The Limits of Hedge Fund Activism: CEO Overconfidence*

Abhishek Ganguly, *University of Oklahoma*
Arup Ganguly, *Boston College*
Lin Ge, *Boston University*
Charles Trzcinka, *Indiana University*

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Abstract

Prior work views hedge fund activism as a value-enhancing governance mechanism. We qualify this consensus by identifying a salient limit to activism: CEO overconfidence, a well-documented behavioral bias. Overconfident CEOs both deter activist campaigns and attenuate their efficacy: announcement-window abnormal returns and subsequent gains in Tobin's Q and ROA are markedly weaker when such CEOs lead targeted firms. Activist interventions become more likely following abrupt departures of overconfident CEOs and less so after their appointments, a diametric pattern that mitigates endogenous matching concerns. Finally, we find activists resort to forced removal less often for overconfident CEOs than for non-overconfident CEOs.

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1 Introduction

An extensive literature characterizes activist hedge funds as informed and influential institutional investors that identify mispricing and catalyze value-enhancing strategic changes at their targets (e.g., Brav, Jiang, and Kim, 2010, 2015; Bebchuk, Brav, and Jiang, 2015; Jiang, 2018; Brav, Jiang, and Li, 2022). Reflecting their growing footprint, a 2024 client memorandum from Wachtell, Lipton, Rosen & Katz reports that about 17% of S&P 500 firms have a disclosed activist hedge fund with an ownership stake exceeding 1% of shares outstanding.[1] Consistent with this prominence, hedge fund activism has become mainstream within alternative assets (Preqin, 2014). It is frequently portrayed in the financial press as a central force in corporate governance—the "new sheriffs of the boardroom" (Wall Street Journal, 2005), "capitalism's unlikely heroes" (The Economist, 2015), and, more recently, "Wall Street's new captain" (Financial Times, 2025).

Yet these headline successes of hedge fund activism obscure important boundary conditions beyond which their impact is markedly limited. As formalized by Gantchev (2013), activists initiate campaigns only when expected gains exceed the full costs of engagement. These costs arise at every stage of the engagement cycle, beginning with search and due diligence, continuing through trading and execution frictions, and extending into negotiation and ongoing monitoring. They also encompass the opportunity costs of the activist's time, reduced portfolio diversification, and the dilution of private gains due to free-riding by nonparticipating shareholders. A growing set of high-profile failures, such as Bill Ackman's (Pershing Square Capital) costly, multi-year crusade against Herbalife under chief executive officer (CEO) Michael Johnson that ended in 2018 and David Einhorn's (Greenlight Capital) ultimately fruitless campaign against Tesla under CEO Elon Musk in 2020, illustrates that, under certain

[1] https://www.wlrk.com/webdocs/wlrknew/ClientMemos/WLRK/WLRK.28563.24.pdf

circumstances, such costs of intervention can outweigh expected benefits. We provide new evidence that CEO overconfidence, a well-documented behavioral bias, is a central source of activists' excess engagement costs. Entrenched, overconfident CEOs resist and delay concessions, creating a strategic standoff that materially constrains activists' impact.

Behavioral corporate finance documents systematic CEO overconfidence, challenging the standard assumption of fully rational, value-maximizing leadership (e.g., Malmendier and Tate, 2015; Malmendier, 2018; Guenzel and Malmendier, 2020). Theoretical models imply that selection need not eliminate the trait: when overconfidence is difficult to observe, value-maximizing boards may appoint overconfident CEOs (Goel and Thakor, 2008), and firms may rationally prefer them even when the bias is recognized (Gervais, Heaton, and Odean, 2011). CEO overconfidence is pervasive and persistent, rather than anomalous. We examine whether and how this behavioral bias moderates the efficacy of hedge fund activism, integrating insights from behavioral corporate finance and the activism literature. We show that activist influence is materially constrained when the target firm's CEO, the firm's pivotal decision maker, exhibits systematic overconfidence.

Our inquiry confronts two challenges. First, theory offers conflicting guidance on whether the presence of an overconfident CEO at the target firm attenuates or amplifies the effectiveness of hedge fund activism. Although activists may regard confrontations with an overconfident CEO as prohibitively costly, they may also view such encounters as high-impact opportunities for value creation. Where the opportunity set is innovation-rich, activist hedge funds may rationally prefer overconfident CEOs, whose bias complements the environment, since such CEOs could undertake riskier, innovation-intensive projects, and better translate industry-level growth opportunities into firm value (Hirshleifer, Low, and Teoh, 2012). To resolve this theoretical indeterminacy, we adopt

an empirical approach that operationalizes CEO overconfidence through several complementary, revealed belief measures, widely accepted in the literature (Malmendier, 2018). Our analysis encompasses a comprehensive dataset of hedge fund activist interventions in the US spanning more than a quarter century from 1994 to 2019. The results reveal that companies led by overconfident CEOs exhibit a significantly lower probability of being targeted by hedge fund activists than firms without overconfident CEOs, which translates into a substantial 50% reduction in the probability of hedge fund activists targeting such firms. The robustness of these findings is confirmed through various empirical models, using several different measures of CEO overconfidence. Furthermore, our analysis reveals that firms led by overconfident CEOs exhibit an 8.3 percentage point reduction in the likelihood of becoming targets for hedge fund activism relative to their vulnerability to non-hedge fund activist interventions. Considering the central role of hedge fund activists in external governance mechanisms (Brav, Jiang, and Kim, 2010, 2015; Bebchuk, Brav, and Jiang, 2015; Jiang, 2018; Brav, Jiang, and Li, 2022), these findings imply that the efficacy of hedge fund activism in mitigating or neutralizing managerial behavioral biases is frequently limited.

Second, while the paper's primary objective is to uncover a previously unrecognized constraint on hedge fund activism rather than to pin down precise causal magnitudes, we are attentive to potential endogeneity between CEO overconfidence and activist targeting. We therefore implement a battery of empirical diagnostics as described below, designed to mitigate concerns about omitted-variable bias, reverse causality, and measurement-error bias (Roberts and Whited, 2013), ensuring that our central inference does not hinge on these confounds. To mitigate omitted-variable concerns, we estimate models that condition on a rich set of firm- and CEO-level covariates and include firm, industry, and year fixed effects. These fixed effects absorb time-

invariant firm heterogeneity and common macro- and sector-level shocks, materially limiting bias from unobserved heterogeneity. Consistent with literature, we do not include CEO fixed effects: CEO overconfidence is a persistent, largely time-invariant attribute (Malmendier, Tate, and Yan, 2011; Malmendier, 2018), so CEO fixed effects would eliminate the cross-sectional variation that identifies its effect and leave little within-CEO variation on which to base inference. Accordingly, our empirical strategy exploits variation across CEOs and, where applicable, within-firm variation arising from CEO turnover to estimate the effect of CEO overconfidence on hedge fund activism. To further mitigate omitted-variable bias and selection effects, we estimate the post-activism changes in Tobin's Q and ROA using a difference-in-differences design applied to a propensity score matched sample. Intuitively, the nearest-neighbor matching, pairs each activist target with a statistically comparable non-target, in the same year as the hedge fund activist intervention, balancing observables that could confound the outcomes. The DiD estimator then contrasts the pre-to-post change in performance for targets with the corresponding change for their matched controls, differencing out common macro or industry shocks and any time-invariant firm-level characteristics.

To attenuate measurement error concerns, we construct several proxies for CEO overconfidence, based on their revealed preferences, either inferred from CEOs' decisions to delay the exercise of deeply in-the-money vested stock options or their personal stock purchasing decisions, behaviors widely interpreted as reflecting inflated expectations of firm performance (Malmendier, 2018). The Holder 67 and its variants, and the Net Buyer measures used in the paper as measures of CEO overconfidence, also address the common empirical and conceptual challenges identified in the psychology literature in measuring overconfidence, such as the confounding of overestimation and overprecision, and the inconsistency between overestimation

and overplacement (Moore and Healy, 2008). These measures infer CEO beliefs from revealed behavior (actual option exercise or personal stock purchasing decisions) rather than surveys of self-reported probabilities and beliefs. By focusing on mean return optimism (e.g., holding options longer for greater upside) and not asking CEOs to quantify their confidence levels, these measures avoid the overprecision trap. Moreover, these measures do not require any direct comparison to peers' performance, so the classic overplacement ("better-than-others") dimension as pointed out in Moore and Healy (2008) as one of the challenges in measuring overconfidence, is not part of the definition at all. A CEO's overconfidence status is determined by his own option exercise behavior relative to an objective benchmark (rational exercise threshold), not by ranking the CEO against other CEOs. This eliminates the scenario in which a CEO could appear overconfident by one metric but underconfident by another in the same context.

To address the endogeneity threat posed by reverse causality, we exploit CEO turnover events and find that while the departure of an overconfident CEO increases the likelihood of hedge-fund activism, the appointment of an overconfident successor has the opposite effect. Economically, the switch from an overconfident to a rational CEO increases the probability of activist intervention by nearly 60 percent. This turnover-based diametric design strengthens the causal interpretation of our baseline results by disentangling activists' targeting decisions from contemporaneous firm performance and strategic choices that the departing CEO may have initiated. Moreover, conditional on intervention, targets led by overconfident CEOs exhibit a lower incidence of forced CEO turnover over the subsequent five years than targets led by non-overconfident CEOs. Because forced CEO exits are largely outside managerial control, this evidence further mitigates endogeneity concerns and highlights an additional limit on activist influence when CEOs are overconfident.

Additionally, our analysis shows that the disclosure of hedge fund activist interventions in companies led by overconfident CEOs results in a markedly lower Cumulative Abnormal Returns (CARs) and Buy and Hold Abnormal Returns (BHARs) relative to interventions in firms without overconfident CEOs. Such results suggest that the market perceives these interventions as less valuable, potentially due to the increased costs borne by shareholders. Market participants evidently recognize that activist hedge funds face materially lower odds of translating their value-creation agendas into realized gains when overconfident CEOs lead target firms. Under the semi-strong efficient-market framework, this differential price response, in both short-term (CARs) and long-term (BHARs), can be interpreted as the causal impact of CEO overconfidence on the market's valuation of hedge fund activists' interventions. Taken together, the findings provide compelling evidence that CEO overconfidence causally constrains hedge fund activism, making it improbable that the documented patterns arise solely from endogenous matching.

While hedge fund managers may themselves be susceptible to overconfidence, several institutional features discipline its incidence and impact. Hedge fund managers' performance is evaluated by sophisticated limited partners (LPs), primarily institutional and accredited investors, with high-powered, performance-contingent contracts governing their compensation. The canonical two-and-twenty schedule, typically with a high-water-mark provision, tightens the link between their compensation and realized returns (Lo, 2010). Activist portfolios are concentrated, and managers typically run only a limited number of concurrent campaigns, which heighten attention and monitoring intensity at each target. Public displays of confidence, often amplified by media coverage, are more plausibly strategic communications aimed at mobilizing fellow shareholders than reflections of underlying beliefs. By contrast, our measures of CEO overconfidence are grounded in revealed-belief evidence from the exercise of vested, own-firm

stock options. Accordingly, our empirical framework treats the target CEO as the potentially biased actor and the activist as a comparatively disciplined, if not entirely rational, counterparty.[2]

Overall, our evidence indicates that managerial behavioral biases, most notably CEO overconfidence, impose a first-order constraint on the efficacy of hedge fund activism in remedying governance deficiencies. Accordingly, incorporating these frictions into empirical designs and formal models is essential for an accurate characterization of hedge fund activism's role as an external governance mechanism. The following section reviews the related literature and develops our primary research questions.

2 Related Literature and Research Questions

Despite substantial progress in CEO overconfidence and hedge-fund activism as separate literatures, their intersection remains underexplored. Behavioral corporate finance, beginning with Roll's (1986) managerial-hubris hypothesis, posits that CEOs may systematically overestimate project value and their ability to realize it. Survey and psychometric evidence, as well as media-based measures, attest to the prevalence of this behavioral bias among senior managers (Malmendier and Tate, 2008; Graham, Harvey, and Puri, 2013). Consistent with this view, overconfident CEOs are more acquisitive and tend to overpay for targets (Malmendier and Tate, 2008), with self-attribution further entrenching overconfidence in M&As (Billett and Qian, 2008). However, the consequences are context-dependent: in innovation-rich settings, overconfidence can complement the opportunity set as overconfident CEOs undertake riskier, innovation-intensive

[2] Guenzel and Malmendier (2020) highlight a central challenge for the behavioral corporate finance literature. A fully articulated behavioral framework that incorporates the biases of all parties involved in the corporate governance process would be ideal, as negotiations between activists and management can be fraught when either side brings an assertive, overconfident temperament to the table. However, if hedge-fund managers themselves display such traits, the dominance dynamics they introduce may well magnify the effects we document here.

projects and are associated with faster growth and, in some settings, superior performance (Hirshleifer, Low, and Teoh, 2012). CEO overconfidence can also elicit stronger commitments from suppliers and labor where relationship-specific investments are pivotal (Phua, Tham, and Wei, 2018). This heterogeneity yields ambiguous ex-ante predictions for activist engagements with overconfident CEOs and motivates our analysis of how managerial overconfidence conditions the scope and efficacy of hedge-fund activism.

Significant advancements have also been made in the research exploring the role of hedge fund activists within the firms they target for intervention. Hedge fund activists predominantly target undervalued firms (Brav, Jiang, and Kim, 2010), that indicate governance deficits or operational inefficiencies (Brav, Jiang, and Kim, 2015). Although public discourse sometimes portrays hedge fund activism as short-termist or predatory, the academic evidence is more nuanced: announcement returns around campaign initiation are positive (Brav, Jiang, Partnoy, and Thomas, 2008), and improvements in performance and valuation often persist over longer horizons (Bebchuk, Brav, and Jiang, 2015; Jiang, 2018; Brav, Jiang, and Li, 2022). Beyond valuation effects, activism is associated with real outcomes, most notably, stronger innovative output as reflected in subsequent patenting (Brav, Jiang, Ma, and Tian, 2018).

