\begin{aligned} D(\Delta(\textit{Large Short})<0)_{i,c,s,t} = \alpha + \beta \times D(\textit{Activist Targeting})_{i,t-1} \\ + \gamma' \times \mathbf{X}_{i,t-1} + \psi_c + \rho_s + \theta_t + \epsilon_{i,c,s,t}, \end{aligned} \tag{2}$$

in which $D(\Delta(\text{Large Short}) < 0)$ is an indicator variable equal to one if the total size of disclosed large short-selling positions in firm i decreases from quarter *t-1* to quarter t and zero otherwise. *D(Activist Targeting)* is an indicator equal to one if a firm is targeted by an activist in quarter *t-1* and zero otherwise. All the other controls are identical to those in Equation (1). As shown in column 1 of Table 5, the probit results indicate that the presence of an activist hedge fund (i.e., *D(Activist Targeting)=1*) is positively associated with the probability that the short interest of reporting large short sellers decreases, with a coefficient of 0.247 that is significant at the 1% level. This implies that, all else equal, stocks targeted by activists have an almost 60% higher marginal probability of decreasing large short positions than non-target stocks.

TABLE 5 ABOUT HERE

In addition to being associated with a subsequent decrease in the presence of large short sellers, hedge fund activism may also alter the aggregate supply and demand for stock shorting. Evidence of long-run price increases following hedge fund activism campaigns, as shown in Brav et al. (2008), may lead some (small) short sellers to reduce their positions. Column 2 shows that

activism is positively associated with a decrease in shorting demand in the quarter following an activist campaign announcement, with the 0.200 coefficient being significant at the 1% level.

Lamont (2012) shows that firms react to short selling, coordinating with large shareholders to restrict the supply of shares available. More generally, the availability of shares for shorting depends on a firm's ownership structure. Porras Prado et al. (2016) find that lending supply is lower following the disclosure of a 13D filing by activists targeting U.S. firms. Indeed, column 3 shows that European hedge fund activist campaigns are also associated with a higher probability of lower lendable supply, with the 0.184 coefficient being significant at the 1% level. In Appendix Table A4, we report results when using changes in aggregate short interest and lendable supply instead of indicator variables that capture a decrease in those variables. Our estimates in column 3 of Appendix Table A4 show that the presence of an activist is associated with a 0.298 percentage-point reduction in lendable supply. This implies a 3.7% decrease relative to the 7.97% mean lendable supply as a fraction of shares outstanding (computed on the same firm-quarters used in the column 3 regression). A similar calculation for the change in aggregate short selling in column 2 yields a much higher effect on the demand side. The coefficient of -0.158 corresponds to a 17.8% decrease relative to the 0.89% sample average. Overall, our results suggest that activism has a greater impact on demand for shorting shares than on the supply of shorting. This mitigates concerns that activism's effects on the probability of large shorts are driven by limits to arbitrage arising from changes in lendable supply, rather than by a positive informational signal that lowers demand for short selling.

Overall, the evidence in Subsections IV.A and IV.B supports our hypothesis that activist hedge funds are more likely to target a firm when large short sellers are present. However, the reverse is not true: the presence of an activist campaign is associated with reductions in the amount of short interest held by large short sellers, aggregate short selling, and lendable supply. This is consistent with short sellers facing high costs and risks associated with shorting activity (Porras Prado et al. (2016) and Engelberg et al. (2018)). In the remainder of this paper, we focus on how short sellers affect hedge fund activism and post-activism outcomes.

C Establishing Causal Effects

An activist hedge fund's decision to target a particular firm might be related to unobserved characteristics that short sellers also use when deciding whether to short the stock. This raises concerns about reverse causality and simultaneity, which matching estimators cannot address, potentially biasing our estimates. For example, activists might be attracted to an underperforming firm with poor corporate governance and profit from improving it. Simultaneously, short sellers may decide to short the stock because they believe the company's governance cannot be improved and it will continue to underperform. Therefore, providing causal evidence on the link between short selling and hedge fund activism requires addressing endogeneity concerns.

In this subsection, we employ the harmonization of short-selling regulations across the EU in 2012 as our identification strategy to mitigate these concerns. This regulation requires that large short positions be disclosed to the market on the trading day after they cross a 0.5% threshold relative to market capitalization. Our identification assumption is that this plausibly exogenous regulatory change affected information about short-selling demand for a particular stock. For example, knowing that the entire 10% aggregate shorting demand originates from a single investor could materially influence the decision to launch an activist campaign compared to a scenario in which the same short interest is evenly distributed among 1,000 investors, each shorting only 0.01% of market capitalization. Therefore, the regulation provides a plausibly exogenous shock, allowing us to study how activist investors react to new information about who is shorting a stock.

More specifically, the EU's harmonized short sale disclosure requirements took effect on November 1st, 2012, across all member countries. Before this date, three countries—France, Spain, and the United Kingdom—had already implemented alternative large short sale disclosure regimes (Jones et al. (2016)).[14]

[14]In September 2008, France and Spain mandated the disclosure of individual short positions in financial stocks, which expanded to all Spanish stocks in June 2010 and all French stocks in February 2011. In January 2009, the United Kingdom introduced short-position disclosure requirements for financial stocks and for firms in

Compared with stocks in countries that already had disclosure requirements (i.e., France, Spain, and the United Kingdom), stocks without such requirements before November 2012 should be more likely to face activist campaigns because short-selling signals become available. The change in disclosure requirements provides a plausible source of exogenous variation in the information available about short-seller composition. For example, a stock with only 0.25% of its outstanding shares being lent out would not, by definition, have any large short positions requiring disclosure after November 2012. Firms with a higher *aggregate* short interest before November 2012 are more likely to have large *individual* short positions above the minimum disclosure level. In turn, this makes treated firms with large ex-ante aggregate short positions more likely to see an increase in the probability of being targeted after November 2012, relative to those with small aggregate short positions.[15]

We use quarterly data from the six quarters preceding and six quarters following November 2012 (2011Q2–2014Q2), comprising approximately 40,000 stock-quarter observations. The indicator variable *Post* equals one for periods after November 2012, when the disclosure rule was in effect, and zero otherwise. *Treat* equals zero for stocks traded in France, Spain, and the United Kingdom that were subject to short sale disclosure rules before November 2012 and one otherwise. Our treatment group comprises stocks subject to large short-sale disclosure requirements starting in November 2012.

We estimate the following linear probability model (LPM):

$$D(\textit{Activist Targeting})_{i,c,s,t} = \alpha + \beta_1 \times \textit{Treat}_{i,c} + \delta \times \textit{Post}_t \times \textit{Treat}_{i,c} + \beta_2 \times SS_{i,t-1} + \gamma' \times \mathbf{X}_{i,t-1} + \mu_i + \psi_c + \rho_s + \theta_t + \epsilon_{i,c,s,t}. \quad (3)$$

a rights-issue period. This staggered adoption of standardized short-selling disclosure rules across EU countries allows us to study activist targeting decisions using a difference-in-differences (DiD) estimation strategy.

[15]We find that 43.8% of stock-quarter observations in the top quintile of *On Loan*, a measure of aggregate short interest, have a disclosed large short position, compared with only 3.8% of observations in the bottom quintile. As expected, the correlation between aggregate short selling and the indicator for large short positions is positive, at 0.4 in our sample.

The main parameter of interest is δ. A positive value for δ indicates that stocks in the treatment group (i.e., *Treat*=1) are more likely to be targeted by activists after the large short sale disclosure requirement is implemented (i.e., *Post*=1). In some specifications, we also include firm (μ_i) fixed effects. When we include firm fixed effects, the country and industry fixed effects are absorbed because they are time-invariant within firms. We note that adding firm fixed effects makes the firm-invariant variable *Treat* redundant. Because all stocks are simultaneously affected by the regulatory change in November 2012, our setup does not suffer from the biases shown by Callaway & Sant'Anna (2021) in staggered DiD settings.

We present the estimated coefficients in Table 6, obtained from an LPM with double-clustered standard errors at the firm and country-quarter levels, using various combinations of fixed effects. The estimates in column 1, using country, industry, and year-quarter fixed effects, show that the interaction term (*Post*× *Treat*) is positive and statistically significant at the 1% level. This implies that firms without prior short-sale disclosure requirements became more likely to be targeted by activists *after* November 2012, when regulation was harmonized across EU countries, compared with firms that already had such requirements. The estimated coefficient implies a marginal increase of 0.424 percentage points in the targeting probability, a statistically and economically significant effect given that the unconditional sample targeting probability is 0.34%.[16] The sum of the coefficients on *Treat* and *Post*× *Treat* is not statistically different from zero. As expected, after the regulatory change, treated and control firms differ by no statistically significant amount, as all firms are now subject to the same disclosure rules. The results are similar in column 2 after controlling for firm and year-quarter fixed effects. In column 3, we perform a robustness test that excludes the regulation transition quarter, 2012Q4.

TABLE 6 ABOUT HERE

[16]For ease of exposition, we multiply the estimated coefficients by 100 across all specifications.

To summarize, our results are consistent with the conjecture that a plausibly exogenous regulatory shock that increases the disclosure of large short sellers in a given stock is associated with a higher likelihood of activist targeting.

To further assess the validity of the parallel-trends assumption underlying our DiD strategy, Figure 2 plots the dynamic treatment effects from an event-study specification that includes firm and year-quarter fixed effects. Specifically, we replace *Post* in Equation (3) with quarterly indicator variables from $t-6$ through $t+6$ and plot the coefficients on their interactions with the $Treat$ indicator, along with their confidence intervals. The third quarter of 2012, or $t-1$ relative to the November 2012 harmonization date, is the baseline period.

The pre-treatment coefficients, estimated in periods when the treated firms were subject to different large short-selling disclosure rules than the control firms, are jointly significant (F-test $p = 0.007$). In the post-treatment period, when all firms are subject to the same set of rules, they are no longer individually or jointly significant (F-test $p = 0.125$).[17] We note that market participants anticipated the 2012 harmonization effective date, potentially attenuating estimated treatment effects around the event date.

FIGURE 2 ABOUT HERE

V Short Positions and Activists' Profitability

We now examine the profitability of activist campaigns and how it is affected by the presence of large short sellers. We employ a standard calendar-time portfolio approach, analyzing the returns of a strategy that buys all stocks with an unresolved campaign on a given day. Abnormal returns (*Alpha*) are computed using a four-factor model (*MKT*, *SMB*, *HML*, and *UMD*) and annualized by multiplying the daily estimated alpha by 252.

[17] This setup is slightly different from the usual DiD design, in which control and treatment firms are similar *before* receiving the treatment. In our case, all firms face the same disclosure regime *after* the treatment.