Building on this heterogeneity, another critical ingredient is the cost structure of hedge fund activism. Campaigns entail sizable direct and indirect expenditures: the 2017 proxy contest between Trian Fund Management and Procter & Gamble reportedly involved roughly $60 million in combined outlays; in a sequential model of campaign dynamics, Gantchev (2013) estimates the expected cost of a campaign that proceeds to a proxy fight at about $10.71 million; and in a sample of 821 campaigns, Boyson and Pichler (2019) document that incumbent management responds

with moderate to hostile resistance in approximately 43.4% of cases. Activists internalize these costs and initiate campaigns only when expected benefits exceed expected costs.[3]

Overlaying this cost–benefit calculus with managerial overconfidence yields ambiguous predictions. Overconfident CEOs, who tend to overrate the merits of their strategies and projects, may resist more vigorously, inflating expected costs. However, the same bias can generate larger mispricing or governance slack, raising the potential gains from intervention. This dual-edged logic motivates two central research questions:

1. *Are hedge fund activists less or more likely to target firms led by overconfident CEOs?*
2. *Once a hedge fund activist campaign is launched, does the presence of an overconfident CEO enhance or diminish the shareholder value generated relative to campaigns at firms led by rational CEOs?*

Taken together, these considerations render our two questions first-order for both theory and practice. Identifying whether activists select into firms led by overconfident CEOs is necessary to separate sorting from treatment and to correctly interpret announcement returns, campaign outcomes, and longer-horizon performance. Conditional on selection, empirically establishing how overconfidence shapes the value created (or destroyed) by activism clarifies whether activism disciplines bias or productively harnesses it, thereby pinning down the boundary conditions under which such external governance complements or substitutes for managerial behavioral biases. By integrating behavioral heterogeneity into the activism cost–benefit calculus, such analysis links two mature literatures and yields testable predictions with direct implications for capital allocation, stewardship, and the design of governance interventions. The following section describes our data and presents several summary and univariate statistics.

[3] https://insight.factset.com/2017-proxy-fights-high-cost-low-volume

3 Data and Univariate Tests

(a) Hedge Fund Activism Data

Commercial hedge-fund databases rely on voluntary self-reporting by funds and are therefore subject to well-documented selection issues, most notably self-selection and survivorship biases (Agarwal and Naik, 2005; Bui and Ganguly, 2017). To mitigate these concerns, and following established practice (Brav, Jiang, Partnoy, and Thomas, 2008; Brav, Jiang, Ma, and Tian, 2018; Brav, Jiang, and Li, 2022), we primarily construct our sample of hedge-fund activism events from mandatory Schedule 13D filings submitted to the U.S. Securities and Exchange Commission (SEC) over 1994–2019. Schedule 13D must be filed within ten calendar days after an investor acquires beneficial ownership of more than 5% of a class of a public issuer's equity securities, and filings are publicly accessible through the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system.[4] Because a 13D filer does not certify passive intent, such filing preserves flexibility to pursue an activist campaign. We programmatically retrieve the universe of Schedule 13D submissions from EDGAR for our sample period. Figure 1 reports the time-series distribution of these filings.

See Figure 1

It is interesting to note that there has been a downward trend in Schedule 13D filings. One contributing factor to this trend is the strategic decision made by certain institutional investors, including mutual funds and pension funds, to opt for Schedule 13G filings in lieu of Schedule 13D. These investors engage in passive investment strategies and, as such, do not seek to exert control over the companies in which they invest. The preference for Schedule 13G filings can be attributed

[4] Under the amended rule, the 5% reporting threshold remains unchanged; however, effective February 5, 2024, an initial Schedule 13D must be filed within five business days of the date on which the investor first acquires beneficial ownership of more than 5% of a covered class of equity securities.

to their less rigorous reporting obligations, which make them a more appealing option for these types of investors. However, not all 13D filers are hedge fund activists. To isolate hedge fund activist interventions, we follow Brav, Jiang, Partnoy, and Thomas (2008) and classify filers using the Item 2 ("Identity and Background") description in the 13D, supplemented by targeted web searches to confirm hedge fund status. Appendix A provides representative Item 2 excerpts.

See Appendix A

In the following step, we also collect information on activist interventions by hedge funds where there were no Schedule 13D filings since the hedge fund activist did not cross the 5% threshold.[5] For example, in December 2006, Relational Investors LLC, a San Diego-based hedge fund that owned significantly less than 5% (0.6% to be exact) of Home Depot, took an activist stance against Home Depot's management and even captured a board seat.[6] Following Brav, Jiang, Partnoy, and Thomas (2008), we use the internet and media searches to extend such data for another five years up to 2019.[7] Figure 2 below provides the histogram to show the frequency distribution of the final hedge fund activism sample during our sample period.

See Figure 2

Figure 2 documents the pronounced procyclicality of hedge fund activism: campaign frequency rises in expansions and contracts in recessions, consistent with the business-cycle dynamics emphasized by Burkart and Dasgupta (2019). To address endogeneity concerns arising from this cyclical variation, all specifications include period (calendar-year) fixed effects that

[5] We are grateful to Professor Wei Jiang from Emory University, who provided such data for the period 1994-2014.
[6] https://www.nytimes.com/2007/02/06/business/06depot.html
[7] Departing from Brav, Jiang, Partnoy, and Thomas (2008), who restrict attention to sub-5% campaigns initiated with 2–5% stakes, we include all activist interventions launched with disclosed ownership below the 5% Schedule 13D threshold. This broader screen reflects the rise of toehold activism among large-capitalization targets, where sub-2% positions can nonetheless be consequential. For example, ValueAct Capital initiated its 2013 engagement with Microsoft while holding approximately 0.8% of the firm's shares outstanding; more recently, in 2021, Engine No. 1 secured three board seats at ExxonMobil in a proxy contest despite owning roughly 0.02% of shares outstanding.

absorb aggregate shocks and common time trends, so inference comes from within-period cross-sectional variation.

(b) Managerial Overconfidence Data

CEOs occupy the apex of the corporate hierarchy and plausibly combine high ability with strong conviction. Distinguishing empirically between well-calibrated confidence and overconfidence, however, is nontrivial. We therefore rely on extant literature to measure CEO overconfidence, our key variable of interest. We use the well-accepted option-based measure known as the "Holder 67" to proxy for CEOs' overconfidence following Malmendier and Tate (2005) and Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011). The idea behind this measure is that a CEO who chooses not to exercise his exercisable vested options at least twice during his tenure, even when the options were 67% in the money, reveals that he overestimates the future performance of his firm, and is hence classified as overconfident. The 67% option exercise threshold is based on the certainty-equivalence theoretical framework of Hall and Murphy (2002) and has been widely adopted in subsequent work (e.g., Malmendier and Tate, 2008; Campbell, Gallmeyer, Johnson, Rutherford, and Stanley, 2011; Banerjee, Humphery-Jenner, and Nanda, 2015; Phua, Tham, and Wei, 2018, and others). For robustness, we also implement alternative thresholds of Holder30 (30%) and Holder100 (100%). A key benefit of utilizing an option-based metric to assess CEO overconfidence for our context lies in its foundation on the CEO's revealed beliefs, thereby mitigating potential biases arising from CEO's self-representation in media or survey responses. We compute option moneyness using ExecuComp data and apply Core and Guay's (2002) approximation to construct each CEO's portfolio of vested options. Implementation details are provided below:

First, we calculate the realizable value per option using the formula:

$$Realizable\ Value\ Per\ Option = \frac{Total\ Realizable\ Value\ of\ the\ Exercisable\ Options}{The\ Number\ of\ Exercisable\ Options} \text{ ---- (i)}$$

Second, to obtain an estimate of the average exercise price of the options, since we do not have option-grant-specific exercise prices, we use the formula below:

$$Average\ Exercise\ Price\ of\ the\ Options = Stock\ Price\ at\ the\ Fiscal\ Year\ End - Realizable\ Value\ Per\ Option \text{ ---- (ii)}$$

Third, the average percent moneyness of the options is computed as:

$$Average\ Percent\ Moneyness = \frac{Realizable\ Value\ Per\ Option}{Average\ Exercise\ Price\ of\ the\ Options} \text{ ---- (iii)}$$

Finally, we classify CEOs as overconfident throughout the tenure of the CEO if the CEO does not exercise his options at least twice during his tenure, even when the options were 67% in the money. We use several variations of Holder 67 in our robustness tests, wherein, for example, we classify the CEO as overconfident whose options were in the money at least twice but mark them as overconfident, only starting the first time they are in the money.

Figure 3 plots annual counts of hedge fund activist interventions against S&P 1500 firms, partitioned by CEO overconfidence using the Holder 67 proxy (CEOs whose options are at least 67% in the money on more than one occasion, coded as overconfident beginning in the first qualifying year).

See Figure 3

Two regularities emerge. First, activists target firms led by rational CEOs more frequently than those led by overconfident CEOs. This ordering holds in most years and becomes especially pronounced in the 2010s. Second, although the overall level of activism rises over the sample, the relative ranking of the two series is largely preserved across the pre-crisis expansion, the crisis and immediate aftermath, and the subsequent recovery, with only occasional years in which the series converge or briefly reverse. Even prior to any formal multivariate panel regressions, the figure

provides suggestive visual evidence consistent with the hypothesis that the elevated negotiation and monitoring costs of engaging overconfident CEOs attenuate activists' propensity to intervene.

To assess robustness, we re-estimate our main analysis using alternative measures of CEO overconfidence used in the literature, such as Net Buyer, Holder 100, and Holder 30. The results are qualitatively similar. Holder 100 and Holder 30 are constructed following the similar methodology as Holder 67, with the key difference being that, instead of considering options that are 67% in the money, we examine unexercised options that are 100% and 30% in the money, respectively. Net Buyer is a measure developed by Kolasinski and Li (2013), where CEO overconfidence is measured using their personal stock purchasing decisions. An advantage of the Net Buyer measure over some other overconfidence measures used in the literature is that it anchors inference in CEOs' observable trading behavior. Because it is derived from mandatory insider-trading disclosures, it is immune to the distortions that can arise from media-coverage bias in press-based proxies, self-selection and self-report biases in survey-based measures, and the conflation of genuine overconfidence with mere inertia that can afflict option-exercise ("Longholder") measures. Drawing from the Thomson Reuters Ownership database, we examined how well CEOs' insider stock purchases performed over six months. We calculated performance by comparing the stock's return to a benchmark index (specifically, the CRSP value-weighted size-decile index) over the same timeframe. We labeled a CEO as overconfident in any given year if they made insider purchases within the following three years that underperformed the benchmark on average over their respective six-month periods.

(c) Other Control Variables

For more robust multivariate tests that are presented in the next section, we employ a suite of firm and CEO-specific control variables following the prior literature. The firm-specific

measures include market value, market-to-book, HHI(SIC), HHI(Seg), ROA, leverage, R&D intensity, dividend yield, firm's institutional ownership, stock liquidity, analyst following, and stock return.[8] These firm-level characteristics have been included since they have been documented to be associated with hedge fund activists' interventions in the hedge fund activism literature (Brav, Jiang, and Kim, 2015; Brav, Jiang, and Li, 2022). CEO-specific variables include CEO Gender, CEO Age, CEO Tenure, CEO Ownership, CEO-Chairman Duality, CEO Founder, Pay Ratio, and Pay Slice. We incorporate such CEO characteristics because they may be correlated with the probability of a firm being targeted by activists. For example, Francis, Hasan, Shen, and Wu (2021) document that activist investors disproportionately target firms led by female CEOs. Moreover, many of these CEO-specific control variables such as CEO Age, CEO Tenure, CEO Ownership, CEO-Chairman Duality, CEO Founder, Pay Ratio, and Pay Slice serve as proxies for "CEO Power," which is another CEO characteristic that is distinct from "CEO Overconfidence" and has been found to impact firm performance and value in prior literature (Adams, Almeida, and Ferreira, 2005; Bebchuk, Cremers, and Peyer, 2011). Controlling for "CEO Power," which is an observable, nonbehavioral governance attribute, enables us to more precisely isolate the effects of "CEO Overconfidence," a specific behavioral bias.

Return data is from CRSP, target firms' balance sheet data is from Compustat, CEOs' data is from ExecuComp, analyst coverage data is from IBES, E-Index or the Entrenchment Index has been obtained from RiskMetrics, and institutional ownership data is from the Thomson Financial 13F institutional holdings database.[9] Table 1 provides the summary statistics of these variables for firms that hedge fund activists targeted in comparison with those that hedge fund activists did not target (Appendix B provides their definitions). As shown in Table 1, the incidence of CEO

[8] We apply 1%–99% winsorization to all variables that are potentially unbounded.
[9] E-Index or the Entrenchment Index is based on Bebchuk, Cohen, and Ferrell (2009).

overconfidence, measured by the Holder 67 indicator, is lower among targeted firm-years (mean = 0.459; median = 0) than among non-targeted firm-years (mean = 0.540; median = 1), an 8.1 percentage-point gap. This unconditional difference is consistent with a negative association between CEO overconfidence and the likelihood of hedge-fund activist targeting. In the multivariate analysis, we condition on the twenty firm- and CEO-level controls reported in Table 1 and include firm and year fixed effects to absorb time-invariant heterogeneity and common shocks, thereby mitigating omitted-variable concerns and strengthening the credibility of the estimates.

See Table 1

See Appendix B

In the following section, we empirically explore our main research questions in a controlled multivariate regression environment.

4 Main Results

(a) Likelihood of being Targeted by Hedge Fund Activists

To examine the link between CEO overconfidence and the likelihood of being targeted by a hedge fund activist, we begin by empirically estimating the following multivariate model:

$$\Pr\left(Y_{i,t+1} = 1 \mid X, O_{it}\right) = G\left(\beta_1 + \beta_2 O_{i,t} + X^T \gamma\right) \text{ ---- (iv)}$$

where, G is the probit model with the assumption of normal distribution of errors, *i* indexes the firm, *t* indicates the year, *Y* is an activism dummy, *O* is the dummy for CEO overconfidence "*Holder 67*" measure, and *X* is a vector of observable controls.[10]

[10] Results are qualitatively unchanged if we assume standard logistic distribution of errors and use a logit model instead. Furthermore, results are robust to other proxies for CEO overconfidence as later shown in the Robustness section. The empirical framework follows Malmendier (2018, p. 319), developed in the acquisitions setting, with the set of controls adapted to the context of hedge fund activism.

In empirically testing equation (iv), we are positioned to answer our first primary question of whether hedge fund activists demonstrate a greater or less propensity to target firms under the leadership of overconfident CEOs. In this specification, our focal point of analysis is the coefficient β_2. A finding of $\beta_2 = 0$ would indicate a null effect, suggesting that the overconfidence of a firm's CEO holds no significant bearing on the likelihood of hedge fund activist intervention. If $\beta_2 > 0$, it would indicate that hedge fund activists prefer to target firms with overconfident CEOs. However, a result of $\beta_2 < 0$ would imply a tendency for hedge fund activists to eschew firms with overconfident CEOs. We present the results of such a probit specification in Model 1 of Table 2.A.

See Table 2.A

Model 1 shows that the coefficient on the overconfidence dummy is negative (i.e., - 0.122) and is significant at the 1% level (t-statistics are reported within the parentheses). In other words, hedge fund activists avoid firms led by overconfident CEOs. Such results hold after controlling for the various firm-level controls as used in the extant hedge fund activism and corporate governance literature. In this case, the identification primarily comes from between-firm differences. Hence, to further mitigate concerns regarding the absence of exogenous variation in CEO overconfidence, we refine our empirical approach by estimating models 2, 3, and 4 as Linear Probability Models (LPM), incorporating a range of fixed effects to enhance the robustness of our analysis. While Model 2 includes the year-fixed effects to control for time-varying unobservables, Models 3 and 4 add industry- or firm-fixed effects to account for time-invariant industry and firm-level unobservables, respectively. The coefficients are still significant in all the three models. For example, in Model 4, which has both firm- and year-fixed effects, the coefficient is -0.012, significant at 10% level. Here the firm-fixed effect model restricts the analysis to only within-firm variation. In other words, it reduces the sample to only those firms that have been targeted by

hedge fund activists at least once, and that had at least one overconfident and one non-overconfident CEO during our sample period. Standard errors have been clustered at the firm level in all four models to account for possible serial correlations (Petersen, 2009). According to the results of Model 4, having an overconfident CEO reduces the likelihood of being targeted by a hedge fund activist by 1.2 percentage points. Moreover, in Table 2.A, market value (proxy for firm size) enters with a negative and statistically significant coefficient, implying that larger firms face a lower probability of hedge fund targeting. The coefficients on Q are likewise negative and significant, consistent with activists concentrating on relatively undervalued firms. Recent stock returns are also negative and significant across specifications, indicating that poorer recent performance predicts a higher likelihood of hedge fund targeting. These patterns are consistent with prior evidence (Brav, Jiang, and Li, 2022).

Both anecdotal and empirical evidence suggest that hedge fund activists target firms with governance deficits. The behavioral corporate finance literature likewise implies that managerial overconfidence is more likely to persist under lax monitoring, making governance a plausible confound in our setting. Accordingly, in the specifications reported in Table 2.B, we include firm-level governance controls based on Bebchuk, Cohen, and Ferrell's (2009) Entrenchment Index (E-index), with higher values indicating greater managerial entrenchment.

See Table 2.B

E-Index includes six anti-takeover provisions such as staggered boards, limits to shareholder bylaw amendments, poison pills, presence of golden parachutes, supermajority requirements for mergers, and charter amendments that capture most of the explanatory power of Gompers, Ishii, and Metrick's (2003) G-Index or the Governance Index. We further include a vector of CEO characteristics to account for heterogeneity that may be correlated with the

likelihood of activist targeting. Although data availability for the E-Index and CEO controls reduces the usable sample, our inferences are unchanged: effect sizes and statistical significance remain essentially intact across all four specifications reported in Table 2.B. For instance, in the LPM Model 4 of Table 2.B, which includes both firm- and year-fixed effects, the coefficient on the dummy for CEO overconfidence is -0.022, significant at the 5% level. It implies that, holding all controls constant, having an overconfident CEO reduces the likelihood of being targeted by a hedge fund activist by 2.2 percentage points, providing further empirical support to the tendency of hedge fund activists to avoid firms with overconfident CEOs. It is essential to recognize that a reduction of more than two percentage points in the probability of hedge fund activist targeting, although ostensibly modest in its magnitude, holds significant economic implications. The landscape of public companies in the United States has experienced notable fluctuations, with the count of listed entities descending from approximately 6,000 in the mid-1990s to the vicinity of 4,000 by the year 2020.[11] Assuming an average of approximately 5,000 publicly listed firms in the United States during our sample period and an annual average of 200 firms targeted by hedge fund activists, the baseline naïve probability for a typical US firm to be a hedge fund activist's target stands at 4%. Consequently, a two percentage point decrease in this likelihood, attributable to the presence of an overconfident CEO, represents a substantial 50% reduction in the probability of hedge fund activists targeting such firms.

We next examine whether hedge fund activists, widely regarded as among the most sophisticated and prolific institutional investors (Brav, Jiang, and Li, 2022), behave differently from non–hedge fund activists when intervening in firms led by overconfident CEOs. Because activist campaigns can be initiated by both hedge funds and other investor types, we restrict this

[11] https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/reports-of-corporates-demise-have-been-greatly-exaggerated

analysis to firms that experience at least one activist intervention by either group over the sample period, thereby enabling a direct comparison across activist types. Table 3 reports the results. The dependent variable here is still the dummy, indicating whether hedge fund activists target the firm. The primary independent variable of interest is the CEO overconfidence dummy. The coefficients on Overconfidence are negative in all four columns, and significant in models 2, 3, and 4, indicating that hedge funds are less likely to intervene in a company led by an overconfident CEO, holding fixed the extensive set of controls. As shown in Model 4, which incorporates both year- and industry-fixed effects and controls for E-Index, firms led by overconfident CEOs are less likely to be targeted by hedge fund-led campaigns (conditional on an activist intervention occurring) as compared to non-hedge fund activists by 8.3 percentage points, significant at the 5% level. A natural interpretation of the evidence is that hedge fund activists possess superior ex-ante awareness of the engagement costs posed by overconfident managers, an awareness that appears less pronounced among non-hedge-fund investors. This heterogeneity in screening and response to managerial overconfidence is consistent with hedge fund activists' comparative advantage in navigating corporate governance frictions. Also, worth noting is that to strengthen causal identification, we condition on the intervention margin and restrict attention only to targeted firms. This like-for-like design improves common support and mitigates omitted variable bias arising from never-targeted firms that fall outside activists' opportunity set.

See Table 3

Even modest reductions in the ex-ante probability of hedge fund activist targeting can generate economically meaningful valuation effects when mapped to the scale of U.S. public firms. A small percentage change in targeting risk, given the documented effectiveness of sophisticated activist hedge funds as external governance mechanisms (Brav, Jiang, and Li, 2022), can translate

into significant absolute changes in firm value. Motivated by this observation, the following subsection examines whether market reactions to hedge fund activist announcements, measured by announcement window returns, differ between firms led by overconfident versus rational CEOs.

(b) Market Response

We begin by implementing event-studies in the spirit of Fama, Fisher, Jensen, and Roll (1969) to gauge the stock-market reaction to public announcements of hedge-fund activism. Specifically, we estimate short-window cumulative abnormal returns (CARs) around the announcement date to infer the market's assessment of expected value creation. To examine whether CEO's behavioral traits shape this assessment, we partition targets by CEO overconfidence and compare CARs for firms led by overconfident versus non-overconfident ("rational") CEOs. If investors anticipate, consistent with the preceding evidence, that hedge fund activism is less value-enhancing when an overconfident CEO oversees the target, CARs should be attenuated in that subsample. This design follows the empirical literature documenting sizable announcement period gains in activism settings and allows us to test whether those gains are conditional on CEO behavioral type. We report the short window results in Tables 4.A–4.B.

See Tables 4.A and 4.B

Table 4.A presents the mean cumulative abnormal returns (CARs) for four different event windows in days (i.e., [-2, +2], [-2, +3], [-2, +5], and [-3, +5]), using the market model around the announcement of hedge fund activism campaigns, separated by targeted firms led by "Rational" CEOs and firms led by "Overconfident" CEOs at the time of the hedge fund activism announcement. Although the mean CARs are positive and significant in both the groups and are in the range of what has already been documented in the prior literature, the magnitudes of the

CARs are significantly lower when firms with "Overconfident" CEOs are being targeted by the hedge funds as shown by the p-values of the differences (>0) in the last column. Markets react 1.46-1.79 percentage points more when the target has a rational CEO. That's an approximately 60%-70% larger announcement effect relative to the overconfident CEO subsample. Such short-term event studies indicate that the markets envisage different value impacts of hedge fund activism for firms led by "Rational" versus "Overconfident" CEOs. It expects more value creation or a higher probability of realizing it, when activists confront rational CEOs. This is consistent with the belief that rational managers are more likely to engage, negotiate, and implement changes without protracted, value-eroding fights. By contrast, under overconfident CEOs, who tend to be more entrenched, optimistic about existing strategies, and resistant to outside discipline, investors appear to price in lower odds of success and higher expected contest costs.

Table 4.B corroborates these findings within a multivariate regression framework. Across all four specifications, we document a statistically significant negative relation between cumulative abnormal returns (CARs) around the announcement of hedge fund activism and an indicator for CEO overconfidence at the target firm. For instance, in model (1), targets led by overconfident CEOs exhibit announcement-window cumulative abnormal returns (CARs) that are 1.8 percentage points lower than those of other targets. This estimate is statistically significant and economically large. For context, prior work reports short-run announcement returns to hedge fund activism in the 3%–9% range, depending on the sample and event windows (Brav, Jiang, and Li, 2022). Given that the average activist target in our 2018 sample had a market capitalization of $12 billion, a 1.8-percentage-point CAR deficit implies an average decline of roughly $220 million in shareholder wealth at announcement, more than twenty times the typical cost of a proxy contest, estimated at $10.7 million (Gantchev, 2013).

Such short-window event-study findings provide more than a snapshot of investor reaction. Assuming semi-strong market efficiency, they offer a disciplined lens through which to infer causality, specifically, how CEO overconfidence dampens the value created by hedge-fund activism. Comparing CARs across CEO-type partitions is conceptually equivalent to a difference-in-means estimator: CEO overconfidence serves as the "treatment," with rational CEOs forming the control. Provided that CEO overconfidence is orthogonal to other short-term confounding changes in firm fundamentals and macro news, the differential CARs approximate the causal impact of CEO's overconfidence on the value that hedge fund activism is expected to create. We further validate these findings by performing long-horizon event studies.

See Table 4.C

Table 4.C reports the Hedge Fund Activism Announcement BHARs (Buy and Hold Abnormal Returns) for different event windows in months. Panel A presents the announcement BHARs for firms with "Overconfident" CEOs; Panel B presents the announcement BHARs for firms with "Rational" CEOs. Again, we find that the magnitudes of the BHARs are significantly lower when firms with "Overconfident" CEOs are being targeted by the hedge funds, as shown by the p-values of the differences (>0) in the last column, significant at the 10% level and two hovering just over the 5% threshold. The rational CEO group outperforms the overconfident CEO group by about 2.4 to 3.0 percentage points across the four windows (2.58 pp for [−2,+2], 2.44 pp for [−1,+1], 2.76 pp for [−1,+2], and 3.04 pp for [−1,+4]). Put differently, announcement BHARs are roughly 50%-60% larger when the target is led by a rational CEO. For a representative $12 billion target, a 2.4 to 3.0 percentage points shortfall corresponds to roughly $300–$360 million less value creation. Moreover, BHARs for the rational CEO group drift up modestly as the window widens, suggesting that some of the value impact continues to be incorporated in the weeks

surrounding the announcement. In contrast, BHARs for the overconfident CEO group are comparatively flat across windows. Taken together, the evidence gleaned from both short-term and long-term event studies converges on the inference that the effectiveness of hedge fund activism in counteracting or neutralizing managerial behavioral bias of overconfidence is often constrained.

(c) Operating Performance

The prior section offers a first pass at our second question, whether the value unlocked by hedge-fund activists depends on the targeted firm's CEO's confidence profile, but it leaves open the issue of real operating outcomes. To address this, we follow Brav, Jiang, and Li (2022) and trace performance trajectories in the period surrounding the activism announcement. Table 5 contrasts the evolution of Tobin's q (Q) and return on assets (ROA), arguably the two workhorse metrics of any firm's operational performance, for targets run by overconfident versus rational CEOs, allowing us to gauge how activism shapes operating performance across these managerial types.

See Table 5

The table presents the outcomes (coefficients and t-statistics in parentheses) derived from linear regression analyses. The dependent variables in this analysis are the industry/year-adjusted Q (columns (1), (2), and (3)) and Return on Assets (ROA) (columns (4), (5), and (6)). In this context, the benchmark consists of all firm-years from non-targeted companies within the Compustat database from 1994-2019. The control variables incorporated in the model include the natural logarithm of a firm's market capitalization at the end of a given year, denoted as ln (MV), and the natural logarithm of the number of years since the firm's initial appearance in the merged

CRSP/Compustat database, represented as ln(Age). All models account for year and firm fixed effects and cluster at the firm level.

While columns (1) and (4) include all hedge fund activism events, columns (2) and (5) only include campaigns where the targeted firm had an overconfident CEO, and columns (3) and (6) only include activism campaigns where a rational CEO led the targeted firm.

Economic models (1) and (4) indicate that, for firms targeted by hedge-fund activists, both Q and ROA increased during the five years after the intervention compared with the three years before, consistent with earlier evidence reported by Brav, Jiang, and Li (2022). However, once we separate the sample into firms led by overconfident CEOs and those led by rational CEOs, we find notably that performance improves only when the CEO is rational. For example, models (2) and (3) with Q as the variable of interest suggest that in the three years before the intervention, a target firm with a rational CEO was undervalued by 0.09-0.12, while a firm with an overconfident CEO was undervalued by 0.09-0.2, compared to its usual value. This undervaluation disappears upon hedge fund activist targeting and evolves into a premium of approximately 0.09 (i.e., the market values each dollar of its assets 9¢ more than the benchmark) for firms with rational CEOs but stays undervalued for firms with overconfident CEOs in the next five years. Similarly, we see in models (5) and (6) that the improvement of benchmark-adjusted ROA post-intervention is significantly lower for firms with overconfident CEOs. These findings bolster the view that, after an intervention, hedge-fund activists are generally able to enhance the operational performance of target firms led by rational CEOs more than those headed by overconfident CEOs.

Table 6 replicates the earlier analysis with a difference-in-differences design applied to a propensity-score-matched sample, confirming that the disparate gains in operational performance between firms led by overconfident CEOs and those led by rational CEOs after hedge fund

intervention are not simply due to selection effects. For each activist event, we identify control firms using nearest-neighbor propensity score matching within year-industry (2-digit SIC) pairs. The propensity scores are estimated via probit using firm size, stock returns, leverage, dividend yield, R&D, institutional ownership, and sales growth as covariates, with matching conducted without replacement. Conceptually, nearest-neighbor matching pairs each firm targeted by an activist hedge fund with a statistically comparable non-target firm in the same calendar year and industry, ensuring that observable characteristics that could bias the analysis are balanced.[12] The difference-in-differences estimator then tracks how performance shifts for the targets from the pre- to the post-intervention period and compares that shift with the corresponding change for their matched controls, thereby purging estimates of economy-wide or industry-wide shocks and any firm-specific traits that remain constant over time. The findings remain qualitatively consistent, indicating a more pronounced improvement in both Tobin's q (Q) and Return on Assets (ROA) post-intervention for firms under the leadership of rational CEOs, in comparison to those headed by overconfident CEOs. For instance, even after we net out the changes experienced by each firm's matched control, target firms with rational CEOs enjoy a premium of approximately 0.38-0.63 (i.e., 38¢-63¢ more than their matched twins) over the five years following the intervention. By contrast, targets run by overconfident CEOs do not realize any premium until the third year after the intervention. Moreover, the absence of significant gaps in Tobin's q(Q) in years t-3 and t-2 supports the "parallel-trend" assumption of the difference-in-differences design. Likewise, firms

[12] Appendix C reports the covariate-balance table, confirming that treated and control firms were statistically indistinguishable on observable characteristics prior to the activist intervention.

headed by overconfident CEOs show no improvement in ROA even five years after the intervention, whereas those led by rational CEOs post significant gains in years four and five.[13]

See Table 6

5 Causality

(a) CEO Regime Switches

This section exploits CEO regime switches to strengthen causal inference on the effect of managerial overconfidence on hedge fund activism. We examine within firm transitions in which an overconfident CEO is replaced by a more rational successor (and, in complementary tests, the reverse). If overconfidence raises the expected costs of engagement, an "Overconfident" to "Rational" switch should increase the firm's subsequent probability of being targeted by hedge fund activists. By comparing targeting rates before and after the regime change within the same firm, while absorbing aggregate shocks with period fixed effects, we difference out time-invariant firm attributes and limit concerns that cross-sectional heterogeneity drives the results. Consistent with this logic, Table 7.A shows a material rise in targeting following Overconfident-to-Rational CEO regime switches.