In Panel A of Table 7, we report average abnormal returns for four value-weighted portfolios sorted separately by the presence of a large short position in the previous quarter, and by campaign success. As reported in columns 1a-2b, activists appear to earn higher abnormal profits in campaigns *involving* large short positions, rationalizing our earlier finding that activists are more likely to target companies with large short sellers. The annualized alpha in column 1a for campaigns initiated when a stock had a large short position is 12.1% and statistically significant at the 5% level. In contrast, in column 2a, campaigns without a large short position show a lower abnormal return of 3.9%, which is not statistically significant. In columns 3a-4b, we report portfolio returns conditional on a campaign's success. As expected, abnormal returns are positive and statistically significant at the 10% level for campaigns in which activists achieve their goals, with an annualized alpha of 9.5%. The corresponding annualized alpha for *unsuccessful* campaigns is 5.4% and is not statistically significant.

TABLE 7 ABOUT HERE

In Panel B, we estimate abnormal returns of double-sorted portfolios based on the campaign outcome and the presence of a large short position. While this would not be an implementable trading strategy, these conditional portfolios help rationalize activists' targeting decisions. Results in columns 1a-2b show that the presence of large short sellers is associated with statistically significant positive abnormal performance only when the campaign is successful ($L + S$), with an average return higher than in successful campaigns without large short sellers ($N + S$). These results support the hypothesis that activism generates higher returns when large short sellers are present. In addition, columns 3a-4b of Panel B show that, when large short sellers are absent, activists still achieve positive abnormal returns in successful campaigns, but not in failed campaigns. In the latter, abnormal returns are lower and not statistically different from zero. In summary, the largest estimated alpha occurs for successful campaigns in which at least one large short position has been disclosed by the end of the previous quarter.

VI Why Are Activists Attracted to Firms with Large Short Sellers?

This section examines why activists are drawn to firms with large short sellers. We consider four sets of evidence. First, we investigate whether large short sellers increase the likelihood that an activist's campaign will succeed. Second, we present evidence for an "information channel" through which large short sellers' disclosures signal to activists that a firm is underperforming and has potential for value improvements. Third, we examine a "bargaining channel" through which the presence of large short sellers increases an activist's bargaining power with the targeted firm's management. Fourth, we assess a "cost channel" through which activists benefit from the lower stock prices following the announcement of a large short position.

A Short Positions and Activists' Campaign Success

Corporate managers are concerned with long-term share prices because of their fiduciary duties to shareholders and their desire to accumulate personal wealth. Edmans et al. (2017) find that the largest component of U.S. CEOs' compensation comes from performance-based stock grants, the value of which is positively related to future stock returns. Further, the probability of forced CEO termination is higher for firms with worse performance (Jenter & Lewellen (2020)). Becht et al. (2008) show that activists generate abnormal returns through engagement rather than stock picking. Therefore, managers may be more open to accepting activists' demands when facing pressure from large short sellers, consistent with the greater success of activist campaigns.

The abnormal returns following activist campaigns in the presence of large short sellers might be attributable to activists being more likely to achieve their goals. We examine this possibility by replacing the dependent variable in Equation (1) with *D(Activist Success)*, an indicator variable equal to one if an activist achieves at least one stated goal of the campaign and zero otherwise. The sample includes all activist interventions for which covariates are available. Column 1 of Table 8 shows that the presence of large short sellers is associated with a coefficient of 0.448

on *D(Large Short)*, which is significant at the 5% level, indicating a substantial positive effect on the probability of activists' success. This implies that having a large short seller raises the probability of campaign success by 16.6 percentage points at the sample means – a 27% increase over the unconditional success rate of 62%. Because we condition on firms being targeted, our estimates could be affected by selection. If activists lower their targeting threshold when short sellers are present, the composition of targeted firms may differ across groups.

TABLE 8 ABOUT HERE

We also expect that activists can generate more material changes to the firm with the support of institutional investors, as suggested by Brav et al. (2024) and He & Li (2022). Column 2 reports that an increase in blockholder ownership—that is, ownership by investors holding more than 5% of outstanding shares—makes it more likely that activists will achieve their stated goals in the presence of large short sellers, with an interaction coefficient of 4.825 (significant at the 1% level). Similarly, column 3 shows that activist success is more sensitive to short sellers' involvement when the Herfindahl-Hirschman index of institutional ownership is higher, with an interaction coefficient of 5.799 (significant at the 10% level). These results are consistent with the interpretation that, under pressure from large short sellers, management is more likely to accept activist demands when large institutional shareholders support them. Overall, these results are consistent with activists achieving their campaign objectives more frequently when large short sellers are present.[18]

B The Information Channel

A central question is whether large short sellers facilitate activism through the *informational content* of their disclosures. Under this "information channel," the public disclosure of a large short position provides an incremental signal to potential activists that a firm is underperform-

[18]We note that the success regressions condition on being targeted by an activist, which introduces potential sample selection. Since the targeting decision is endogenous, the success estimates should be interpreted as conditional associations rather than unconditional causal effects.

ing and has scope for value improvement. Event-driven short sellers, in particular, specialize in identifying companies with operational weaknesses, valuation concerns, or governance issues that may lead to poor performance. Their disclosed positions can therefore be especially informative to activists seeking opportunities to unlock value through operational, strategic, or governance changes, increasing the likelihood of investigation and campaign initiation.[19]

We provide three sets of tests that support the information channel. The first examines the type of large short seller. Using the names of investors in our EU short-seller disclosure dataset, we classify short sellers into four broad categories: hedge funds, asset managers, proprietary desks/banks, and others. For example, BlackRock Inc. is classified as an asset manager, while Elliott Capital Advisors LP is classified as a hedge fund.[20] We test each type both individually and jointly in Table 9.

TABLE 9 ABOUT HERE

The results are striking: only hedge fund short sellers predict activist targeting. As shown in column 4 of Panel A, *D(HF Large Short)* has a coefficient of 0.181, which is significant at the 5% level. The coefficients for asset managers (−0.073) and proprietary desks/banks (−0.132) are not statistically significant. The differences across types are consistent with the information channel: hedge fund short sellers' disclosed positions convey corporate-event signals that overlap with activist investment theses. In contrast, non-fundamental short sellers add no predictive power. We obtain similar results when focusing on the subsample of observations in which large short sellers are present (see Panel B of Table 9).

The second test examines information aggregation. When multiple informed traders independently short the same firm, the negative signal is likely to be more credible and informative. We test whether the *number* of disclosed short sellers predicts activist targeting, controlling for the large short indicator. As shown in column 2 of Table 10, firms with multiple disclosed short sellers face a higher probability of activist targeting (coefficient = 0.154, significant at the 1%

[19] Short selling may also alert management to underlying issues, potentially prompting corrective actions.

[20] Classifications are based on each short seller's self-reported strategy. For short sellers with multiple business lines, we classify them according to their largest business line.

level). The continuous short-seller count, reported in column 3 (coefficient = 0.041, significant at the 5% level), confirms this result. In column 2, the coefficient on the large short indicator declines in magnitude and significance, indicating that the count variable absorbs and sharpens the threshold disclosure signal. This pattern is consistent with information aggregation among independent informed traders.

TABLE 10 ABOUT HERE

The third test examines the first disclosure of a position. The *first* time a short position is publicly disclosed for a firm represents genuinely new information to the market and potential activists, whereas subsequent disclosures are partially anticipated. Column 5 of Table 10 shows that first disclosures have a highly significant direct effect on targeting (the coefficient on *D(First Disclosure)* is 0.202, significant at the 1% level). The lower coefficient on the large short indicator also indicates that the first disclosure absorbs part of the threshold signal. This result is consistent with the idea that information novelty drives the effect.

In addition, in Internet Appendix Table A2, we examine whether non-hedge fund activist campaigns predict subsequent changes in short selling. The coefficients on *D(Activist targeting)* are small and insignificant across all three dependent variables—changes in large short positions (0.122), on loan (0.050), and lendable supply (0.019)—again contrasting with the significant effects documented for hedge fund activism in Table 5. These null results are consistent with the information channel: hedge fund activists, who conduct in-depth fundamental research and are more likely to act on informational signals, respond to large short-seller disclosures, while non-hedge fund activists, such as governance-focused institutional investors or individual shareholders, do not.

Taken together, the evidence from short-seller identity, information aggregation, and first-disclosure novelty is consistent with the information channel as an important mechanism linking large short sellers' disclosures to activists' targeting decisions.

C Bargaining Power of Activists

A complementary mechanism is the "bargaining channel," through which the presence of large short sellers increases an activist's bargaining power with the targeted firm's management. The presence of large short sellers, who are likely informed investors, is associated with lower share prices in the long run (Jank & Smajlbegovic (2015)). Lower prices reduce firms' ability to raise capital and performance-based compensation, a significant component of CEOs' compensation (Edmans et al. (2017)). Furthermore, Kunzmann & Meier (2018) find that short selling increases the probability of CEO turnover, which can, in turn, make management more willing to engage with activists. Therefore, pressure from large short sellers may increase an activist's bargaining power, making managers more receptive to the activist's demands.

Several high-profile European cases illustrate the bargaining channel. In 2024, short seller Hindenburg Research published a report on Swiss banking software firm Temenos AG, triggering a 30% decline in the stock price. Activist Petrus Advisers, which had unsuccessfully called for the CEO's removal for over a year, quickly leveraged the report to amplify its demands. The resulting price drop shifted bargaining dynamics: the board rejected the compensation report, and management made long-resisted concessions. Similarly, after Gotham City Research's report led to a 33% decline in Spanish blood plasma firm Grifols in January 2024, activist Mason Capital entered and demanded governance reforms. Grifols subsequently replaced its CEO, added independent directors proposed by Mason Capital, and explored a take-private transaction. In both cases, short sellers appear to have weakened management's bargaining position, increasing receptiveness to activist demands.

Next, we provide empirical evidence on the bargaining power channel. First, we examine whether activists employ less hostile tactics, which are also less costly and increase the returns to activism, in the presence of large short sellers. We focus on firms targeted by activists during our sample period. As shown in column 1 of Table 11, the coefficient on *D(Large Short)* for board seat demands is -0.313 (significant at the 10% level), indicating that activists are less likely to seek board seats when large short sellers are present. Similarly, activists are less

likely to launch a proxy contest (coefficient = −0.761, significant at the 1% level), another costly and risky form of activist intervention (Gantchev (2013), Fos (2017), and Brav et al. (2024)).

TABLE 11 ABOUT HERE

Next, we examine corporate policies following activist campaigns. Column 3 shows that the growth rate of CEO compensation in the three years following activism is lower when large short sellers are present, consistent with the notion that activism is more effective at improving governance when management faces pressure from short sellers.[21] Column 4 suggests that activism-induced CEO turnover is unrelated to the presence of large short sellers and to aggregate short interest. As shown in column 5, when large shorts are present, a firm targeted by an activist is more likely to be acquired by another firm three years after the activism campaign (coefficient = 0.431, significant at the 5% level). This result is consistent with management being less resistant to acquisitions, which activists often facilitate (Boyson et al. (2017)).