See Table 7.A

The four specifications reported in this table replicate the baseline model from Table 2.B, with a single modification: we replace the overconfident CEO indicator with an indicator for a regime transition from an overconfident to a rational CEO. Across all four specifications, with progressively tighter fixed effects, the coefficient on the transition indicator is positive and statistically significant, consistent with a causal interpretation of our baseline results. In the

[13] Changes in Tobin's q (Q) and ROA seldom occur at the same pace. Q is forward looking as investors price in the future trajectory an activist may chart for the firm, whereas ROA is backward looking, capturing profits that have already been earned. As a result, improvements in ROA typically lag gains in Q.

two-way fixed-effects specification (Model 4, including firm and year fixed effects), the point estimate implies that a switch from an overconfident to a rational CEO raises the probability of being targeted by a hedge fund activist by 2.3 percentage points. Relative to the 4% unconditional targeting rate for U.S. firms, this effect is economically meaningful, an increase of nearly 60% (from 4.0% to 6.3%).

To further probe causality, we examine CEO regime changes in the opposite direction, that is, the transitions from rational to overconfident. Table 7.B reports the estimates. Across specifications (models 3 and 4), the transition indicator is uniformly negative and economically meaningful with respect to the likelihood of hedge fund activist targeting. In Model 4, which absorbs firm and year fixed effects, a rational to overconfident shift is associated with a 2.4 percentage point reduction in the probability of being targeted. The opposite sign and nearly symmetric pattern of these estimates relative to the results for the overconfident to rational transition strengthens the case for a plausible causal relation between CEO overconfidence and exposure to hedge fund activism.

See Table 7.B

To quantify the full extent of the impact of CEO overconfidence on the propensity for hedge-fund activism, our next set of tests exploits CEO transitions, where we treat switches from an overconfident to a rational CEO as the treatment group and contrast them with transitions from a rational to an overconfident CEO, which serve as the control. Because both the treatment and control cohorts undergo a CEO transition, standard succession-related shocks, for example, uncertainty, operational disruption, search costs, and strategic resets, cancel out in this difference-in-differences design. Consequently, the only remaining variation is the direction of the confidence shock, allowing us to attribute any change in hedge-fund activism squarely to the

CEO's overconfidence, and not to the fact of turnover itself. The results are presented in Table 7.C.

See Table 7.C

Models 1 and 2 estimate difference-in-differences specifications within ±3-year and ±5-year windows surrounding each CEO transition, respectively. The dependent variable is a binary indicator for the presence of hedge-fund activism in a given firm-year. Our focal explanatory term is Post × Group: Post equals 1 for all years beginning with the first regime switch, and Group equals 1 for firms that move from an overconfident to a rational CEO (treatment). Firms that transition from a rational to an overconfident CEO constitute the control group. Both models control for the standard covariate set and include firm and calendar-year fixed effects. Across both model 1 and model 2, the Post × Group coefficient shows that replacing an overconfident CEO with a rational successor increases the probability of hedge-fund activism by approximately 5–6 percentage points. This effect is robust to specification choices and remains statistically significant at the 5 percent level after accounting for common time trends and baseline differences between the two switch types.

(b) Forced CEO Turnovers

The extant literature makes clear that hedge fund activism is a potent disciplinary channel for dislodging underperforming CEOs and installing leadership that better aligns with shareholder interests. Brav, Jiang, Partnoy, and Thomas (2008) show that, prior to an activist's arrival, CEO turnover at target firms is statistically indistinguishable from that of matched peers. Within a year of the intervention, however, turnover at those targets is 12.4 percentage points higher. Corroborating this evidence, Choi and Gong (2020) find that, over the first two years following an activist campaign, CEO turnover at target firms is roughly double that observed in propensity

score-matched controls. Therefore, in this subsection, we ask whether hedge-fund activism alters the likelihood of involuntary (forced) CEO turnover differently for overconfident versus more rational CEOs. We draw the forced-turnover indicators from Peters and Wagner (2014) and Jenter and Kanaan (2015). Because a board, not the incumbent, decides whether to dismiss a CEO, these events carry a markedly higher "external-shock" component than voluntary departures such as retirements or resignations and thus offer econometric leverage.

Table 7.D shows that, conditional on hedge-fund intervention, overconfident CEOs are appreciably less likely to be forcibly removed than their rational peers during the ensuing five-year period. In the benchmark linear-probability specification (columns 2 and 3), it shows that hedge fund activism's incremental impact on forced CEO turnover is about 3.3-3.4 percentage points smaller when the CEO is overconfident. The probit estimates in column 1 are not statistically distinguishable from zero, yet its sign mirrors the linear result, reinforcing the overall pattern. Collectively, the findings in Table7.D imply that consistent with the extant literature, hedge fund activism is followed by more board-initiated CEO removals. However, overconfident CEOs appear more insulated as they are less likely to be forced out in general and the post-activism jump is muted. Such results align with the story that managerial overconfidence can blunt the disciplinary power of hedge-fund activism.

See Table 7.D

6 Robustness Tests

(a) Alternative Measures of CEO Overconfidence

To this point, the paper has addressed omitted-variable endogeneity using a suite of complementary strategies: a long list of observable controls, rich sets of fixed effects, a

difference-in-differences design implemented on a propensity-score–matched sample, and variation from CEO-regime transitions, including forced turnovers. We also mitigate reverse causality concerns by lagging all covariates and verifying that any regime shifts predate the onset of activism. A remaining concern is measurement error in the key regressor, another source of endogeneity in empirical corporate finance, which can bias coefficient estimates and undermine causal interpretation (Roberts and Whited, 2013).

Our baseline proxy for CEO overconfidence is the widely used "Holder 67" option-exercise measure, grounded in the executive-option valuation framework of Hall and Murphy (2002). In this section, we evaluate the robustness of our findings to alternative revealed-belief measures of managerial overconfidence. This exercise is designed to ensure that the results are not an artifact of a particular proxy but instead reflect a broader, more generalizable phenomenon.

Option-based proxies for CEO overconfidence are well established in the literature, yet they arguably capture only the facet of overconfidence expressed through options-related decision-making. So, under this alternative metric of CEO overconfidence, we use a measure called "Net Buyer" (Kolasinski and Li, 2013), where CEO overconfidence is measured using their personal stock purchasing decisions. We examine how well CEOs' insider stock purchases performed over a six-month period, as compared to a benchmark index (specifically, the CRSP value-weighted size-decile index) over the same timeframe. CEOs are considered overconfident in any given year if they made insider purchases within the following three years that underperformed the benchmark on average over their respective six-month periods. This test offers a novel perspective by focusing on the CEO's stock purchasing behavior, broadening the scope of analysis beyond options-based frameworks. Therefore, we re-estimate the Table 2.A

specifications, replacing Holder 67 with the Net Buyer proxy for overconfidence. Results appear in Table 8.A. In model (4), which includes firm and year fixed effects, the coefficient on the CEO Overconfidence indicator is −0.023 ($p < 0.01$). Interpreted in the linear-probability metric, this implies that, for the same firm, leadership by an overconfident CEO reduces the likelihood of hedge fund targeting by 2.3 percentage points, a statistically significant and economically meaningful effect.

See Table 8.A

We next implement an alternative options based measure of CEO overconfidence, where we look at CEOs whose options were in the money at least once and mark them overconfident throughout their tenure. This alternative measure differs from the Holder 67 measure of CEO overconfidence, wherein the criterion for overconfidence is defined by the CEO not exercising his stock options at least twice during his tenure, even when the options were 67% in the money. One potential advantage of using this single-instance variant of the Holder 67 measure is that it better aligns with the persistent nature of CEO overconfidence. Overconfidence is not typically a one-off behavioral bias but a consistent pattern. This approach acknowledges that once a CEO demonstrates overconfidence, it is likely a characteristic that will influence their decision-making and behavior in a sustained manner rather than fluctuating significantly over short periods. Using this alternative measure of CEO Overconfidence, we repeat our main tests from Table 2.B. As presented in Table 8.B (First Alternative Measure of Holder 67), our main results are robust to this alternative measure of CEO Overconfidence. In the context of Linear Probability Model 4, as presented in Table 8.B, which incorporates both firm-fixed and year-fixed effects, we observe that the coefficient for the CEO overconfidence dummy variable is -0.020, with a statistical significance of 5%. This finding suggests that the presence of an overconfident CEO is associated

with a 2.0 percentage point reduction in the probability of the firm being targeted by a hedge fund activist, which is qualitatively similar to the results when we use Holder 67.

See Table 8.B

We repeat the same exercise with a more stringent version of Holder 67 (Second Alternative Measure of Holder 67) where if the CEO has an option that is more than 67% in the money more than once during his tenure but did not exercise it, the CEO is marked overconfident starting the first time he is in the money. We find that the results, albeit weaker, are qualitatively similar.

See Table 8.C

Our next alternative metric, termed "Holder100," is similarly predicated on stock option exercise behavior. This measure classifies a CEO as overconfident if, on at least two occasions during his tenure, he refrains from exercising an option that is in excess of 100% in the money. Under this criterion, such a behavioral pattern of not capitalizing on significantly profitable stock options is interpreted as an indicator of overconfidence, leading to the classification of the CEO as overconfident for the entirety of his tenure. This measure thus provides a more stringent threshold for identifying overconfidence compared to the "Holder 67" benchmark.

Utilizing this alternative metric of CEO overconfidence, namely "Holder100," we replicate the principal analyses conducted initially in Table 2.B. The findings, as delineated in Table 8.D, affirm that our primary results are consistent and robust when applying this alternative measure of CEO overconfidence. Specifically, within the framework of Linear Probability Model 4, as detailed in Table 8.D, which accounts for both firm-fixed and year-fixed effects, the coefficient associated with the CEO overconfidence dummy variable registers at -0.019, significant at the 5%

level, thereby reinforcing the validity of our initial findings under a more stringent criterion for CEO overconfidence.

See Table 8.D

Under our last alternative metric of CEO overconfidence, designated as "Holder 30," a CEO is classified as overconfident for the duration of his tenure if, on at least two occasions, he does not exercise an option that is more than 30% in the money. Applying this "Holder 30" criterion, we re-examine the analyses initially conducted in Table 2.B. As reported in Table 8.E, the outcomes demonstrate that our primary findings remain robust when using this "Holder 30" measure of CEO overconfidence. Specifically, in the context of Linear Probability Model 4, detailed in Table 8.E and incorporating both firm-fixed and year-fixed effects, the coefficient for the CEO overconfidence dummy variable is observed at -0.020, achieving statistical significance at the 5% level. This result indicates that the presence of an overconfident CEO, as defined by the "Holder 30" standard, is correlated with a 2.0 percentage point decrease in the likelihood of the firm being targeted by a hedge fund activist. This finding is qualitatively consistent with the results obtained using the "Holder 67" measure, reinforcing our conclusions' robustness across varying thresholds of CEO overconfidence.

See Table 8.E

(b) Overconfidence of other C-suite Officers

Canonical governance theory and decades of empirical studies converge on one conclusion: the CEO sets a firm's strategic trajectory and personifies its public narrative. Empowered by the board with "real" authority (Aghion and Tirole, 1997), the CEO determines objectives, allocates resources, and remains ultimately accountable for results. Hedge-fund activists, therefore, treat the office of the CEO as the fulcrum of any campaign. Persuading or replacing the CEO can reset

corporate direction far more quickly than pressuring other C-suite officers. Functional leaders, for example, the chief financial officer (CFO), may fine-tune the capital structure or disclosure, but they cannot single-handedly rewrite strategy and seldom engage with activists directly. Accordingly, proxy contests and open letters unfold in the court of public opinion as much as in boardrooms, with the CEO at center stage as both decisionmaker and emblem of change.

Overconfidence is not the sole preserve of CEOs. Chief Financial Officers (CFOs), Chief Strategy Officers (CSOs), Chief Legal Officers (CLOs), Chief Technology Officers (CTOs), Chief Operating Officers (COOs), and other senior officers can display the same behavioral bias. When decision rights are highly concentrated in a dominant CEO, overconfidence elsewhere in the C-suite may exert little influence on corporate outcomes. Our baseline regressions already incorporate comprehensive measures of CEO power; however, recognizing that power and bias may interact, we test in this section whether activist investors respond more strongly to overconfidence in the CEO than in other top managers.

However, this assessment is subject to several data constraints. SEC disclosure regulations prior to 2006 limited mandatory executive compensation reporting to CEOs and the four most highly paid officers, potentially excluding certain CFOs or other relevant executives from our dataset, particularly in smaller or older firms. Moreover, the quality and comprehensiveness of executive-level data before 2006 complicate historical analysis and inference.

See Table 8.F

Our empirical analyses span two periods to enhance robustness: Model 1 of Table 8.F presents results for 2006–2019, and Model 2 excludes the 2007–2009 financial crisis, covering 2010–2019. Across both time horizons and after controlling for firm fundamentals, executive

attributes, as well as firm and year-fixed effects, CEO overconfidence remains the most potent predictor of the firm's probability of becoming an activist target.

We sharpen the test by juxtaposing the CEOs' and CFOs' overconfidence directly (Table 8.G). Model 1 spans 2006–2019, whereas Model 2 trims the sample to 2010–2019 to avoid the crisis years. Firm and year-fixed effects strip out any time-invariant or time-varying corporate attributes, governance architecture, culture, or industry positioning that might confound the estimates. In each specification, CEO overconfidence remains a strong, statistically significant predictor of activist intervention, while the CFO counterpart is statistically indistinguishable from zero. The pattern reinforces the view that behavioral biases matter for activism primarily through the office of the CEO, who has the "real" decision-making authority.