The longer an activist campaign lasts, the more costly it becomes for the activist, who shoulders all the costs associated with activism but shares the benefits of a successful campaign with other equity holders. To assess the extent of such costs, we link the duration of activist campaigns to the presence of large short sellers. Specifically, we use the Cox (1972) proportional hazards model to estimate the hazard rate on a daily frequency for activist campaign resolution.[22] The dependent variable is the number of days between an activist's disclosure and the campaign's resolution. In column 1 of Table 12, the estimated hazard ratio is positively associated with *D(Large Short)* and significant at the 5% level. The estimate implies that, conditional on a campaign being unresolved, the hazard rate of campaign resolution on a given day is 29.0% higher ($=e^{0.254}$) in the presence of large short sellers. Moreover, this result is not simply due to aggregate short selling. In column 2, we find an even larger effect when controlling for aggregate

[21] We do not focus on stock-based CEO compensation because most European firms, 81.4% of our sample firms, do not grant equity pay. The average equity portion is less than 15% among firms that employ stock-based compensation.

[22] In the Cox model, the hazard function at a given time t (from activist disclosure), conditional on the campaign not yet being resolved, is given by $h_i(t) = h_0(t)e^{X'_{i,t-1}\beta}$, where $h_0(t)$ is an unspecified, non-parametric baseline hazard function.

short selling (*On Loan*), with a 38.4% higher hazard rate. Overall, the involvement of large short sellers is related (both economically and statistically) to shorter activist campaigns.

TABLE 12 ABOUT HERE

The bargaining channel also predicts that the effect of short sellers on activism should be stronger when corporate managers have more equity-based compensation, because such managers suffer greater personal wealth losses from short-seller-driven price declines. In unreported results, we construct indicators of equity-based managerial pay at both the CEO and all-manager levels using BoardEx data for European firms and interact them with the *D(Large Short)* indicator. For both CEO and manager equity pay—across all specifications (extensive, above-median, top-quartile, and continuous)—the interaction coefficients are uniformly insignificant, suggesting that the targeting effect of large short sellers does not vary with managerial wealth exposure.

In summary, the evidence from activist tactics (Table 11) and campaign duration (Table 12) supports the bargaining channel, indicating that management appears more receptive to activist demands when large short sellers are present. However, we find no differential effects through managerial compensation structure, which weakens our ability to distinguish the bargaining channel from alternative explanations. Both the information and bargaining channels likely operate simultaneously, with the information channel appearing stronger in our tests.

D The Cost Channel

The announcement of a large short position is associated with an immediate decrease in the stock price (Jank et al. (2021)), which can lower an activist's cost of accumulating a block of shares. This represents a third potential channel through which activists can achieve superior returns.

To examine the cost channel, we plot the four-factor-adjusted cumulative abnormal returns (CARs) from 60 days before to 30 days after activist campaign announcements in Figure 3.[23] Figure 3 shows that the average CAR during the [-60, -10) window is virtually zero when at least one large short seller is present, while increasing by 1.1% on average when large short sellers are not involved. Both groups experience a large increase in share prices on the announcement day.

FIGURE 3 ABOUT HERE

While Figure 3 suggests that the cost channel does not play a dominant role in the 60 days immediately preceding activist announcements, it may still contribute to activists' decisions over longer horizons. As shown in Table A3, the 12-month return of firms targeted by activists is lower among firms that involve large short sellers, although this difference is not statistically significant ($t = -1.14$). The point estimate is nonetheless directionally consistent with the cost channel operating over a longer accumulation period. Indeed, Jank et al. (2021) report that the typical holding period of a large short position is 93.1 days, with more than 25% of short trades being closed in less than 10 days. Therefore, by the time an activist accumulates shares during the 60-day window before the announcement, much of the short-seller-driven price decline may already have occurred, enabling the activist to acquire shares at more favorable prices.

In summary, our analysis examines three complementary channels through which large short sellers may influence activist hedge funds' targeting decisions. The evidence is most consistent with the *information channel*: large short positions by hedge funds, whose trades convey corporate-event signals, are more strongly associated with activist targeting than other short-seller types. The effect of large short disclosures is amplified by information aggregation (multiple short sellers) and information novelty (first disclosures). The evidence is also consistent with the *bargaining channel*, as reflected in reduced campaign hostility (Table 11) and shorter campaign durations (Table 12). However, compensation heterogeneity tests cannot distinguish

[23] Our factors, *MKT*, *SMB*, *HML*, and *UMD*, are obtained from AQR Capital Management's website, following Fama & French (1996) and Asness & Frazzini (2013). See https://www.aqr.com/Insights/Datasets/Betting-Against-Beta-Equity-Factors-Daily

it from the information channel in our European setting. The *cost channel* may also contribute to some extent over longer time horizons. These channels are not mutually exclusive and likely operate simultaneously.

VII Conclusion

This paper studies how two types of sophisticated investors, activist hedge funds and large short sellers, interact when targeting the same stock. Using European activist campaigns from 2010 to 2019 and EU-wide disclosures of short positions exceeding 0.5% of shares outstanding, we find that large short positions predict activist targeting. In contrast, activist campaigns are followed by a reduction in large short-selling activity, potentially due to greater short-squeeze risk and a reduced supply of lendable shares.

We exploit the pan-European harmonization of short-sale disclosure rules in November 2012 as a plausibly exogenous shock to the information available about large short sellers. After the reform, firms newly subject to disclosure requirements experienced a relative increase in activist campaigns compared with firms in France, Spain, and the United Kingdom, where disclosure rules were already in place.

Using a calendar-time portfolio approach, we show that activism generates higher abnormal returns in the presence of large short sellers, especially when activists achieve their stated objectives. We then examine three mechanisms. The evidence is most consistent with the information channel: only hedge fund short sellers predict activist targeting, and the effect is stronger when disclosures aggregate information across short sellers or reveal a short position for the first time. We also find evidence consistent with a bargaining channel: campaigns are less hostile and shorter when large short sellers are present, whereas the cost channel appears to matter mainly over longer horizons.

Our findings are relevant to investors and regulators interested in the profitability of activist campaigns and short-sale disclosure. They suggest that public short-position disclosures can influence other market participants, including activist investors, with potential consequences for

corporate outcomes. Because our evidence comes from Europe, where compensation structures and disclosure rules differ from those in the United States, it remains an important question for future research whether similar mechanisms operate under SEC Rule 13f-2, which requires institutional managers to report large short positions, with aggregate data later disclosed publicly.

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Figure 1. Activist Campaigns and Their Success Rates Over Time
This figure plots the annual number of activist campaigns in Europe from 2010 to 2019 (left axis) and the associated success rate (right axis). The sample comprises 684 activist hedge fund campaigns hand-collected from investor relations webpages, regulatory filings, and financial news sources. A campaign is considered successful if the activist achieves at least one stated goal.

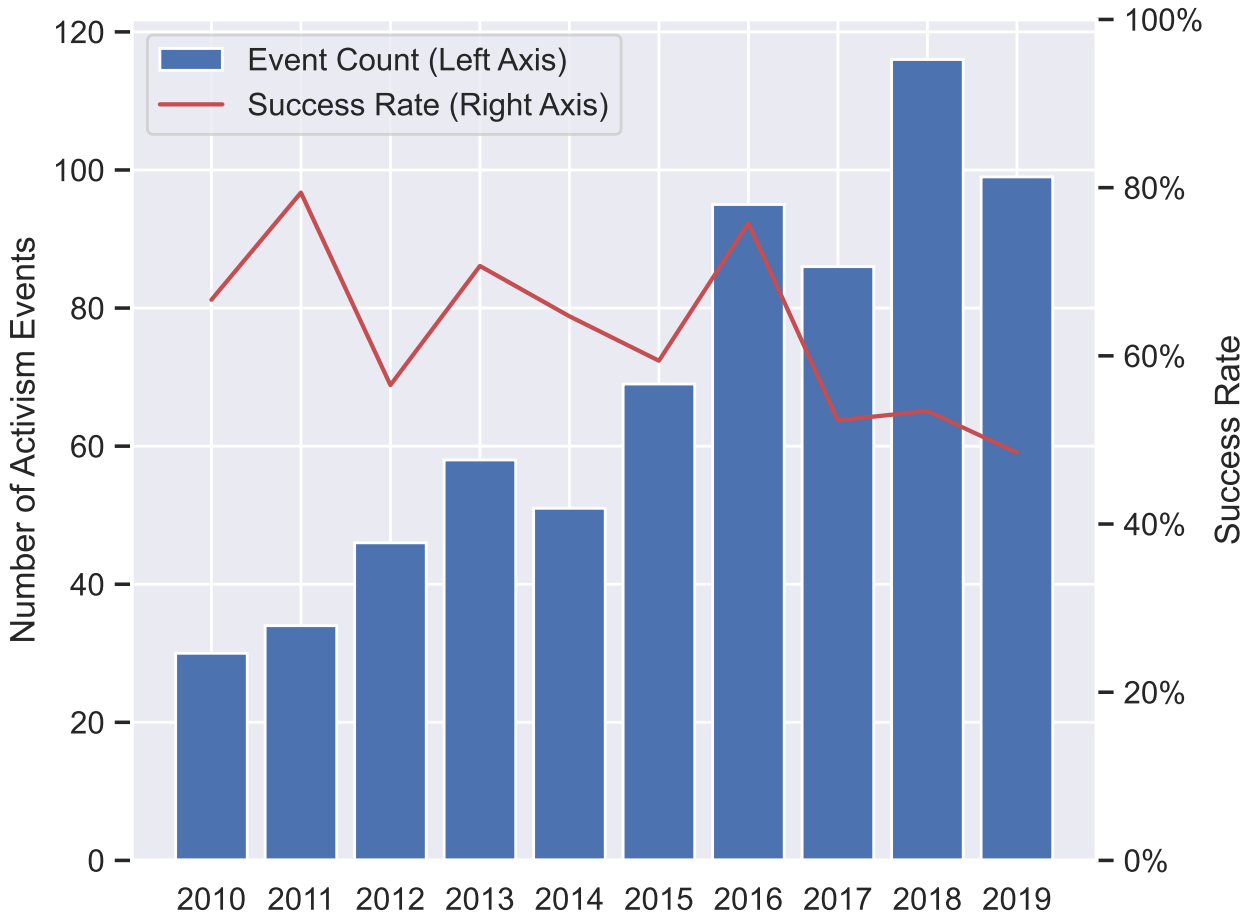


Figure 2. Event Study: Pre-Treatment Parallel Trends
This figure plots the dynamic treatment effects from an event-study specification with firm and year-quarter fixed effects. Specifically, we replace *Post* in Equation (3) with quarterly indicator variables from $t-6$ through $t+6$ and plot the coefficients on their interactions with the *Treat* indicator, along with their confidence intervals. We use the same specification as column 3 of Table 6. The third quarter of 2012, or $t-1$ relative to the November 2012 harmonization date, is the baseline period, and we exclude $t=0$ to mitigate anticipation bias. Standard errors are double-clustered at the firm and country-quarter levels. The shaded area represents 95% confidence intervals. Pre-treatment coefficients, when the treatment firms were subject to different large short-selling disclosure rules, are jointly significant (F-test $p=0.007$). In the post-treatment period, when all firms are subject to the same set of rules, they are no longer individually or jointly significant (F-test $p=0.125$).

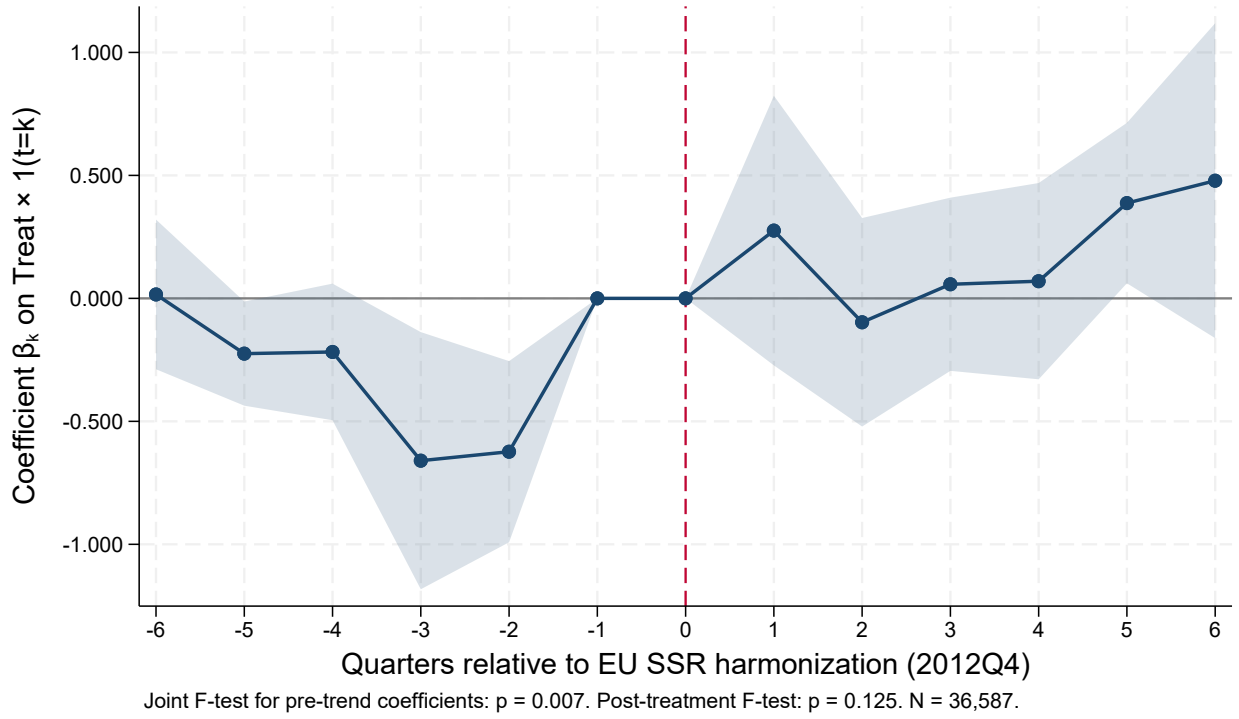


Figure 3. Cumulative Abnormal Returns Around Activist Announcements
This figure plots average cumulative abnormal returns (CARs) from 60 calendar days before to 30 calendar days after activist campaign announcements. CARs are sums of daily excess returns, adjusted for the Fama & French (1993) plus momentum factors, with an estimation window ranging from 365 to 80 calendar days before activist announcements. We obtain our factors (*MKT*, *SMB*, *HML*, and *UMD*) from AQR Capital Management's website, with *MKT* representing the market's excess return over the risk-free rate. The other factors are calculated based on European market data, following Fama & French (1996) and Asness & Frazzini (2013). The solid orange line represents the average cumulative return for firms with at least one large short position in the quarter before activist announcements. The dashed blue line represents the average cumulative return for firms without any large short positions.



Table 1
Hedge Fund Activism in Europe
In this table, we report descriptive statistics on hedge fund activism campaigns in Europe between January 2010 and December 2019. For each country, Panel A reports the number of events, the fraction of events involving a foreign activist, the fraction involving a U.S.-based activist, the average fraction of shares held by activists at the announcement (*Activist ownership*), and the success rate. A campaign is considered successful if the activist achieves at least one stated goal. Panel B reports statistics on campaign outcomes grouped by activist demands. The demands, except for the general undervaluation, are not mutually exclusive, as a single activist campaign can target multiple issues.

Panel A: Hedge fund activism across the countries

Country	N(Events)	%(Foreign Activist)	%(U.S. Activist)	Activist Ownership	Success Rate
Austria	16	93.8%	0.0%	11.0%	68.8%
Belgium	5	100.0%	20.0%	4.7%	40.0%
Cyprus	3	66.7%	0.0%	32.8%	33.3%
Czech Republic	4	100.0%	0.0%	1.8%	50.0%
Denmark	7	71.4%	28.6%	8.7%	71.4%
Finland	16	75.0%	6.2%	10.5%	93.8%
France	47	72.3%	36.2%	4.7%	29.8%
Germany	95	66.3%	26.3%	11.6%	54.7%
Ireland	13	92.3%	15.4%	7.5%	46.2%
Italy	48	97.9%	14.6%	4.6%	70.8%
Luxembourg	6	100.0%	16.7%	10.7%	50.0%
Netherlands	18	88.9%	61.1%	5.3%	72.2%
Norway	12	75.0%	25.0%	10.3%	75.0%
Poland	36	47.2%	5.6%	11.3%	86.1%
Portugal	2	50.0%	50.0%	2.3%	50.0%
Romania	2	0.0%	0.0%	7.0%	0.0%
Slovenia	2	0.0%	0.0%	3.1%	0.0%
Spain	24	87.5%	16.7%	12.2%	62.5%
Sweden	26	65.4%	38.5%	14.6%	73.1%
United Kingdom	302	38.4%	27.2%	10.2%	60.3%
Total	684	58.8%	24.7%	9.8%	60.7%

Panel B: Types of activist demands

Type	N(Events)	%	Success rate
Business strategy	74	10.8%	64.9%
Capital structure	81	11.8%	61.7%
Corporate governance	392	57.3%	66.3%
Oppose merger	96	14.0%	52.1%
Sale of firm or assets	147	21.5%	62.6%
General undervaluation	22	3.2%	50.0%

Table 2
Short Selling in Europe
In Panel A, we report country-level statistics on large short-selling positions between November 2012 and December 2019 at the firm-quarter level, conditional on having at least one large short position disclosure under EU Regulation 236/2012 and data available on Compustat Global. Short-selling positions are collected from the websites of each country's National Competent Authority and expressed as a percentage of shares outstanding. The sample covers 15,123 firm-quarters with large short positions involving 1,932 unique stocks. Panel B reports country-level statistics on end-of-quarter aggregate short interest for stocks with non-missing equity lending data. Aggregate short interest is measured by *On Loan*, defined as the number of shares loaned out divided by the number of shares outstanding, covering 100,593 firm-quarters across 5,715 unique stocks. In both panels, we require that a stock exists in Compustat Global. *Other European markets* includes Bulgaria, the Czech Republic, Iceland, Lithuania, Malta, and Slovenia. UK includes securities with ISIN prefixes GB, GG, JE, IM, GI, BM, and VG, reflecting LSE listings by firms incorporated in the UK, Crown Dependencies, and British Overseas Territories.

Panel A: Large Short positions across countries

Country	No. of positions	No. of sellers	No. of stocks	Mean	25th pctile.	Median	75th pctile.	Std. Dev.
Austria	202	62	28	1.43%	0.50%	0.94%	1.94%	1.29%
Belgium	412	129	48	1.85%	0.60%	1.20%	2.23%	1.86%
Cyprus	12	9	4	0.93%	0.54%	0.94%	1.28%	0.50%
Denmark	431	133	44	1.83%	0.50%	1.04%	2.19%	2.04%
Finland	583	167	55	2.17%	0.64%	1.29%	2.87%	2.23%
France	766	297	124	1.29%	0.49%	0.84%	1.72%	1.12%
Germany	2,000	316	210	2.06%	0.59%	1.20%	2.71%	2.21%
Greece	61	10	9	1.37%	0.60%	1.10%	1.61%	1.25%
Hungary	25	18	5	1.65%	0.75%	1.31%	2.34%	1.04%
Ireland	146	79	34	1.43%	0.49%	0.69%	1.40%	2.01%
Italy	1,192	207	155	1.77%	0.54%	1.08%	2.25%	1.84%
Luxembourg	167	87	22	2.37%	0.60%	1.17%	3.34%	2.50%
Netherlands	696	224	88	2.58%	0.61%	1.30%	3.23%	3.08%
Norway	270	108	47	2.57%	0.78%	1.38%	3.38%	2.94%
Poland	189	47	33	1.09%	0.59%	0.77%	1.30%	0.75%
Portugal	120	53	10	2.27%	0.63%	1.79%	3.08%	1.98%
Spain	795	180	77	1.90%	0.56%	1.09%	2.30%	2.15%
Sweden	1,106	377	178	1.74%	0.49%	0.98%	1.99%	2.01%
United Kingdom	5,662	483	631	1.93%	0.59%	1.10%	2.38%	2.18%
Other European markets	18	16	5	0.72%	0.49%	0.61%	1.01%	0.31%
Total	15,123	1,317	1,932	1.90%	0.58%	1.09%	2.32%	2.14%

Table 2 – Continued

Panel B: Aggregate short interest across countries

Country	N(Firm-quarters)	N(stocks)	Mean	25th pctile.	Median	75th pctile.	Std. Dev.
Austria	1,396	68	1.26%	0.02%	0.31%	1.64%	2.04%
Belgium	2,637	126	0.90%	0.01%	0.13%	0.82%	1.89%
Cyprus	184	14	0.06%	0.00%	0.00%	0.04%	0.16%
Denmark	2,546	128	0.13%	0.00%	0.01%	0.10%	0.37%
Finland	2,925	153	1.17%	0.00%	0.08%	1.15%	2.26%
France	11,147	594	0.97%	0.00%	0.12%	0.99%	1.92%
Germany	10,547	575	1.18%	0.00%	0.16%	1.29%	2.21%
Greece	9	1	0.00%	0.00%	0.00%	0.00%	0.00%
Hungary	242	18	0.00%	0.00%	0.00%	0.00%	0.01%
Ireland	1,380	71	0.46%	0.00%	0.10%	0.52%	1.04%
Italy	7,200	422	0.98%	0.01%	0.14%	0.87%	2.00%
Luxembourg	744	51	1.01%	0.01%	0.20%	0.95%	1.99%
Netherlands	2,800	151	1.54%	0.03%	0.53%	1.79%	2.47%
Norway	3,829	241	0.12%	0.00%	0.01%	0.07%	0.32%
Poland	2,505	177	0.08%	0.00%	0.01%	0.07%	0.18%
Portugal	770	41	0.92%	0.01%	0.13%	0.88%	1.94%
Spain	3,586	173	1.14%	0.01%	0.29%	1.34%	2.01%
Sweden	9,809	723	0.10%	0.00%	0.01%	0.09%	0.24%
United Kingdom	34,894	1,887	0.89%	0.00%	0.13%	0.73%	1.97%
Other European markets	1,443	101	0.22%	0.00%	0.00%	0.04%	0.78%
Total	100,593	5,715	0.81%	0.00%	0.08%	0.65%	1.85%