See Table 8.G

7 Conclusion

This study uncovers a previously unrecognized limit to the governance role of hedge fund activism. Drawing from the field of behavioral corporate finance, we investigate the interaction between CEO overconfidence and hedge fund activism within the framework of biased executives (specifically, overconfident CEOs) and rational market participants (embodied by sophisticated hedge fund activists). Two questions guide the study. First, are hedge fund activists more or less likely to target companies run by overconfident CEOs? Second, once a firm is targeted, does the hedge fund activists' value added depend on whether the CEO is overconfident or rational? After accounting for additional determinants of hedge fund activism, we discover a lower likelihood of hedge fund activists targeting companies with overconfident CEOs. Firms led by overconfident CEOs are more than 50 percent less likely to attract hedge-fund activist campaigns. These findings

are consistently robust across various model specifications and fixed-effect approaches, aligning with the idea that, holding all else constant, the costs associated with targeting a firm led by an overconfident CEO generally exceed the anticipated benefits of value creation. Our analysis further reveals a distinct proficiency among hedge fund activists, as opposed to non-hedge fund activists, in identifying the complex challenges of managerial overconfidence in activist interventions. This suggests that sophisticated hedge fund activists demonstrate a more nuanced understanding of the potential costs involved in engaging with overconfident managers, an insight that appears to be less evident among non-hedge fund investors. Additionally, we document evidence indicating that market reactions to hedge fund activists targeting firms with overconfident CEOs are significantly less than those targeting similar firms without overconfident CEOs. When run by an overconfident versus rational CEO, we also find that the Q and ROA of targeted firms evolve differently. Improvements in Q and ROA are relatively slower or negligible for targeted firms led by overconfident CEOs.

Recognizing the potential for endogeneity, we perform additional tests centered on CEO turnover. Departures of overconfident CEOs increase the likelihood of activist entry, whereas the appointment of an overconfident successor has the opposite effect. For example, a CEO switch from an overconfident CEO to a rational CEO increases the likelihood of the firm being targeted by a hedge fund activist by nearly 60 percent. We also document that activist campaigns are less likely to culminate in to forced CEO turnovers when the incumbent is classified as overconfident than when the CEO is not. These turnover results reinforce the plausible causal readings of our baseline estimates. Taken together, the evidence presented in the paper reveals a previously unrecognized channel through which managerial bias influences the governance role of hedge-fund activists. While hedge fund activism is often viewed as a corrective external tool for agency

problems, it proves less effective and, indeed, less likely even to be attempted when an overconfident CEO shields the target. This paper bridges and advances the CEO overconfidence and hedge fund activism literatures by showing that executive biases persist even under vigorous hedge-fund monitoring, thereby delineating the limits of external governance and providing fresh evidence for current policy debates on the efficacy of activist funds.

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Figure 1: 13D Filings Distribution

The figure shows the distribution of 13D filings from 1994 to 2019. We scrape SEC's EDGAR filing system for all 13D filings during our sample period.

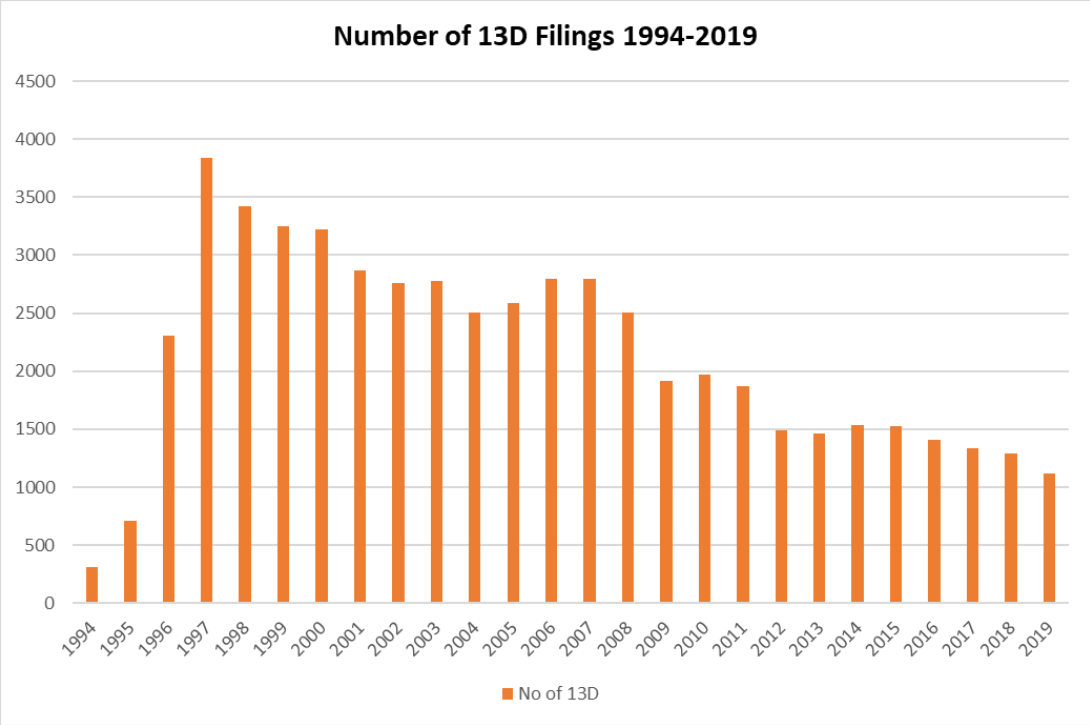


Figure 2: Distribution of Hedge Fund Activism

Figure below shows the frequency distribution of Hedge Fund activism sample from year 1994 to 2019. Since not all 13D filers are hedge fund activists, following Brav, Jiang, Partnoy, and Thomas (2008), we use the description of the filer type from Item 2, i.e., "Identity and Background" of Schedule 13D and web searches to narrow them to only hedge funds. We also collect information on activist interventions by hedge funds where there were no Schedule 13D filings since the hedge fund activist did not cross the 5% threshold. We use the internet and media searches to extend our hedge fund activism data.

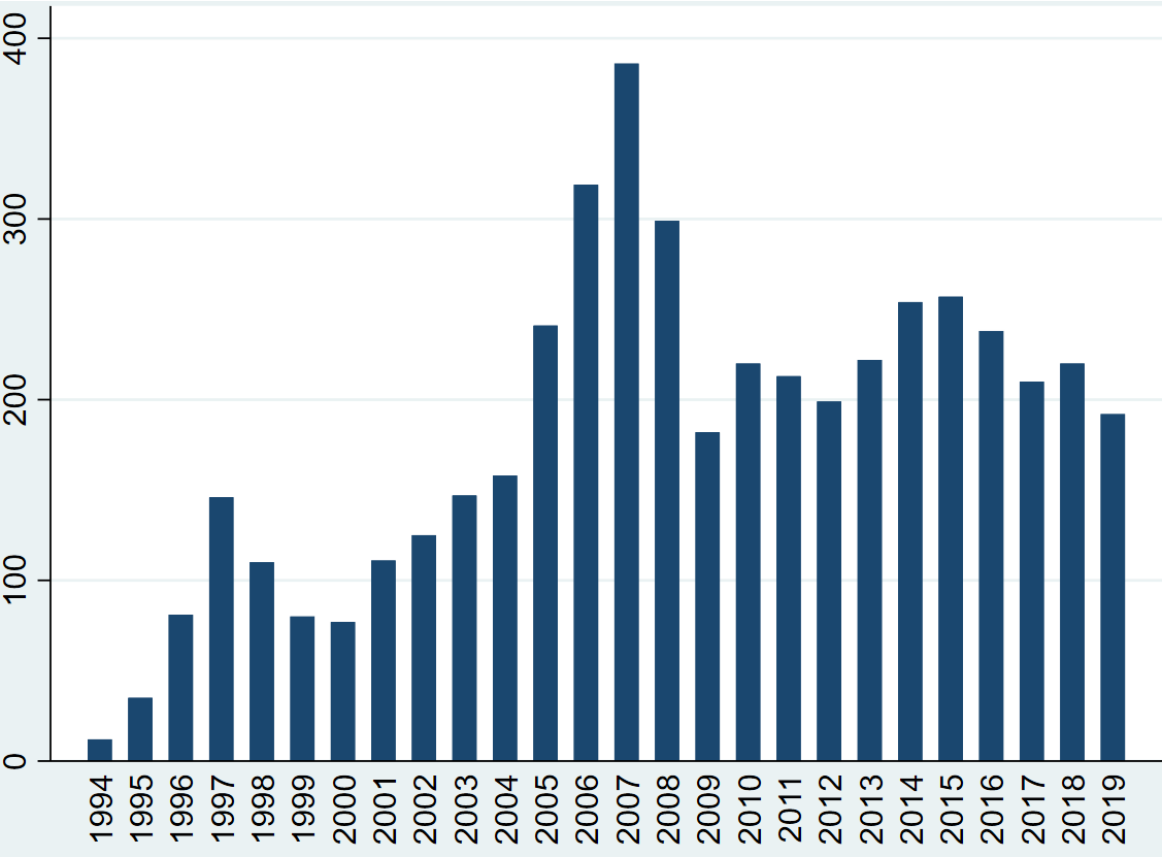


Figure 3: Distribution of Hedge Fund Activism – Firms with overconfident CEOs vs. not overconfident CEOs

The figure presents year-by-year hedge fund activist intervention frequencies, separated for overconfident CEOs (proxied with Holder 67- looking at CEOs whose options were 67% in the money more than once during their tenure & marking them overconfident starting the first time they were in the money) and rational CEOs. Our hedge fund activism sample is further narrowed down to those firms within S&P 1500 for constructing our option-based over-confidence measures.

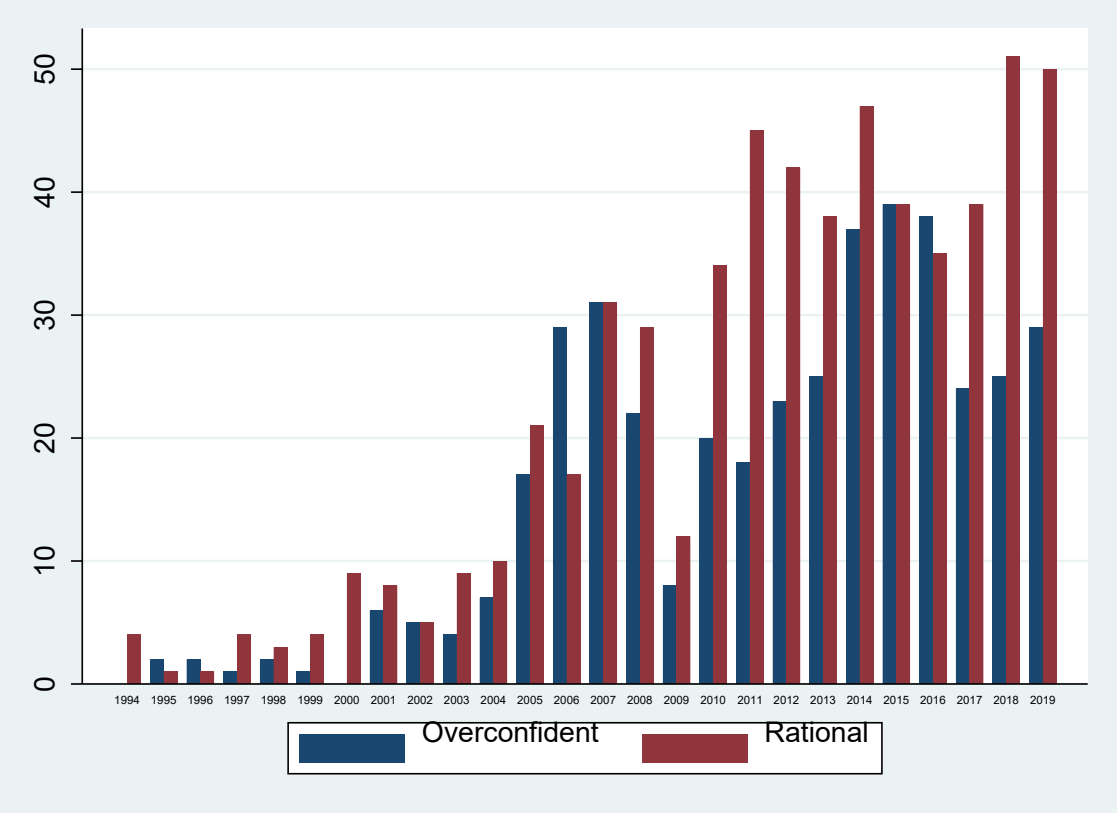


Table 1: Descriptive Statistics

The table lists all variables used in the regression model. The main variable of interest is overconfidence measure Holder 67: If the CEO has an option that is more than 67% in the money at least twice during his tenure but did not exercise it, then the CEO is marked overconfident throughout his tenure. All other variable definitions are in Appendix B.

	Firms targeted by Hedge Fund Activists					Firms NOT targeted by Hedge Funds Activists				
	Mean	Median	Std. Dev.	25%	75%	Mean	Median	Std. Dev.	25%	75%
Overconfidence	0.459	0.000	0.499	0.000	1.000	0.540	1.000	0.498	0.000	1.000
Market Value	0.071	0.069	0.017	0.059	0.081	0.074	0.072	0.016	0.062	0.083
hhi_sic2	0.091	0.056	0.092	0.038	0.103	0.086	0.054	0.086	0.037	0.100
hhi_seg	0.745	0.890	0.281	0.500	1.000	0.754	0.903	0.584	0.501	1.000
Q	1.791	1.522	1.076	1.146	2.061	2.167	1.680	1.479	1.247	2.505
Return on Assets (ROA)	0.120	0.121	0.111	0.072	0.170	0.151	0.143	0.121	0.093	0.207
Leverage	0.236	0.213	0.208	0.045	0.357	0.227	0.211	0.195	0.041	0.349
R&D	0.042	0.001	0.072	0.000	0.059	0.040	0.001	0.071	0.000	0.050
Dividend Yield	0.009	0.000	0.017	0.000	0.014	0.010	0.000	0.015	0.000	0.016
Institutional Ownership	0.799	0.839	0.206	0.703	0.935	0.733	0.780	0.227	0.592	0.902
Illiquidity (Amihud)	0.080	0.038	0.122	0.017	0.084	0.071	0.038	0.101	0.018	0.080
No. Analyst Following	0.025	0.026	0.007	0.021	0.030	0.026	0.026	0.007	0.021	0.031
Stock Return	0.037	-0.011	0.440	-0.227	0.228	0.182	0.124	0.493	-0.113	0.379
CEO Gender	0.062	0.000	0.241	0.000	0.000	0.035	0.000	0.183	0.000	0.000
CEO Age	0.563	0.560	0.075	0.510	0.610	0.563	0.560	0.077	0.510	0.610
CEO Tenure	1.766	1.833	0.981	1.127	2.520	1.829	1.934	0.955	1.251	2.513
CEO Ownership	0.787	1.000	0.409	1.000	1.000	0.760	1.000	0.427	1.000	1.000
CEO Chairman	0.456	0.000	0.498	0.000	1.000	0.528	1.000	0.499	0.000	1.000
CEO Founder	0.087	0.000	0.282	0.000	0.000	0.054	0.000	0.226	0.000	0.000
CEO Pay Ratio	0.027	0.025	0.014	0.018	0.033	0.027	0.025	0.014	0.018	0.033
CEO Pay Slice	0.004	0.004	0.001	0.003	0.005	0.004	0.004	0.001	0.003	0.005