Table 3
Summary Statistics

Panel A provides descriptive statistics on firms targeted by activist hedge funds; differences relative to firms in the same year and two-digit GICS sector; and differences relative to the mean for non-target firms in the same year, with the same two-digit GICS sector, and market capitalization quintile. *Large Short Interest* is the number of shares shorted by all large short sellers divided by shares outstanding as of the quarter end. *D(Large Short)* equals one if at least one large short seller is present and zero otherwise. *D(Multiple short sellers)* equals one if two or more large short sellers are concurrently disclosed on the firm in a given quarter, and zero otherwise. *D(First disclosure)* equals one if the quarter contains the firm's first-ever large short position disclosure, and zero otherwise. *D(HF large short)* equals one if at least one of the large short sellers disclosed on the firm in a given quarter is classified as a hedge fund, and zero otherwise. *D(AM large short)* equals one if at least one large short seller is classified as an asset manager, and zero otherwise. *D(Prop desk/bank large short)* equals one if at least one large short seller is classified as a proprietary trading desk or bank, and zero otherwise. The classification of short sellers follows the procedure described in Subsection VI.B. *Short seller count* is the number of unique large short sellers concurrently disclosed on the firm in a given quarter. *On loan* is the number of shares loaned out divided by shares outstanding. *D(Δ(Large Short)<0)* equals one if the short interest of reporting large short sellers decreases from quarter $t-1$ to quarter t, and zero otherwise. *D(Δ(On loan)<0)* equals one if the on-loan rate decreases from quarter $t-1$ to quarter t, and zero otherwise. *D(Δ(Lendable)<0)* equals one if lendable supply decreases from quarter $t-1$ to quarter t, and zero otherwise. *Size* is the market capitalization in billions of dollars. *M/B* is the market-to-book ratio, defined as (market value of equity)/(book value of equity). *q* is defined as (book value of debt + market value of equity)/(book value of debt + book value of equity). *ROA* is the return on assets, defined as EBITDA/assets. *Leverage* is defined as the debt ratio to the sum of debt and equity, all in book values. *Prior 12-month return* is the buy-and-hold stock return during the 12 months before an activist's disclosure. *Dividend yield* equals (common dividend + preferred dividend)/(market value of common stock + book value of preferred). *Institutional ownership* is the fraction of shares held by institutional investors. *Blockholder Ownership* is the total ownership of institutional blockholders who own more than 5% of outstanding shares. *IO HHI* is the Herfindahl-Hirschman index of institutional ownership. All of the variables above, except *Prior 12-month return*, are measured at the quarter end before the disclosure. Panel B reports summary statistics for campaign-level outcome variables, conditional on activism. *D(Board seats)* equals one if an activist seeks at least one board seat after launching a campaign and zero otherwise. *D(Proxy contest)* equals one if a campaign proceeds to a proxy contest and zero otherwise. *ΔCEO pay* is the growth rate in a target CEO's total compensation from t to $t+3$, where t is the year the campaign is launched. *D(CEO turnover)* equals one if an incumbent CEO departs during the window [t, t+3] and zero otherwise. *D(M&A)* equals one if a firm targeted by an activist is acquired during the window [t, t+3] and zero otherwise. Columns 4 and 5 report the minimum and maximum values of each variable within the sample of activist-targeted firm-quarters. Columns 6–7 of Panel B report the difference in means between campaigns with and without a concurrent large short position. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Firm characteristics (targeted firm-quarters)

	Summary statistics					Difference from sector-year mean		Difference from non-target sector-year-size-quintile mean	
Variable	Mean	Median	Std. Dev.	Min	Max	Avg. diff.	*t*-stat.	Avg. diff.	*t*-stat.
	1	2	3	4	5	6	7	8	9
Large short interest (%)	0.631	0	1.501	0	13.680	0.465***	7.43	0.278***	4.60
D(Large short)	0.303	0	0.460	0	1	0.222***	11.58	0.132***	7.41
D(Multiple short sellers)	0.208	0	0.406	0	1	0.161***	9.48	0.107***	6.61
D(First disclosure)	0.097	0	0.296	0	1	0.075***	6.05	0.051***	4.14
D(HF large short)	0.254	0	0.435	0	1	0.194***	10.71	0.127***	7.41
D(AM large short)	0.111	0	0.314	0	1	0.080***	6.06	0.046***	3.54
D(Prop desk/bank large short)	0.039	0	0.193	0	1	0.028***	3.42	0.017**	2.09
Short seller count	0.394	0	0.972	0	8.000	0.309***	7.63	0.212***	5.42
On loan	0.019	0.006	0.029	0	0.110	0.010***	8.08	0.007***	6.04
D(Δ(Large Short) < 0)	0.188	0	0.391	0	1	0.139***	8.53	0.086***	5.47
D(Δ(On loan) < 0)	0.514	1	0.500	0	1	0.089***	3.99	0.055**	2.48
D(Δ(Lendable) < 0)	0.593	1	0.492	0	1	0.109***	4.97	0.113***	5.20
Size ($ billion)	5.144	0.923	9.907	0	42.447	3.246***	7.90	0.692**	2.00
M/B	2.095	1.229	3.858	-5.269	33.945	-0.480***	-3.00	-0.851***	-5.35
Tobin's *q*	1.488	1.144	1.420	0.054	17.592	-0.375***	-6.34	-0.457***	-7.80
ROA	0.056	0.087	0.266	-3.354	0.691	0.040***	3.62	-0.038***	-3.75
Leverage	0.404	0.370	0.318	-0.011	1.661	0.073***	5.50	0.055***	4.26
Prior 12-month return	0.024	0.011	0.419	-0.859	2.327	-0.052***	-3.11	-0.106***	-6.42
Dividend yield (%)	0.448	0	1.320	0	7.823	-0.003	-0.06	-0.153***	-2.73
Institutional Ownership	0.226	0.211	0.176	0	0.715	0.117***	16.36	0.048***	7.16
Blockholder Ownership	0.058	0	0.089	0	0.478	-0.001	-0.14	0.002	0.59
IO HHI	0.177	0.090	0.220	0.013	1.000	-0.172***	-17.40	-0.056***	-7.90

Table 3 – Continued

Panel B: Outcomes of campaigns involving large shorts

						Difference relative to campaigns without large shorts	
Variable	Mean	Median	Std. Dev.	Min	Max	Avg. diff.	t-stat.
	1	2	3	4	5	6	7
D(Campaign success)	0.679	1	0.469	0	1	-0.058	-0.61
D(Board seats)	0.474	0	0.500	0	1	-0.206***	-4.88
D(Proxy contest)	0.158	0	0.365	0	1	-0.123***	-3.95
ΔCEO pay	0.433	0.037	1.391	-1	7.444	-0.915***	-3.22
D(CEO turnover)	0.520	1	0.501	0	1	0.025	0.35
D(M&A target)	0.180	0	0.385	0	1	0.055*	1.67

Table 4
Activism following Short-Selling Disclosures
This table reports probit coefficients examining the effect of large short position disclosures on the occurrence of hedge fund activism. The sample period runs from 2013Q1 to 2019Q4. The dependent variable is an indicator variable that equals one if an activist targets a firm in quarter *t*, and zero otherwise. *D(Large short)* equals one if at least one large short seller is present and zero otherwise, and *Large short interest* equals the sum of disclosed large short positions. All independent variables are defined in Table 3 and are measured in quarter *t*-1. All specifications include year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Var.: D(Activist targeting)	
	1	2
D(Large short)	0.106**	
	(0.049)	
Large short interest (%)		0.091**
		(0.041)
On loan (%)	0.027***	0.022**
	(0.009)	(0.010)
Size (log $)	0.081***	0.082***
	(0.014)	(0.014)
M/B	-0.026***	-0.026***
	(0.009)	(0.009)
ROA	-0.137***	-0.138***
	(0.052)	(0.052)
Leverage	0.173**	0.174**
	(0.075)	(0.075)
Prior 12-month return	-0.171***	-0.172***
	(0.056)	(0.056)
Dividend yield (%)	-0.056**	-0.056**
	(0.022)	(0.022)
Institutional ownership	0.124	0.125
	(0.143)	(0.143)
Observations	84,622	84,622
Pseudo R-squared	0.072	0.072
% (Dep variable = 1)	0.55	0.55

Table 5
Changes in Short Positions following Activism
This table reports probit coefficients on the effect of hedge fund activism on the probability of decreases in large short positions, aggregate short interest, and lendable supply. The sample period runs from November 2012 to December 2019. In column 1, the dependent variable, *D(Δ(Large short)<0)*, is an indicator equal to one if the short interest of reporting large short sellers decreases in quarter t relative to the previous quarter and zero otherwise. In column 2, the dependent variable is an indicator equal to one if *On loan* decreases from quarter t-1 to quarter t and zero otherwise. In column 3, the dependent variable is an indicator equal to one if *lendable supply* as a percentage of outstanding shares decreases from quarter t-1 to quarter t and zero otherwise. *D(Activist targeting)* is an indicator equal to one if the firm is targeted by an activist in quarter t-1 and zero otherwise. All other independent variables are defined in Table 3 and are measured in quarter t-1. All specifications include year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	D(Δ(Large short) < 0)	D(Δ(On loan) < 0)	D(Δ(Lendable) < 0)
D(Activist targeting)	0.247***	0.200***	0.184***
	(0.077)	(0.062)	(0.068)
On loan (%)	0.204***		
	(0.006)		
Size (log $)	0.146***	0.119***	0.016**
	(0.009)	(0.006)	(0.006)
M/B	0.003	0.001	0.007***
	(0.003)	(0.001)	(0.001)
ROA	-0.069	0.007	0.077***
	(0.047)	(0.026)	(0.024)
Leverage	0.117**	0.067***	-0.042**
	(0.051)	(0.025)	(0.019)
Prior 12-month return	0.024	-0.184***	-0.549***
	(0.028)	(0.016)	(0.021)
Dividend yield (%)	-0.021***	0.071***	0.037***
	(0.007)	(0.006)	(0.005)
Institutional ownership	1.099***	0.139***	-0.080**
	(0.082)	(0.048)	(0.040)
Observations	85,929	84,461	84,501
Pseudo R-squared	0.252	0.049	0.071
% (Dep variable = 1)	9.73	42.67	48.45