Table 2.A: CEO Overconfidence and Activism

The table presents the results of the relationship between the overconfidence of a firm's CEO and the likelihood of the firm being targeted by an activist. Models 1 is a Probit Model, and Models 2, 3, and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by an activist at Year t+1. The main independent variables of interest are overconfidence dummies. This specification uses a concurrent overconfidence measure (Holder 67): If the CEO has an option that is more than 67% in the money at least twice during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure. Control variables include size (Market Value), Growth, Tobin's q (Q), Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments. Appendix B provides variable definitions. The Probit model has year-fixed effects and has been clustered at the firm level. The linear probability models have industry/firm and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1)	(2)	(3)	(4)
	Probit	LPM	LPM	LPM
Holder67	-0.122***	-0.011***	-0.012***	-0.012*
	(-2.77)	(-3.07)	(-3.43)	(-1.86)
hhi_sic2	0.258	0.026	0.028	0.111**
	(1.02)	(1.13)	(0.95)	(2.17)
hhi_seg	0.023*	0.001	0.001	0.001
	(1.65)	(0.73)	(0.43)	(1.08)
Market Value	-5.114**	-0.504***	-0.397**	-0.163
	(-2.16)	(-2.74)	(-2.14)	(-0.36)
Growth	-0.028	-0.004	-0.002	-0.001
	(-0.33)	(-0.60)	(-0.31)	(-0.07)
Q	-0.086***	-0.004***	-0.005***	-0.006***
	(-3.41)	(-2.75)	(-3.73)	(-2.83)
Return on Assets (ROA)	-0.348	-0.026*	-0.038**	-0.024
	(-1.60)	(-1.70)	(-2.41)	(-0.93)
Stock Return	-0.289***	-0.020***	-0.019***	-0.016***
	(-4.82)	(-5.87)	(-5.55)	(-4.08)
Leverage	0.144	0.012	0.012	0.004
	(1.24)	(1.21)	(1.17)	(0.25)
R&D	0.906**	0.072**	0.080**	0.060
	(2.49)	(2.36)	(2.33)	(0.92)
Dividend Yield	-1.972	-0.228*	-0.176	0.238
	(-1.27)	(-1.81)	(-1.32)	(1.15)
Institutional Ownership	0.557***	0.034***	0.032***	0.010

	(4.66)	(4.28)	(3.99)	(0.84)
Illiquidity (Amihud)	0.658**	0.052*	0.041	0.000
	(2.13)	(1.66)	(1.35)	(0.01)
No. Analyst Following	0.987	0.223	-0.069	-0.668
	(0.25)	(0.70)	(-0.20)	(-1.22)
Constant	-1.650***	0.060***	0.033**	0.038
	(-8.26)	(4.16)	(2.12)	(1.31)
Fixed Effects	Year	Year	Year/Industry	Year/Firm
Cluster	Firm	Firm	Firm	Firm
N	18,477	19,541	19,541	19,541
adj. R-sq		0.023	0.029	0.076

Table 2.B: CEO Overconfidence and Activism – control for E-Index

The table presents the results on the relationship between overconfidence of a CEO of a firm and the likelihood of the firm being targeted by an activist. Model 1 is a Probit Model and Models 2, 3, and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by an activist at Year t+1. The main independent variable of interest is an overconfidence dummy. This specification uses a concurrent overconfidence measure (Holder 67): If the CEO has an option that is more than 67% in the money at least twice during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure. Control variables include E-Index, size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides variable definitions. The Probit model has year-fixed effects and has been clustered at the firm level. The linear probability models have industry/firm and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1) Probit	(2) LPM	(3) LPM	(4) LPM
Overconfidence	-0.193***	-0.014***	-0.017***	-0.022**
	(-3.53)	(-3.34)	(-3.81)	(-2.54)
hhi_sic2	0.240	0.019	0.067	0.172**
	(0.79)	(0.73)	(1.49)	(2.26)
hhi_seg	0.112	0.007	0.005	0.014
	(1.17)	(0.96)	(0.67)	(0.80)
E-Index	0.022	0.002	0.002	0.000
	(0.86)	(0.82)	(0.80)	(0.10)
Growth	-0.026	-0.003	0.001	0.014
	(-0.21)	(-0.27)	(0.10)	(1.02)
Market Value	-2.354	-0.376	-0.250	0.251
	(-0.76)	(-1.50)	(-0.97)	(0.36)
Q	-0.102***	-0.004**	-0.006***	-0.008**
	(-2.76)	(-2.13)	(-3.01)	(-2.39)
Return on Assets (ROA)	-0.205	-0.030	-0.045*	-0.069*
	(-0.68)	(-1.32)	(-1.90)	(-1.67)
Leverage	0.101	0.010	0.005	-0.015
	(0.66)	(0.80)	(0.42)	(-0.61)
R&D	0.976**	0.081**	0.076*	0.095
	(2.09)	(1.97)	(1.65)	(0.92)
Dividend Yield	-1.755	-0.200	-0.154	0.212
	(-0.94)	(-1.25)	(-0.92)	(0.79)

Institutional Ownership	0.583***	0.026**	0.020*	0.013
	(3.34)	(2.37)	(1.77)	(0.80)
Illiquidity (Amihud)	1.645***	0.126*	0.116*	0.130
	(2.97)	(1.95)	(1.77)	(1.20)
No. Analyst Following	2.464	0.478	0.211	-0.617
	(0.46)	(1.07)	(0.44)	(-0.70)
Stock Return	-0.402***	-0.030***	-0.029***	-0.024***
	(-4.31)	(-5.31)	(-5.11)	(-3.58)
CEO Gender	0.132	0.015	0.009	-0.006
	(1.23)	(1.40)	(0.87)	(-0.28)
CEO Age	0.638*	0.042	0.045	0.122**
	(1.65)	(1.29)	(1.40)	(2.09)
CEO Tenure	0.038	0.002	0.002	0.008**
	(1.17)	(0.81)	(0.94)	(2.20)
CEO Ownership	-0.034	-0.003	-0.002	-0.001
	(-0.51)	(-0.59)	(-0.35)	(-0.09)
CEO Chairman	-0.084	-0.006	-0.006	-0.011
	(-1.51)	(-1.32)	(-1.43)	(-1.49)
CEO Founder	0.225**	0.021**	0.017	0.015
	(2.31)	(2.04)	(1.61)	(0.85)
CEO Pay Ratio	1.522***	0.059	0.057	0.065
	(3.36)	(0.98)	(0.94)	(1.13)
CEO Pay Slice	-26.797	-0.646	-0.181	-0.692
	(-1.15)	(-0.32)	(-0.09)	(-0.25)
Constant	-2.918***	0.020	-0.003	-0.087
	(-6.24)	(0.69)	(-0.10)	(-1.43)
Fixed Effects	Year	Year	Year/Industry	Year/Firm
Cluster	Firm	Firm	Firm	Firm
N	11,126	12,001	12,001	12,001
adj. R-sq		0.022	0.027	0.099

Table 3: CEO Overconfidence and Activism (Hedge Fund vs. non-Hedge Fund Activists)
The table presents the results on the relationship between overconfidence of a CEO of a firm and the likelihood of the firm being targeted by an activist. Here we restrict our sample to firms that are targeted by activists (hedge funds or non-hedge funds) at least once. Models 1 and 3 are Probit Models, and Models 2 and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by a hedge fund activist at Year t+1. The main independent variable of interest is an overconfidence dummy. This specification uses a concurrent overconfidence measure (Holder 67): If the CEO has an option that is more than 67% in the money at least twice during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure. Control variables include E-Index, size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides variable definitions. All the linear probability models have industry and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1) Probit	(2) LPM	(3) Probit	(4) LPM
Overconfidence	-0.171	-0.060*	-0.321**	-0.083**
	(-1.53)	(-1.82)	(-2.23)	(-2.05)
E-Index			-0.059	0.028
			(-1.04)	(1.49)
hhi_sic2	0.655	0.629	0.623	0.976*
	(1.09)	(1.48)	(0.85)	(1.71)
hhi_seg	-0.208	0.019	-0.164	0.062
	(-1.05)	(0.33)	(-0.68)	(0.92)
Growth	-0.011	0.075	-0.271	0.050
	(-0.05)	(1.23)	(-0.88)	(0.59)
Market Value	-32.648***	-7.357***	-34.494***	-7.231***
	(-6.10)	(-4.45)	(-4.84)	(-3.66)
Q	-0.078	-0.013	-0.173**	-0.032*
	(-1.46)	(-0.86)	(-2.31)	(-1.68)
Return on Assets (ROA)	0.566	-0.114	1.146	-0.073
	(1.04)	(-0.74)	(1.40)	(-0.33)
Leverage	-0.343	-0.001	-0.525	-0.008
	(-1.29)	(-0.01)	(-1.43)	(-0.08)
R&D	1.321	-0.081	2.422*	-0.081
	(1.47)	(-0.35)	(1.87)	(-0.26)
Dividend Yield	-4.646	-0.177	-5.589	-0.008
	(-1.39)	(-0.18)	(-1.38)	(-0.01)
Institutional Ownership	1.268***	0.402***	1.603***	0.432***

	(3.76)	(4.14)	(3.05)	(3.01)
Illiquidity (Amihud)	-1.172	-0.320	-2.000	-0.485
	(-1.46)	(-1.55)	(-1.39)	(-1.33)
No. Analyst Following	-13.022	-3.131	-10.949	-1.308
	(-1.18)	(-0.99)	(-0.74)	(-0.32)
Stock Return	0.196	-0.028	0.156	-0.069
	(1.60)	(-0.79)	(0.96)	(-1.55)
CEO Gender	0.375	0.180***	0.399	0.170**
	(1.57)	(3.32)	(1.36)	(2.54)
CEO Age	-1.201	-0.082	-1.030	-0.112
	(-1.58)	(-0.38)	(-1.08)	(-0.44)
CEO Tenure	0.225***	0.039**	0.243***	0.051**
	(3.38)	(2.03)	(2.96)	(2.28)
CEO Ownership	-0.187	0.031	-0.161	0.020
	(-1.44)	(0.88)	(-0.97)	(0.48)
CEO Chairman	-0.027	-0.019	-0.073	-0.047
	(-0.24)	(-0.56)	(-0.52)	(-1.24)
CEO Founder	0.267	0.065	0.332	0.045
	(1.27)	(1.30)	(1.25)	(0.75)
CEO Pay Ratio	1.051	0.189***	1.971	0.247***
	(0.30)	(2.86)	(0.31)	(2.96)
CEO Pay Slice	-45.641	-7.824	-62.459	-12.833
	(-0.79)	(-0.70)	(-0.67)	(-0.94)
Constant	3.254***	1.334***	3.400***	1.234***
	(4.75)	(7.23)	(3.56)	(4.74)
Fixed Effects	N	Year/Industry	N	Year/Industry
Cluster	N	Firm	N	Firm
N	1,214	1,214	903	903
adj. R-sq		0.271		0.314

Table 4.A: Event Study Analyses (CAR)

The table reports the Hedge Fund Activism Announcement CARs (Cumulative abnormal returns) for different event windows in days. Panel A presents the announcement CARs for firms with "Overconfident" CEOs; Panel B presents the announcement CARs for firms with "Rational" CEOs. The differences in terms of p-value are shown in the last column.

	Panel A: Firms with "Overconfident" CEOs		Panel B: Firms with "Rational" CEOs		
Windows (Days)	Mean CAR	Standardized Cross-Sectional Test (Z)	Mean CAR	Standardized Cross-Sectional Test (Z)	Diff > 0 (p-value)
(-2, +2)	2.29%	7.056***	3.87%	9.165***	0.0036
(-2, +3)	2.43%	7.092***	3.89%	9.047***	0.008
(-2, +5)	2.59%	7.218***	4.34%	9.337***	0.0033
(-3, +5)	2.91%	7.542***	4.70%	9.546***	0.0049

Table 4.B: Short-Term Activism Announcement Returns

The table presents the results on the relationship between overconfidence of a CEO of a firm (as measured by Holder67) and the cumulative abnormal return (CAR) at the announcement of activism. The dependent variables are the CARs around the time of activism announcement with various windows, using the market model. The main variable of interest is the dummy indicating whether the targeted firm's CEO was classified overconfident or not (overconfident = 1 and Rational = 0). Control variables include size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides the variable definitions. Standard errors are clustered at the firm level, and t statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Hedge Fund Activism Announcement CAR			
	(1)	(2)	(3)	(5)
	(-2, +2)	(-2, +3)	(-2, +5)	(-3, +5)
Overconfidence	-0.018***	-0.016**	-0.017**	-0.015*
	(-2.59)	(-2.17)	(-2.01)	(-1.72)
hhi_sic2	-0.171*	-0.171	-0.208*	-0.209*
	(-1.65)	(-1.52)	(-1.77)	(-1.69)
hhi_seg	0.015	0.008	0.007	0.006
	(1.22)	(0.64)	(0.49)	(0.37)
Growth	0.012	0.011	0.017	0.026
	(0.85)	(0.74)	(0.95)	(1.27)
Market Value	-0.629	-0.851**	-1.145**	-1.264***
	(-1.63)	(-2.06)	(-2.50)	(-2.67)
Q	-0.004	-0.004	-0.005	-0.007
	(-1.03)	(-0.90)	(-1.08)	(-1.46)
Return on Assets (ROA)	-0.047	-0.036	-0.031	-0.026
	(-0.92)	(-0.65)	(-0.52)	(-0.44)
Leverage	0.018	0.013	0.011	0.014
	(0.89)	(0.58)	(0.49)	(0.56)
R&D	-0.027	-0.058	-0.013	-0.004
	(-0.47)	(-0.91)	(-0.17)	(-0.06)
Dividend Yield	-0.258	-0.280	-0.088	0.042
	(-1.03)	(-1.00)	(-0.30)	(0.14)

Institutional Ownership	0.009	-0.003	0.009	0.013
	(0.42)	(-0.11)	(0.35)	(0.48)
Illiquidity (Amihud)	-0.066	-0.097**	-0.075	-0.096*
	(-1.59)	(-2.12)	(-1.54)	(-1.86)
No. Analyst Following	0.961	1.225	1.714**	1.655*
	(1.36)	(1.60)	(2.10)	(1.93)
Stock Return	-0.020**	-0.022**	-0.028***	-0.030***
	(-2.28)	(-2.42)	(-2.78)	(-2.95)
CEO Gender	0.007	0.001	-0.006	0.006
	(0.55)	(0.10)	(-0.34)	(0.27)
CEO Age	0.055	0.038	0.030	0.031
	(1.00)	(0.64)	(0.47)	(0.45)
CEO Tenure	0.005	0.004	0.006	0.004
	(1.04)	(0.73)	(0.97)	(0.59)
CEO Ownership	-0.007	-0.004	-0.013	-0.009
	(-0.66)	(-0.36)	(-1.18)	(-0.80)
CEO Chairman	0.001	0.003	0.001	0.002
	(0.13)	(0.31)	(0.11)	(0.19)
CEO Founder	-0.003	-0.001	-0.006	-0.005
	(-0.23)	(-0.11)	(-0.48)	(-0.34)
CEO Pay Ratio	0.012	0.009	-0.030	-0.027
	(0.81)	(0.57)	(-1.59)	(-1.42)
CEO Pay Slice	-0.952	-0.227	2.266	1.912
	(-0.34)	(-0.07)	(0.69)	(0.57)
Constant	0.002	0.030	0.005	0.007
	(0.03)	(0.56)	(0.09)	(0.11)
Fixed Effects	Year/Industry	Year/Industry	Year/Industry	Year/Industry
Cluster	Firm/Year	Firm/Year	Firm/Year	Firm/Year
N	775	775	775	775
adj. R-sq	0.028	0.019	0.048	0.044

Table 4.C: Event Study Analyses (BHAR)

The table reports the Hedge Fund Activism Announcement BHARs (Buy and Hold Abnormal Returns) for different event windows in months. Panel A presents the announcement BHARs for firms with "Overconfident" CEOs; Panel B presents the announcement BHARs for firms with "Rational" CEOs. The differences in terms of p-value are shown in the last column.