Table 6
Heterogeneous Short-Selling Disclosure Requirements
This table reports results from a linear probability model examining the heterogeneous effects of short-selling disclosure requirements in the EU. The sample spans 2011Q2–2014Q2 (six quarters before and six quarters after November 2012). *Post* equals one for the year-quarters after November 2012 and zero otherwise. *Treat* equals zero for stocks in France, Spain, and stocks in the United Kingdom that were subject to short-selling disclosure before November 2012 (including financial stocks and stocks that underwent rights issues), and one otherwise. Column 1 includes year-quarter, country, and industry fixed effects and columns 2 and 3 use year-quarter and firm fixed effects. Column 3 excludes the 2012Q4 transition quarter as a robustness test. All specifications include the same firm-level controls as in Table 4. We multiply all coefficients by 100. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Var.: D(Activist targeting)		
Coefficients (×100)	1	2	3
Treat	-0.326**		
	(0.163)		
Treat × Post	0.424***	0.409***	0.475***
	(0.112)	(0.109)	(0.115)
On loan	0.051*	0.012	0.009
	(0.029)	(0.056)	(0.057)
Year-quarter FE	Y	Y	Y
Firm FE	N	Y	Y
Country FE	Y	N	N
Industry FE	Y	N	N
Observations	37,955	39,605	36,587
R-squared	0.004	0.117	0.123
% (Dep variable = 1)	0.34	0.33	0.33

Table 7
Short Positions and Activists' Profitability

In this table, we report abnormal returns of activist campaigns between January 2013 and December 2019 using Carhart (1997)'s four-factor model. We obtain our factors (*MKT*, *SMB*, *HML*, and *UMD*) from AQR Capital Management's website, where *MKT* represents the market return relative to the risk-free rate. The other factors are calculated based on European market data, following Fama & French (1996) and Asness & Frazzini (2013). The dependent variable is the daily return of a calendar-time portfolio that buys all stocks with an unresolved campaign on a given day. Panel A shows results based on univariate sorts for firms with *Large Short Positions (L)*, with *No Large Short Positions (N)*, for *Successful Campaigns (S)*, and for *Unsuccessful Campaigns (U)*. Panel B reports results for double-sorted portfolios based on whether a firm involves large short positions (L or N) and whether a campaign is successful or not (S or U). Portfolios are value-weighted. *Alphas ($\times$ 252)* are annualized by multiplying daily alphas by 252. t-statistics are calculated using the Newey-West standard errors with seven lags (Newey & West (1987)). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A:	Univariate Sorted Portfolios							
	Large Short Positions (L)		No Large Short Positions (N)		Successful Campaigns (S)		Unsuccessful Campaigns (U)	
	Coefficient 1a	t-stat. 1b	Coefficient 2a	t-stat. 2b	Coefficient 3a	t-stat. 3b	Coefficient 4a	t-stat. 4b
Alpha	0.121**	2.04	0.039	0.64	0.095*	1.95	0.054	0.83
MKT	0.640***	13.75	0.407***	7.07	0.611***	19.42	0.412***	5.89
SMB	-0.511***	-6.11	-0.680***	-9.05	-0.659***	-10.17	-0.726***	-8.63
HML	-0.252***	-2.63	-0.200*	-1.80	-0.013	-0.18	-0.431***	-3.78
UMD	-0.182**	-2.33	0.245***	2.68	0.133**	2.37	-0.061	-0.60
Days	1,794		1,794		1,794		1,794	
R-Squared	0.369		0.227		0.462		0.220	

Panel B:	Double Sorted Portfolios							
	L + S		L + U		N + S		N + U	
	Coefficient 1a	t-stat. 1b	Coefficient 2a	t-stat. 2b	Coefficient 3a	t-stat. 3b	Coefficient 4a	t-stat. 4b
Alpha	0.127**	1.99	0.057	0.89	0.091*	1.68	0.040	0.59
MKT	0.584***	13.58	0.459***	7.21	0.614***	16.84	0.356***	5.85
SMB	-0.469***	-5.06	-0.350***	-3.90	-0.628***	-8.24	-0.753***	-8.37
HML	-0.136	-1.38	-0.465***	-4.17	0.025	0.30	-0.263**	-2.18
UMD	0.066	0.86	-0.306***	-3.09	0.120*	1.80	0.162*	1.67
Days	1,794		1,794		1,794		1,794	
R-Squared	0.263		0.156		0.407		0.173	

Table 8
Short Positions and Activist Success

This table reports probit coefficients on the effect of large short position disclosures on activist campaign success. The sample includes all activist interventions for which covariates are available. The dependent variable is an indicator equal to one if an activist achieves at least one stated goal and zero otherwise. Column 1 is the baseline. In columns 2–3, we interact *D(Large short)* with ownership concentration measures (blockholder ownership and IO HHI). *Blockholder Ownership* is the total ownership of institutional blockholders who own more than 5% of outstanding shares. *IO HHI* is the Herfindahl-Hirschman index of institutional ownership. All specifications include the same firm-level controls as in Table 4, along with year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Var.: D(Activist success)		
	1	2	3
D(Large short)	0.448**	0.280	0.011
	(0.181)	(0.215)	(0.300)
D(Large short) × Blockholder ownership		4.825***	
		(1.733)	
D(Large short) × IO HHI			5.799*
			(3.020)
Blockholder ownership		-1.655	
		(1.307)	
IO HHI			-0.451
			(0.581)
On loan (%)	-0.001	-0.022	-0.024
	(0.033)	(0.033)	(0.032)
Controls	Y	Y	Y
Observations	460	427	427
Pseudo R-squared	0.167	0.196	0.196
% (Dep variable = 1)	61.96	61.59	61.59

Table 9
Short-Seller Identity and Activist Targeting
This table reports probit coefficients examining which types of short sellers predict activist hedge fund targeting. We classify large short sellers into four categories and create indicator variables for each type based on their self-reported strategy: hedge funds (*D(HF large short)*), asset managers (*D(AM large short)*), proprietary desks/ banks (*D(Prop desk/bank large short)*), and others. Panel A tests each type individually and jointly. Panel B restricts the sample to firm-quarters with at least one large short position (by construction *D(Large short)* is excluded from the regressions). The dependent variable is an indicator variable equal to one if an activist targets a firm in quarter t and zero otherwise. All specifications include the same firm-level controls as in Table 4, and year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Full sample

	Dep. Var.: D(Activist targeting)			
	1	2	3	4
D(Large short)	-0.048	0.141**	0.118**	0.009
	(0.069)	(0.055)	(0.050)	(0.082)
D(HF large short)	0.213**			0.181**
	(0.086)			(0.088)
D(AM large short)		-0.113		-0.073
		(0.072)		(0.075)
D(Prop desk/bank large short)			-0.146	-0.132
			(0.104)	(0.105)
On loan(%)	0.022**	0.030***	0.029***	0.028***
	(0.009)	(0.009)	(0.009)	(0.010)
Controls	Y	Y	Y	Y
Observations	84,622	84,622	84,622	84,622
Pseudo R-squared	0.073	0.073	0.073	0.074
% (Dep variable = 1)	0.55	0.55	0.55	0.55

Panel B: Subsample with D(Large short)=1

	1	2	3	4
D(HF large short)	0.268***			0.247**
	(0.095)			(0.099)
D(AM large short)		-0.090		-0.034
		(0.076)		(0.081)
D(Prop desk/bank large short)			-0.132	-0.108
			(0.109)	(0.110)
On loan (%)	0.011	0.021**	0.021*	0.015
	(0.010)	(0.011)	(0.011)	(0.012)
Controls	Y	Y	Y	Y
Observations	12,550	12,550	12,550	12,550
Pseudo R-squared	0.083	0.079	0.079	0.084
% (Dep variable = 1)	1.27	1.27	1.27	1.27

Table 10
Information Aggregation and First Disclosure Novelty
This table reports probit coefficients examining whether the number of disclosed short sellers and whether a disclosure represents the first-ever large short position in a given firm predict activist targeting. Column 1 presents the baseline specification with the large short indicator. Columns 2–4 add measures of short-seller count: an indicator for multiple disclosed short sellers, the total number of large short sellers in a given quarter (*Short seller count*), and the logarithm of *Short seller count* plus one. Column 5 adds an indicator for the first short-selling disclosure for a firm. The dependent variable is an indicator equal to one if an activist targets a firm in quarter t and zero otherwise. All specifications include the same firm-level controls as in Table 4, as well as year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Var.: D(Activist targeting)				
	1	2	3	4	5
D(Large short)	0.106**	0.055			0.089*
	(0.049)	(0.049)			(0.048)
D(Multiple short sellers)		0.154***			
		(0.050)			
Short seller count			0.041**		
			(0.016)		
Log(Short seller count+1)				0.146***	
				(0.044)	
D(First disclosure)					0.202***
					(0.061)
On loan (%)	0.027***	0.021**	0.029***	0.024***	0.029***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Controls	Y	Y	Y	Y	Y
Observations	84,622	84,622	84,622	84,622	84,622
Pseudo R-squared	0.072	0.074	0.072	0.073	0.074
% (Dep variable = 1)	0.55	0.55	0.55	0.55	0.55

Table 11
Activist Demands and Post-Activism Outcomes

In this table, we report results on the effect of large short position disclosures on activist demands and post-activism outcomes, controlling for firm characteristics. Binary dependent variables (D(Board seats), D(Proxy contest), D(CEO turnover), and D(M&A)) are estimated using probit, and continuous dependent variable (ΔCEO pay) is estimated using OLS. *D(Board seats)* equals one if an activist seeks at least one board seat after launching a campaign and zero otherwise. *D(Proxy contest)* equals one if a campaign proceeds to a proxy contest and zero otherwise. Δ*CEO pay* is the growth rate in a target CEO's total compensation from t to $t+3$, where t is the year the campaign is launched. *D(CEO turnover)* equals one if an incumbent CEO departs during the window [t, t+3] and zero otherwise. *D(M&A)* equals one if a firm targeted by an activist is acquired during the window [t, t+3] and zero otherwise. We report coefficient estimates and their associated standard errors in each column. The firm controls are identical to those used in Table 4 and are measured in the quarter immediately before the campaign quarter. All specifications include year, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dep. Var.:	D(Board seats)	D(Proxy contest)	ΔCEO pay	D(CEO turnover)	D(M&A)
	1	2	3	4	5
D(Large short)	-0.313*	-0.761***	-0.975**	0.062	0.431**
	(0.173)	(0.271)	(0.415)	(0.291)	(0.206)
On loan (%)	0.008	0.023	-0.062	0.021	-0.018
	(0.023)	(0.025)	(0.054)	(0.044)	(0.026)
Controls	Y	Y	Y	Y	Y
Observations	573	563	107	212	563
R-squared	0.179	0.162	0.503	0.206	0.175

Table 12
Duration of Activist Campaigns

In this table, we apply a Cox (1972) proportional hazards model to estimate the daily hazard rate for activist campaign resolution. The dependent variable, *Duration(Activist campaign)*, is the number of calendar days from the public disclosure of an activist campaign to its resolution. A campaign is treated as resolved (the failure event in the Cox model) on the earliest date on which the activist publicly announces the conclusion of the campaign—through the achievement of at least one stated goal, withdrawal, settlement, takeover of the target, or delisting. The duration variable is winsorized at the 1% level in both tails to limit the influence of a small number of extremely long campaigns. The sample uses hedge-fund-led activist campaigns launched between January 2013 and December 2019 and with a resolution end-date available. Columns 1a/1c and 2a/2c report the latent-index coefficients and the corresponding hazard ratios, $e^{\hat{\beta}}$; columns 1b and 2b report standard errors clustered at the firm level. A hazard ratio above one indicates that the covariate is associated with faster campaign resolution; a hazard ratio below one implies slower resolution. All independent variables are defined in Table 3 and measured in the quarter immediately preceding the campaign quarter. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Var.: Duration(Activist campaign)					
	Coefficient	Std. Errors	Hazard Ratio	Coefficient	Std. Errors	Hazard Ratio
	1a	1b	1c	2a	2b	2c
D(Large Short)	0.254**	0.099	1.290	0.325***	0.112	1.384
On loan (%)				-0.017	0.013	0.983
Size (log $)	-0.094***	0.030	0.910	-0.082***	0.031	0.921
M/B	0.003	0.007	1.003	0.004	0.008	1.004
ROA	-0.250	0.330	0.779	-0.215	0.328	0.807
Leverage	0.005	0.046	1.005	0.000	0.045	1.000
Prior 12-month return	0.326**	0.140	1.386	0.272*	0.148	1.312
Dividend yield (%)	4.836	3.612	125.995	4.338	3.902	76.588
Institutional ownership	0.092	0.308	1.097	0.080	0.316	1.083
N(Campaigns)		524			508	
Campaign-days at risk		92,931			92,067	
Wald Chi-squared		18.48			17.85	

Internet Appendix

One potential issue with the methodology used in Subsections IV.A and IV.B is that firms targeted by activists (i.e., the "treated" group) may differ systematically from non-targeted firms (i.e., the "control" group). If so, correct inference requires a properly balanced sample of firms with similar characteristics other than the presence of an activist hedge fund. Several studies on activism mitigate this concern by using propensity score matching (PSM) to control for observable differences between targeted and non-targeted firms (e.g., Cremers et al. (2018)).

First, we use PSM to construct comparison groups that are similar on the observable covariates driving selection, following Cremers et al. (2018). We run the procedure twice, once for each direction of the analysis. To study activist targeting, we match on *D(Large Short)*; to study large short selling activity, we match on *D(Activist targeting)*. In both cases we use a 1:5 nearest-neighbor algorithm with replacement, restricted to the region of common support, and we require matched observations to fall in the same year-quarter. For the *D(Large Short)* matching we further require matches to be in the same country. Treated observations enter the second-stage regressions with a weight of one, and control observations with the attention weight implied by how often each is used as a match.

In the first stage, we estimate the propensity score by logit using the same control variables as in Table 4, along with quadratic terms for firm size and institutional ownership. An important concern is that matching without replacement is infeasible for the large short positions' treatment. Firms with a large disclosed short position account for 14.8% of the sample, and only 5.8 control observations exist per treated observation, so a 1:5 algorithm without replacement requires 87% of the entire control pool, and 51.9% of treated observations fall in country-quarter cells that cannot supply five distinct controls. In that case, the algorithm assigns whatever observations remain in the cell rather than nearest neighbors, and Rubin's B only falls from 172.3 to 153.9 against a conventional threshold of 25 (Rubin, 2001). Matching with replacement resolves this: the same 1:5 algorithm reduces Rubin's B to 25.6. Because securities lending

activity is close to a mechanical consequence of a large disclosed short position – the raw standardized difference in *On loan* is 130.9% and the variance ratio is 10.7 – we additionally apply entropy balancing on *On loan* to the matched weights (Hainmueller, 2012).

The treated and control groups differ in the full sample. Firms targeted by activists tend to be larger, more leveraged, and to have lower returns over the previous year. After matching on activist targeting, we obtain average propensity scores of 0.0086 for the 458 treated observations and 0.0087 for the 2,248 distinct control observations, a difference of −0.8% with a p-value of 0.899, failing to reject equality of the mean propensity scores of the treated and control groups. The corresponding scores for the matching on *D(Large short)* are 0.5036 and 0.5071, a standardized difference of −1.4% with a p-value of 0.641. In both cases, the matching algorithm identifies control firms with a propensity to be treated similar to that of the firms ultimately treated.

In Internet Appendix Tables A5 and A6, we compare the unmatched and matched samples for the two matchings and report averages of the main variables used in the paper. For the activist matching, the mean absolute standardized bias falls from 26.7% to 1.6%, the largest remaining difference is 8.9% (dividend yield), Rubin's B is 10.0, and no covariate difference is significant at the 10% level. For the matching on *D(Large short)*, the mean absolute standardized bias falls from 58.6% to 4.2%, and the largest remaining difference is 10.5% (institutional ownership). We note that several of these differences remain statistically significant despite being economically negligible. This reflects the size of the matched sample rather than residual imbalance: with 30,517 observations, conventional t-tests reject on differences of no economic consequence. Following Shipman et al. (2017), we report the full set of design choices underlying the match and assess balance using standardized bias and Rubin's B (Rubin, 2001), neither of which depends mechanically on sample size.

In Internet Appendix Table A7, we use the matched sample on large short positions to re-estimate the regressions discussed in Subsection IV.A. Our main findings remain unchanged. Consistent with the full-sample evidence, firms shorted by large short sellers are more likely to

be targeted by activist hedge funds: the coefficient on *D(Large Short)* is 0.133 with a standard error of 0.068 ($p = 0.051$), and the coefficient on the continuous measure of *Large short interest* is 0.072 with a standard error of 0.035, significant at the 5% level. Furthermore, as shown in Internet Appendix Table A8, activist targeting in the previous quarter raises the likelihood that disclosed short interest subsequently declines, with a coefficient of 0.210 significant at the 1% level, consistent with our results in the unmatched sample (see Subsection IV.B).

The coefficient on *D(Large Short)* in the matched sample (0.133) is modestly larger than the corresponding full-sample estimate (0.107), a difference of roughly one quarter. Restricting attention to firms that are comparable on observables concentrates the estimate on the region of common support between shorted and non-shorted firms, and removes the influence of the large mass of small, illiquid firms that are neither shorted nor plausible activist targets. Both estimates agree in sign, statistical significance, and economic magnitude, confirming the robustness of the positive association between large short sellers and activist targeting once observable covariates are balanced.

Table A1
Non-Hedge Fund Activism Campaigns following Short-Selling Disclosures
In this table, we report probit results on the effect of large short position disclosures on the occurrence of activism by non-hedge fund activists. The sample period runs from 2013Q1 to 2019Q4. The dependent variable is an indicator equal to one if a firm is targeted by a non-hedge fund activist in quarter t and zero otherwise. All independent variables are as defined in Table 3 and are measured in quarter t-1. All models include year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dep. Var.: D(Non-HF activist targeting)	
	1	2
D(Large short)	-0.035	
	(0.064)	
Large short interest (%)		-0.031
		(0.059)
On loan (%)	0.021*	0.023*
	(0.012)	(0.014)
Size (log $)	0.092***	0.092***
	(0.021)	(0.021)
M/B	-0.030***	-0.030***
	(0.011)	(0.011)
ROA	-0.086	-0.086
	(0.077)	(0.077)
Leverage	0.093	0.092
	(0.083)	(0.083)
Prior 12-month return	-0.197*	-0.197*
	(0.102)	(0.102)
Dividend yield (%)	-0.087***	-0.087***
	(0.033)	(0.033)
Institutional ownership	0.143	0.144
	(0.176)	(0.174)
Observations	84,255	84,255
Pseudo R-squared	0.111	0.111
% (Dep variable = 1)	0.32	0.32

Table A2
Changes in Short Positions following Non-Hedge Fund Activism Campaigns
In this table, we report probit results on the effect of non-hedge fund activism on changes in large short positions, aggregate short interest, and lendable supply. The sample period runs from 2013Q1 to 2019Q4. In column 1, the dependent variable, $D(\Delta(\textit{Large short}) < 0)$, is an indicator equal to one if the short interest of reporting large short sellers decreases in quarter t relative to the previous quarter and zero otherwise. In column 2, the dependent variable is an indicator equal to one if *On Loan* decreases from quarter t-1 to quarter t and zero otherwise. In column 3, the dependent variable is an indicator equal to one if lendable supply as a percentage of outstanding shares decreases from quarter t-1 to quarter t and zero otherwise. $D(Non-HFtargeting)$ is an indicator equal to one if a firm is targeted by a non-hedge fund activist in quarter *t-1* and zero otherwise. All other independent variables are as defined in Table 3 and are measured in quarter t-1. All models include year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	D(Δ(Large short) < 0)	D(Δ(On loan) < 0)	D(Δ(Lendable) < 0)
	1	2	3
D(Non-HF targeting)	0.122	0.050	0.019
	(0.110)	(0.095)	(0.082)
On loan (%)	0.204***		
	(0.006)		
Size (log $)	0.146***	0.119***	0.016**
	(0.009)	(0.006)	(0.006)
M/B	0.003	0.001	0.007***
	(0.003)	(0.001)	(0.001)
ROA	-0.070	0.007	0.076***
	(0.047)	(0.026)	(0.024)
Leverage	0.118**	0.068***	-0.042**
	(0.051)	(0.025)	(0.019)
Prior 12-month return	0.024	-0.184***	-0.549***
	(0.027)	(0.016)	(0.021)
Dividend yield (%)	-0.021***	0.071***	0.037***
	(0.007)	(0.006)	(0.005)
Institutional ownership	1.098***	0.139***	-0.080**
	(0.083)	(0.048)	(0.040)
Observations	85,929	84,461	84,501
Pseudo R-squared	0.252	0.049	0.071

Table A3
Summary Statistics: Firms Targeted by Activist Hedge Funds
This table provides descriptive statistics on activist targets that involve large short sellers in the past three months, and the difference relative to target firms involving no large short sellers. *On loan* is the number of shares loaned out divided by shares outstanding. *Size* is the market capitalization in billions of dollars. *M/B* is the market-to-book ratio, defined as (market value of equity)/(book value of equity). *q* is defined as (book value of debt + market value of equity)/(book value of debt + book value of equity). *ROA* is the return on assets, defined as EBITDA/assets. *Leverage* is defined as the ratio of debt to the sum of debt and equity, all in book values. *Prior 12-month return* is the buy-and-hold stock return during the 12 months before an activist's disclosure. *Dividend yield* equals (common dividend + preferred dividend)/(market value of common stock + book value of preferred). *Institutional ownership* is the fraction of shares held by institutional investors, as reported by Thomson Eikon. All of the variables above, except *Prior 12-month return*, are measured at the quarter end before the disclosure. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Target firms involving large short sellers					Difference with targets without large short sellers	
	Mean	Median	Std. Dev.	Min	Max	Avg. diff.	*t*-stat.
On loan	0.042	0.027	0.035	0.000	0.110	0.033***	11.34
Size ($ billion)	5.916	2.588	8.430	0.013	42.447	1.136	1.35
M/B	1.885	1.299	2.776	-5.269	21.303	-0.248	-0.83
Tobin's *q*	1.483	1.141	1.186	0.503	10.585	-0.012	-0.10
ROA	0.097	0.084	0.104	-0.618	0.460	0.060***	3.37
Leverage	0.437	0.437	0.285	-0.011	1.274	0.047*	1.69
Prior 12-month return	-0.009	-0.050	0.421	-0.859	1.860	-0.045	-1.14
Dividend yield (%)	0.407	0.000	1.105	0.000	7.823	-0.065	-0.58
Institutional ownership	0.314	0.296	0.150	0.000	0.715	0.124***	8.42