	Panel A: Firms with "Overconfident" CEOs		Panel B: Firms with "Rational" CEOs		
Windows (Months)	Mean BHAR	Standardized Cross-Sectional Test (Z)	Mean BHAR	Standardized Cross-Sectional Test (Z)	Diff > 0 (p-value)
(-2, +2)	5.28%	4.180***	7.86%	6.184***	0.0916
(-1, +1)	4.82%	5.238***	7.26%	6.826***	0.0635
(-1, +2)	5.26%	4.754***	8.02%	6.647***	0.0647
(-1, +4)	5.32%	4.409***	8.36%	5.925***	0.1004

Table 5: Evolution of Benchmark Adjusted Q and ROA around Activist Intervention

The table reports the results from linear regressions where the dependent variables are Q and ROA. Columns (1) and (4) include all hedge fund activism events, columns (2) and (5) only include campaigns where the targeted firm had an overconfident CEO, and columns (3) and (6) only include activism campaigns where a rational CEO led the targeted firm. The control variables include ln (MV), representing the natural logarithm of a firm's market capitalization at the end of a specific year, and ln (Age), signifying the natural logarithm of the duration in years since the firm's initial entry into the consolidated CRSP/Compustat database. The independent variables of interest are the dummy variables, [t + k], where k is in the range of -3 to 5. These variables are assigned a value of one if a firm was targeted by activist hedge funds in the k years before (for $k \geq 0$) or after (for $k < 0$) the intervention year. Standard errors are clustered at the firm level, and t statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	Q and ROA evolution					
	(1)	(2)	(3)	(4)	(5)	(6)
	All HF (Q)	Overconfident (Q)	Rational (Q)	All HF (ROA)	Overconfident (ROA)	Rational (ROA)
	DV: Benchmark Adjusted Q			DV: Benchmark Adjusted ROA		
t - 3	-0.079***	-0.091**	-0.090***	-0.003	-0.004	-0.004
	(-5.05)	(-2.00)	(-2.86)	(-1.26)	(-0.73)	(-0.95)
t - 2	-0.086***	-0.106***	-0.058*	-0.005**	-0.010**	-0.006
	(-5.65)	(-2.58)	(-1.76)	(-2.27)	(-1.97)	(-1.39)
t - 1	-0.119***	-0.227***	-0.117***	-0.007***	-0.019***	-0.010**
	(-8.04)	(-5.85)	(-3.90)	(-3.34)	(-3.97)	(-2.24)
t Event Year	-0.076***	-0.068***	-0.066***	-0.012***	-0.011***	-0.011***
	(-4.89)	(-5.10)	(-4.92)	(-5.31)	(-5.85)	(-5.75)
t + 1	-0.000	-0.152***	-0.007	-0.007***	-0.017***	-0.011**
	(-0.02)	(-3.58)	(-0.18)	(-3.15)	(-3.02)	(-2.32)
t + 2	0.032*	-0.062	-0.009	-0.003	-0.011**	-0.005
	(1.88)	(-1.42)	(-0.21)	(-1.09)	(-1.96)	(-0.94)
t + 3	0.050***	-0.131***	0.070*	-0.002	-0.013**	-0.007
	(2.88)	(-2.91)	(1.74)	(-0.73)	(-2.28)	(-1.51)
t + 4	0.048***	-0.066	0.081**	0.003	-0.014**	0.001
	(2.74)	(-1.36)	(1.98)	(1.32)	(-2.40)	(0.26)
t + 5	0.043**	-0.079	0.085*	0.007**	-0.005	0.007
	(2.31)	(-1.49)	(1.68)	(2.44)	(-0.82)	(1.32)

ln(MV)	0.355***	0.355***	0.356***	0.033***	0.033***	0.033***
	(57.49)	(57.61)	(57.65)	(37.78)	(37.90)	(37.75)
ln(Age)	-0.189***	-0.188***	-0.254***	0.006***	0.006***	0.007***
	(-19.16)	(-19.05)	(-17.79)	(3.16)	(3.14)	(3.09)
Constant	-1.117***	-1.120***	-0.962***	-0.170***	-0.171***	-0.174***
	(-32.07)	(-32.19)	(-24.39)	(-29.31)	(-29.43)	(-26.17)
Fixed Effects	Year/Firm	Year/Firm	Year/Firm	Year/Firm	Year/Firm	Year/Firm
Cluster	Firm	Firm	Firm	Firm	Firm	Firm
N	153,961	153,961	153,961	138,185	138,185	138,185
adj. R-sq	0.572	0.571	0.571	0.651	0.651	0.651

Table 6: Evolution of Benchmark Adjusted Q and ROA around Activist Intervention (Difference-in-differences Analysis with matched sample)

The table reports the results from linear regressions where the dependent variables are Q and ROA. For each activism event, we select untargeted control event by matching propensity score. Columns (1) and (4) include all hedge fund activism events, columns (2) and (5) only include campaigns where the targeted firm had an Overconfident CEO, and columns (3) and (6) only include activism campaigns where a Rational CEO led the targeted firm. The control variables include ln(MV), representing the natural logarithm of a firm's market capitalization at the end of a specific year, and ln(Age), signifying the natural logarithm of the duration in years since the firm's initial entry into the consolidated CRSP/Compustat database. In this table, the focal independent variables in our analysis are the interactions between the treatment indicators d, set to one for firms that are targets, and time dummies [t+k] (where k = -3,-2,…,5). These variables are assigned a value of one if a firm was targeted by activist hedge funds in the k years before (for $k \geq 0$) or after (for $k < 0$) the intervention year. Here, the year t-1 serves as the excluded baseline year in our models. Standard errors are clustered at the firm level, and t statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	Q Evolution			ROA Evolution		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Overconfident	Rational	All	Overconfident	Rational
	DV: Benchmark Adjusted Q			DV: Benchmark Adjusted ROA		
d x (t – 3)	-0.128	0.321	0.029	-0.006	0.005	0.023**
	(-1.29)	(0.79)	(0.28)	(-0.48)	(0.27)	(2.00)
d x (t – 2)	-0.227***	0.043	-0.016	-0.003	0.007	0.021***
	(-2.92)	(0.20)	(-0.19)	(-0.24)	(0.42)	(2.71)
d x Event Year (t)	-0.116*	0.091	0.088	-0.010	-0.007	0.009
	(-1.65)	(0.47)	(1.23)	(-1.17)	(-0.61)	(0.87)
d x (t + 1)	0.020	0.101	0.382***	0.000	-0.006	0.021
	(0.24)	(0.50)	(2.93)	(0.02)	(-0.40)	(1.50)
d x (t + 2)	0.110	0.220	0.429***	0.003	-0.003	0.019
	(1.23)	(1.01)	(3.38)	(0.33)	(-0.19)	(1.42)
d x (t + 3)	0.249**	0.424**	0.555***	0.001	-0.008	0.021
	(1.97)	(1.98)	(3.27)	(0.11)	(-0.39)	(1.48)
d x (t + 4)	0.238*	0.356	0.568***	0.007	0.001	0.025*
	(1.72)	(1.62)	(3.06)	(0.53)	(0.08)	(1.87)

d x (t + 5)	0.336**	0.470*	0.626***	0.012	-0.001	0.036**
	(2.44)	(1.88)	(3.26)	(0.71)	(-0.03)	(2.43)
Ln (MV)	0.820***	1.069***	1.067***	0.053***	0.060***	0.060***
	(8.32)	(5.28)	(5.24)	(7.65)	(6.65)	(6.52)
Ln (Age)	-0.621*	-0.701	-0.567	-0.074**	-0.085***	-0.083***
	(-1.69)	(-1.52)	(-1.30)	(-2.51)	(-2.81)	(-2.73)
t + k Dummies	Y	Y	Y	Y	Y	Y
Constant	-3.532***	-5.122***	-5.323***	0.095*	0.032	0.025
	(-4.96)	(-3.29)	(-3.49)	(1.78)	(0.45)	(0.35)
Fixed Effects	Year/Firm	Year/Firm	Year/Firm	Year/Firm	Year/Firm	Year/Firm
Cluster	Firm	Firm	Firm	Firm	Firm	Firm
N	2,142	1,818	1,827	2,131	1,809	1,816
adj. R-sq	0.698	0.684	0.693	0.735	0.737	0.761

Table 7.A: CEO Regime Change – Overconfident CEOs to Rational CEOs

In this table we see if the likelihood of hedge fund activists' interventions is dependent on the departure of overconfident CEO. The main variable of interest is the dummy indicating whether there was a CEO regime switch from "Overconfident" to "Rational". Control variables include E-Index, size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides variable definitions. Standard errors are clustered at the firm level, and t statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1) Probit	(2) LPM	(3) LPM	(4) LPM
CEO (Overconfident to Rational)	0.206***	0.019***	0.019***	0.023**
	(2.78)	(2.66)	(2.64)	(2.01)
E-Index	0.023	0.002	0.002	0.000
	(0.88)	(0.76)	(0.76)	(0.08)
hhi_sic2	0.176	0.014	0.057	0.165**
	(0.58)	(0.54)	(1.27)	(2.15)
hhi_seg	0.097	0.007	0.005	0.012
	(1.02)	(0.91)	(0.56)	(0.69)
Growth	-0.016	-0.002	0.001	0.014
	(-0.13)	(-0.22)	(0.08)	(1.01)
Market Value	-2.803	-0.393	-0.290	0.221
	(-0.91)	(-1.59)	(-1.14)	(0.32)
Q	-0.105***	-0.004**	-0.006***	-0.008**
	(-2.84)	(-2.25)	(-3.15)	(-2.45)
Return on Assets (ROA)	-0.269	-0.034	-0.048**	-0.070*
	(-0.89)	(-1.49)	(-2.00)	(-1.70)
Leverage	0.099	0.009	0.003	-0.015
	(0.64)	(0.70)	(0.23)	(-0.61)
R&D	0.968**	0.077*	0.078*	0.095
	(2.07)	(1.86)	(1.69)	(0.92)
Dividend Yield	-0.993	-0.126	-0.090	0.224
	(-0.55)	(-0.81)	(-0.54)	(0.84)
Institutional Ownership	0.536***	0.025**	0.020*	0.014
	(3.06)	(2.28)	(1.80)	(0.84)
Illiquidity (Amihud)	1.671***	0.136**	0.126*	0.135
	(3.05)	(2.10)	(1.93)	(1.24)
No. Analyst Following	1.452	0.399	0.138	-0.687
	(0.27)	(0.89)	(0.29)	(-0.77)

Stock Return	-0.401***	-0.031***	-0.030***	-0.024***
	(-4.31)	(-5.39)	(-5.23)	(-3.60)
CEO Gender	0.135	0.015	0.009	-0.006
	(1.26)	(1.44)	(0.87)	(-0.30)
CEO Age	0.613	0.042	0.046	0.130**
	(1.59)	(1.28)	(1.42)	(2.24)
CEO Tenure	0.037	0.002	0.002	0.008**
	(1.12)	(0.80)	(0.81)	(2.18)
CEO Ownership	-0.042	-0.004	-0.003	-0.001
	(-0.63)	(-0.68)	(-0.49)	(-0.14)
CEO Chairman	-0.083	-0.006	-0.006	-0.011
	(-1.51)	(-1.24)	(-1.34)	(-1.43)
CEO Founder	0.235**	0.021**	0.016	0.014
	(2.44)	(2.01)	(1.58)	(0.81)
CEO Pay Ratio	7.703*	0.648*	0.621*	0.677
	(1.82)	(1.74)	(1.67)	(1.40)
CEO Pay Slice	-87.788*	-6.904	-6.244	-6.763
	(-1.69)	(-1.54)	(-1.40)	(-1.10)
Constant	-2.778***	0.025	0.005	-0.087
	(-5.92)	(0.83)	(0.16)	(-1.40)
Fixed Effects	N	Year	Year/Industry	Year/Firm
Cluster	N	Firm	Firm	Firm
N	11,126	12,001	12,001	12,001
adj. R-sq		0.022	0.026	0.099

Table 7.B: CEO Regime Change – Rational CEOs to Overconfident CEOs

The table tests whether the likelihood of a firm to be targeted by hedge fund activists reduces when the CEO regime switch is from a "Rational" to an "Overconfident" CEO. The main variable of interest is the dummy indicating whether there was a CEO regime switch from "Rational" to "Overconfident". Control variables include E-Index, size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides variable definitions. Standard errors are clustered at the firm level, and t statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1) Probit	(2) LPM	(3) LPM	(4) LPM
CEO (Rational to Overconfident)	-0.125	-0.009	-0.011**	-0.024**
	(-1.63)	(-1.64)	(-2.14)	(-2.16)
E-Index	0.025	0.002	0.002	0.000
	(0.97)	(0.86)	(0.88)	(0.12)
hhi_sic2	0.226	0.018	0.061	0.168**
	(0.74)	(0.68)	(1.37)	(2.19)
hhi_seg	0.089	0.006	0.004	0.013
	(0.94)	(0.81)	(0.46)	(0.73)
Growth	-0.033	-0.004	-0.001	0.014
	(-0.26)	(-0.39)	(-0.05)	(1.02)
Market Value	-3.035	-0.424*	-0.299	0.211
	(-0.99)	(-1.71)	(-1.17)	(0.30)
Q	-0.106***	-0.004**	-0.006***	-0.008**
	(-2.87)	(-2.34)	(-3.23)	(-2.44)
Return on Assets (ROA)	-0.232	-0.030	-0.044*	-0.069*
	(-0.77)	(-1.30)	(-1.85)	(-1.67)
Leverage	0.086	0.008	0.003	-0.017
	(0.56)	(0.64)	(0.24)	(-0.67)
R&D	1.046**	0.084**	0.082*	0.099
	(2.25)	(2.04)	(1.78)	(0.96)
Dividend Yield	-1.010	-0.138	-0.098	0.220
	(-0.56)	(-0.88)	(-0.59)	(0.82)
Institutional Ownership	0.558***	0.026**	0.020*	0.015
	(3.22)	(2.29)	(1.75)	(0.88)
Illiquidity (Amihud)	1.687***	0.135**	0.125*	0.133
	(3.10)	(2.10)	(1.92)	(1.22)