Table A4
Changes in Aggregate Short Selling and Lendable Supply following Activism
In this table, we report OLS regressions on the effect of hedge fund activism on aggregate short selling and lendable supply of shares for shorting. The sample period runs from November 2012 to December 2019. In column 1, the dependent variable is the change in short interest of reporting large short sellers from quarter *t-1* to quarter *t*. In column 2, the dependent variable is the change in On loan from quarter *t-1* to quarter *t*. In column 3, the dependent variable is the change in lendable supply from quarter *t*-1 to quarter *t*. All independent variables are defined in Table 3 and are measured in quarter *t*-1. All models include year-quarter, country, and industry fixed effects. In each column, we report coefficient estimates with standard errors double-clustered at the firm and country-quarter levels in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Δ(Large short (%))	Δ(On loan (%))	Δ(Lendable (%))
	1	2	3
D(Activist targeting)	-0.042**	-0.158***	-0.298***
	(0.018)	(0.054)	(0.110)
On loan (%)	0.121***		
	(0.006)		
Size (log $)	0.001	-0.002	-0.015
	(0.001)	(0.005)	(0.014)
M/B	0.000	-0.001*	-0.009***
	(0.000)	(0.000)	(0.001)
ROA	-0.003	0.023**	-0.041
	(0.002)	(0.009)	(0.034)
Leverage	0.004	-0.010	0.042**
	(0.003)	(0.006)	(0.019)
Prior 12-month return	-0.004	0.035***	0.679***
	(0.003)	(0.009)	(0.046)
Dividend yield (%)	0.007***	-0.047***	-0.042***
	(0.001)	(0.006)	(0.007)
Institutional ownership	0.011*	0.072***	0.198*
	(0.006)	(0.020)	(0.116)
Year-quarter FE	Y	Y	Y
Country FE	Y	Y	Y
Industry FE	Y	Y	Y
Observations	84,505	84,505	84,501
R-squared	0.071	0.033	0.090

Table A5
Propensity Score Matching: Balancing Test – Hedge Fund Activism Sample
In this table, we report balancing test outcomes comparing firms targeted by an activist hedge fund in quarter t-1 and firms involving no activists, before applying the propensity score matching algorithm (*Unmatched*) and after applying the algorithm (*Matched*). Treated observations are matched 1:5 by nearest-neighbor matching with replacement on the estimated propensity score, restricted to the region of common support and requiring matched observations to fall in the same year-quarter. We apply entropy balancing on *On loan* to the resulting matching weights (Hainmueller, 2012). The matched sample comprises 458 treated and 2,248 distinct control firm-quarters, and the sample period runs from 2013Q1 to 2019Q4. The covariates used in the matching procedure shown below are defined in Table 3, plus the quadratic forms of firm size and institutional ownership. *Treated* and *Control* report covariate means, with matched control means weighted by the matching weights. %*bias* is the difference in means expressed as a percentage of the pooled standard deviation in the unmatched sample, and the matched t-statistics and p-values are obtained from weighted regressions of each covariate on the treatment indicator with heteroskedasticity-robust standard errors. Because entropy balancing equates the treated and control means of *On loan* by construction, its matched difference is zero by design.

Variable	Sample	Treated	Control	%bias	t-stat.	p-value
On loan (%)	Unmatched	1.99	0.86	46.4	8.40	0.000
	Matched	1.99	1.99	-0.0	-0.00	1.000
Size (log $)	Unmatched	20.91	19.89	48.9	10.37	0.000
	Matched	20.91	20.91	0.1	0.03	0.980
Size squared	Unmatched	441.79	399.94	49.3	10.28	0.000
	Matched	441.79	441.61	0.2	0.04	0.968
M/B	Unmatched	1.99	2.80	-20.7	-5.39	0.000
	Matched	1.99	1.95	1.1	0.27	0.788
ROA	Unmatched	0.07	0.07	2.1	0.66	0.512
	Matched	0.07	0.07	1.8	0.44	0.661
Leverage	Unmatched	0.42	0.33	30.3	6.23	0.000
	Matched	0.42	0.42	-1.0	-0.20	0.844
Prior 12-month return	Unmatched	0.07	0.12	-10.6	-2.32	0.021
	Matched	0.07	0.06	1.7	0.34	0.733
Dividend yield (%)	Unmatched	0.58	0.56	1.1	0.25	0.803
	Matched	0.58	0.69	-8.9	-1.74	0.082
Institutional ownership (IO)	Unmatched	0.24	0.18	34.0	7.45	0.000
	Matched	0.24	0.24	-0.3	-0.06	0.951
IO squared	Unmatched	0.09	0.06	23.6	5.12	0.000
	Matched	0.09	0.08	0.5	0.10	0.920

Table A6
Propensity Score Matching: Balancing Test – Large Short Disclosures Sample
In this table, we report balancing test outcomes comparing firms with a disclosed large short position in quarter t-1 to firms without one. We report descriptive statistics before (*Unmatched*) and after (*Matched*) applying the propensity score matching algorithm. Treated observations are matched 1:5 by nearest-neighbor matching with replacement on the estimated propensity score, restricted to the region of common support and requiring matched observations to fall in the same country and year-quarter. We apply entropy balancing on *On loan* to the resulting matching weights (Hainmueller, 2012). The matched sample comprises 13,165 treated and 17,926 distinct control firm-quarters, and the sample period runs from 2013Q1 to 2019Q4. The covariates used in the matching procedure shown below are defined in Table 3, plus the quadratic forms of firm size and institutional ownership. *Treated* and *Control* report covariate means, with matched control means weighted by the matching weights. %*bias* is the difference in means expressed as a percentage of the pooled standard deviation in the unmatched sample, and the matched t-statistics and p-values are obtained from weighted regressions of each covariate on the treatment indicator with heteroskedasticity-robust standard errors. Because entropy balancing equates the treated and control means of *On loan* by construction, its matched difference is zero by design.

Variable	Sample	Treated	Control	%bias	t-stat.	p-value
On loan (%)	Unmatched	3.53	0.40	130.9	110.71	0.000
	Matched	3.50	3.50	-0.0	0.00	1.000
Size (log $)	Unmatched	21.43	19.63	102.4	125.73	0.000
	Matched	21.44	21.48	-2.6	-1.47	0.141
Size squared	Unmatched	461.41	389.37	100.3	120.20	0.000
	Matched	461.64	463.79	-3.0	-1.65	0.099
M/B	Unmatched	3.28	2.71	12.2	12.60	0.000
	Matched	3.22	3.24	-0.6	-0.31	0.759
ROA	Unmatched	0.11	0.06	19.1	25.61	0.000
	Matched	0.11	0.11	2.1	1.35	0.177
Leverage	Unmatched	0.39	0.32	25.6	27.55	0.000
	Matched	0.39	0.41	-6.3	-3.14	0.002
Prior 12-month return	Unmatched	0.07	0.13	-11.5	-12.44	0.000
	Matched	0.08	0.05	6.8	4.04	0.000
Dividend yield (%)	Unmatched	0.68	0.54	9.9	10.30	0.000
	Matched	0.68	0.63	3.7	1.85	0.064
Institutional ownership (IO)	Unmatched	0.32	0.16	96.4	103.84	0.000
	Matched	0.32	0.30	10.5	3.99	0.000
IO squared	Unmatched	0.13	0.05	77.8	77.65	0.000
	Matched	0.13	0.12	4.8	1.90	0.057

Table A7
Propensity Score Matched Sample: Activism following Large Short-Selling Disclosures
In this table, we report probit results on the effect of large short position disclosures on the occurrence of hedge fund activism, using the propensity-score matched sample. Treated observations are firms with a large disclosed short position in quarter t-1, matched 1:5 to control observations by nearest-neighbor matching with replacement on the estimated propensity score, restricted to the region of common support and requiring matched observations to fall in the same country and year-quarter. We apply entropy balancing on *On loan* to the resulting matching weights (Hainmueller, 2012). Treated observations enter the regression with a weight of one and control observations with their matching weight; the estimation sample contains 13,104 treated and 17,413 control firm-quarters. Both columns are estimated on this sample, which is matched on *D(Large short)*; column (2) replaces the indicator with the continuous measure of large short interest. The sample period runs from 2013Q1 to 2019Q4. The dependent variable is an indicator equal to one if a firm is targeted by an activist in quarter t and zero otherwise. All independent variables are defined in Table 3 and are measured in quarter t-1. All models include year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	D(Activist targeting)	
	1	2
D(Large short)	0.133*	
	(0.068)	
Large short interest (%)		0.072**
		(0.035)
On loan (%)	0.004	-0.005
	(0.013)	(0.016)
Size (log $)	0.067*	0.067*
	(0.034)	(0.035)
M/B	-0.029**	-0.029**
	(0.012)	(0.012)
ROA	-0.352***	-0.353***
	(0.115)	(0.113)
Leverage	0.162	0.157
	(0.101)	(0.100)
Prior 12-month return	-0.280**	-0.281**
	(0.109)	(0.110)
Dividend yield (%)	-0.104***	-0.104***
	(0.031)	(0.031)
Institutional ownership (IO)	-0.009	-0.068
	(0.248)	(0.254)
Observations	30,517	30,517
Pseudo R-squared	0.093	0.094

Table A8
Propensity Score Matched Sample: Changes in Large Short-Selling Disclosures following Activism

In this table, we report probit results on the effect of hedge fund activism on the likelihood that large short sellers reduce their positions, using the propensity-score matched sample. Treated observations are firms targeted by an activist hedge fund in quarter t-1, matched 1:5 to control observations by nearest-neighbor matching with replacement on the estimated propensity score, restricted to the region of common support and requiring matched observations to fall in the same year-quarter. We apply entropy balancing on *On loan* to the resulting matching weights. Treated observations enter the regression with a weight of one and control observations with their matching weight (Hainmueller, 2012). The sample period runs from January 2013 to December 2019. The dependent variable, $D(\Delta(Large\ short) < 0)$, is an indicator equal to one if the short interest of reporting large short sellers decreases in quarter t relative to the previous quarter and zero otherwise. All independent variables are defined in Table 3 and are measured in quarter t-1. All models include year-quarter, country, and industry fixed effects. Standard errors are double-clustered at the firm and country-quarter levels. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	D(Δ(Large short) < 0)
D(Activist targeting)	0.210***
	(0.080)
On loan (%)	0.159***
	(0.018)
Size (log $)	0.060**
	(0.025)
M/B	0.016
	(0.015)
ROA	0.322
	(0.280)
Leverage	0.204
	(0.150)
Prior 12-month return	0.162
	(0.114)
Dividend yield (%)	0.044
	(0.032)
Institutional ownership	1.045***
	(0.332)
Observations	2,632
Pseudo R-squared	0.216

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