No. Analyst Following	2.298	0.489	0.200	-0.662
	(0.43)	(1.10)	(0.42)	(-0.74)
Stock Return	-0.398***	-0.031***	-0.030***	-0.024***
	(-4.31)	(-5.38)	(-5.21)	(-3.57)
CEO Gender	0.141	0.015	0.010	-0.005
	(1.32)	(1.46)	(0.91)	(-0.25)
CEO Age	0.586	0.042	0.045	0.117**
	(1.52)	(1.29)	(1.40)	(2.01)
CEO Tenure	0.011	-0.000	-0.000	0.006
	(0.35)	(-0.02)	(-0.04)	(1.64)
CEO Ownership	-0.041	-0.003	-0.002	-0.001
	(-0.61)	(-0.65)	(-0.42)	(-0.09)
CEO Chairman	-0.084	-0.006	-0.006	-0.012
	(-1.52)	(-1.26)	(-1.34)	(-1.55)
CEO Founder	0.218**	0.020*	0.015	0.013
	(2.28)	(1.87)	(1.43)	(0.75)
CEO Pay Ratio	7.888*	0.667*	0.631*	0.685
	(1.88)	(1.80)	(1.70)	(1.42)
CEO Pay Slice	-89.525*	-7.078	-6.318	-6.904
	(-1.74)	(-1.59)	(-1.42)	(-1.12)
Constant	-2.728***	0.032	0.009	-0.080
	(-5.86)	(1.06)	(0.29)	(-1.31)
Fixed Effects	N	Year	Year/Industry	Year/Firm
Cluster	N	Firm	Firm	Firm
N	11,126	12,001	12,001	12,001
adj. R-sq		0.022	0.026	0.099

Table 7.C: CEO Overconfidence Shocks and the Likelihood of Hedge Fund Activism: Difference-in-Differences Design Using CEO Transitions

This table examines the causal effect of changes in CEO overconfidence on the probability of hedge fund activism using a symmetric difference-in-differences framework based on CEO turnover events. The treatment group comprises firms whose CEO transition involves a shift from an overconfident to a rational CEO, while the control group comprises firms with the opposite transition (rational to overconfident). The key coefficient of interest is the interaction term *Post* × *Treatment*, where *Post* equals one in all years following the turnover ($t \geq 0$) and zero otherwise, and *Treatment* equals one for overconfident-to-rational transitions. Model 1 estimates the difference-in-differences specification using a ±3-year event window around each CEO transition, while Model 2 extends the window to ±5 years. The dependent variable is a dummy equal to one if the firm is targeted by a hedge fund activist in a given year. Control variables include firm-level and CEO characteristics. All regressions include firm and year fixed effects, standard errors are clustered at the firm level, and t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism	
	(1)	(2)
Post-Regime Period (t ≥ 0)	-0.060**	-0.035
	(0.026)	(0.021)
Treatment Group (Overconfident-to-Rational)	-0.057*	-0.030
	(0.033)	(0.029)
Post × Treatment (DiD Estimate)	0.061**	0.052**
	(0.026)	(0.021)
E-Index	0.023**	0.015*
	(0.010)	(0.008)
hhi_sic2	0.380**	0.308**
	(0.173)	(0.128)
hhi_seg	0.028	-0.017
	(0.046)	(0.038)
Growth	0.037	0.049
	(0.042)	(0.031)
Market Value	1.937	0.923
	(2.264)	(1.698)
Q	-0.019*	-0.015*
	(0.011)	(0.008)
Return on Assets (ROA)	-0.091	-0.087
	(0.117)	(0.083)
Leverage	-0.068	-0.056
	(0.066)	(0.044)
R&D	0.248	-0.082
	(0.226)	(0.155)

Dividend Yield	0.323	-0.018
	(0.879)	(0.603)
Institutional Ownership	0.087*	0.072*
	(0.047)	(0.037)
Illiquidity (Amihud)	0.305	0.144
	(0.264)	(0.174)
No. Analyst Following	0.792	0.517
	(2.323)	(1.864)
Stock Return	-0.019	-0.028**
	(0.015)	(0.013)
CEO Gender	-0.036	-0.026
	(0.035)	(0.030)
CEO Age	0.145	0.180*
	(0.126)	(0.103)
CEO Tenure	-0.000	0.006
	(0.007)	(0.006)
CEO Ownership	-0.001	-0.005
	(0.016)	(0.014)
CEO Chairman	-0.003	0.003
	(0.014)	(0.013)
CEO Founder	0.002	-0.037
	(0.043)	(0.034)
CEO Pay Ratio	-1.417	-0.328
	(1.125)	(0.937)
CEO Pay Slice	20.115	10.193
	(13.152)	(10.877)
Constant	-0.359**	-0.227*
	(0.171)	(0.131)
Controls	Y	Y
Fixed Effects	Year/Firm	Year/Firm
Cluster	Firm	Firm
N	2,675	3,619
R-squared	0.234	0.197

Table 7.D: Forced CEO Turnover, Hedge Fund Activism, and CEO Overconfidence
This table examines whether hedge fund activism affects the likelihood of a forced CEO turnover differently for overconfident versus rational CEOs. The dependent variable is an indicator equal to one if the CEO turnover in a given firm-year is classified as forced, and zero otherwise. *Post-event period* equals one if the observation is within five years after a hedge fund activism event and zero otherwise. *Overconfident CEO* equals one if the CEO is classified as overconfident, and zero otherwise. The interaction term *Post × Overconfident CEO* captures whether the effect of activism on forced CEO turnover varies by CEO overconfidence. Control variables include firm size, performance, governance characteristics, ownership structure, CEO demographics, and compensation measures. Models (1)–(3) are estimated using a probit model (column 1) and linear probability models (columns 2 and 3), with standard errors clustered at the firm level. Column 1 includes year and industry fixed effects, column 2 includes year fixed effects, and column 3 includes both year and industry fixed effects. t-statistics are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Forced		
	(1) Probit	(2) LPM	(3) LPM
Post-event period	0.397***	0.047***	0.046***
	(4.64)	(4.85)	(4.72)
Overconfident CEO	-0.321***	-0.010***	-0.012***
	(-4.57)	(-3.77)	(-4.21)
Post × Overconfident CEO	-0.058	-0.034***	-0.033***
	(-0.39)	(-2.83)	(-2.68)
eIndex	0.000	0.000	0.000
	(0.00)	(0.05)	(0.01)
hhi_sic2	1.769*	0.014	0.081**
	(1.83)	(0.86)	(2.17)
hhi_seg	0.174	0.007	0.008
	(1.57)	(1.38)	(1.42)
Growth	-0.152	-0.006	-0.004
	(-1.17)	(-0.92)	(-0.62)
Market Value	-14.358***	-0.900***	-0.859***
	(-3.80)	(-5.15)	(-4.83)
Q	-0.068	0.000	-0.001
	(-1.26)	(0.03)	(-0.76)
Return on Assets (ROA)	-0.826*	-0.041**	-0.048**
	(-1.88)	(-2.13)	(-2.35)
Leverage	0.469***	0.024**	0.030***
	(2.61)	(2.50)	(2.83)
R&D	0.047	0.023	0.008
	(0.07)	(0.91)	(0.28)
Dividend Yield	2.300	0.211	0.228
	(1.26)	(1.61)	(1.63)

Institutional Ownership	0.195	0.005	0.006
	(1.05)	(0.55)	(0.58)
Illiquidity (Amihud)	-0.578	-0.035	-0.035
	(-0.76)	(-1.29)	(-1.25)
No. Analyst Following	20.154***	1.012***	1.047***
	(3.03)	(3.40)	(3.38)
Stock Return	-0.487***	-0.020***	-0.019***
	(-3.53)	(-4.77)	(-4.65)
CEO Gender	0.151	0.011	0.010
	(1.16)	(1.27)	(1.05)
CEO Age	-1.165**	-0.039*	-0.041**
	(-2.18)	(-1.94)	(-2.03)
CEO Tenure	0.142***	0.005***	0.006***
	(3.25)	(2.97)	(3.14)
CEO Ownership	-0.550***	-0.029***	-0.029***
	(-7.11)	(-5.83)	(-5.90)
CEO Chairman	-0.241***	-0.013***	-0.013***
	(-3.49)	(-4.47)	(-4.30)
CEO Founder	-0.674***	-0.021***	-0.022***
	(-3.13)	(-4.92)	(-5.06)
CEO Pay Ratio	21.484***	1.093***	1.081***
	(3.52)	(4.13)	(3.98)
CEO Pay Slice	-279.710***	-14.048***	-14.056***
	(-3.64)	(-4.54)	(-4.44)
Constant	-0.030	0.099***	0.092***
	(-0.06)	(5.06)	(4.49)
Fixed Effects	Year/Industry	Year	Year/Industry
Cluster	Firm	Firm	Firm
N	11,331	12,001	12,001
adj. R-sq		0.034	0.035

Table 8.A: CEO Overconfidence (Net Buyer) and Activism

The table presents the results on the relationship between overconfidence of a CEO of a firm and the likelihood of the firm being targeted by an activist. Model 1 is a Probit Model and Models 2, 3, and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by an activist at Year t+1. The main independent variable of interest is an overconfidence dummy. This specification uses the Net Buyer measure, that identifies CEOs as overconfident if their inside stock purchases within the following three years underperform the CRSP value-weighted size-decile benchmark over six-month holding periods. Control variables include size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments. Appendix B provides variable definitions. All the linear probability models have industry/firm and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1)	(2)	(3)	(4)
	Probit	LPM	LPM	LPM
Net Buyer	-0.141*	-0.007	-0.007	-0.023***
	(-1.92)	(-1.24)	(-1.26)	(-2.79)
hhi_sic2	0.232	0.024	0.018	0.095**
	(0.91)	(1.12)	(0.65)	(2.05)
hhi_seg	0.020	0.001	0.000	0.001
	(1.33)	(0.58)	(0.16)	(0.92)
Market Value	-5.638**	-0.497***	-0.401**	-0.007
	(-2.37)	(-2.87)	(-2.28)	(-0.02)
Growth	-0.038	-0.004	-0.002	0.001
	(-0.45)	(-0.59)	(-0.32)	(0.18)
Q	-0.095***	-0.003***	-0.005***	-0.006***
	(-3.68)	(-2.84)	(-3.84)	(-2.84)
Return on Assets (ROA)	-0.365*	-0.028*	-0.040***	-0.029
	(-1.68)	(-1.94)	(-2.64)	(-1.22)
Stock Return	-0.291***	-0.019***	-0.018***	-0.016***
	(-4.84)	(-5.95)	(-5.68)	(-4.41)
Leverage	0.147	0.011	0.009	-0.000
	(1.25)	(1.17)	(1.01)	(-0.02)
R&D	0.905**	0.066**	0.075**	0.054
	(2.47)	(2.26)	(2.27)	(0.87)
Dividend Yield	-1.498	-0.160	-0.112	0.263
	(-0.99)	(-1.38)	(-0.91)	(1.35)

Institutional Ownership	0.559***	0.032***	0.030***	0.011
	(4.63)	(4.12)	(3.91)	(0.93)
Illiquidity (Amihud)	0.655**	0.054*	0.044	0.004
	(2.12)	(1.77)	(1.47)	(0.09)
No. Analyst Following	0.819	0.226	-0.061	-0.629
	(0.20)	(0.74)	(-0.18)	(-1.20)
Constant	-1.630***	0.054***	0.029*	0.023
	(-8.14)	(3.94)	(1.92)	(0.83)
Fixed Effects	Year	Year	Year/Industry	Year/Firm
Cluster	Firm	Firm	Firm	Firm
N	18,477	20,567	20,567	20,567
adj. R-sq		0.024	0.029	0.076

Table 8.B: CEO Overconfidence (First Alternative Measure of Holder 67) and Activism

The table presents the results on the relationship between overconfidence of a CEO of a firm and the likelihood of the firm being targeted by an activist. Model 1 is a Probit Model and Models 2, 3, and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by an activist at Year t+1. The main independent variable of interest is an overconfidence dummy. This specification uses a concurrent overconfidence measure (Holder 67): If the CEO has an option that is more than 67% in the money at least once during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure. Control variables include E-Index, size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides variable definitions. All the linear probability models have industry/firm and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1)	(2)	(3)	(4)
	Probit	LPM	LPM	LPM
Overconfidence	-0.121**	-0.009**	-0.012**	-0.020**
	(-2.15)	(-1.97)	(-2.38)	(-2.31)
E-Index	0.024	0.002	0.002	0.000
	(0.91)	(0.85)	(0.86)	(0.07)
hhi_sic2	0.223	0.019	0.064	0.168**
	(0.74)	(0.71)	(1.42)	(2.20)
hhi_seg	0.103	0.007	0.005	0.013
	(1.09)	(0.89)	(0.58)	(0.76)
Growth	-0.027	-0.004	0.000	0.014
	(-0.21)	(-0.32)	(0.03)	(1.02)
Market Value	-2.606	-0.408	-0.280	0.278
	(-0.85)	(-1.64)	(-1.09)	(0.40)
Q	-0.106***	-0.004**	-0.006***	-0.008**
	(-2.85)	(-2.22)	(-3.10)	(-2.44)
Return on Assets (ROA)	-0.229	-0.031	-0.046*	-0.072*
	(-0.76)	(-1.36)	(-1.93)	(-1.74)
Leverage	0.096	0.009	0.005	-0.015
	(0.63)	(0.76)	(0.39)	(-0.58)
R&D	0.990**	0.082**	0.079*	0.097
	(2.12)	(1.98)	(1.71)	(0.94)
Dividend Yield	-1.375	-0.168	-0.125	0.216
	(-0.74)	(-1.05)	(-0.75)	(0.81)

Institutional Ownership	0.592***	0.027**	0.021*	0.013
	(3.40)	(2.43)	(1.86)	(0.81)
Illiquidity (Amihud)	1.645***	0.127**	0.116*	0.129
	(3.01)	(1.97)	(1.78)	(1.19)
No. Analyst Following	2.290	0.499	0.210	-0.616
	(0.43)	(1.12)	(0.44)	(-0.70)
Stock Return	-0.405***	-0.031***	-0.030***	-0.024***
	(-4.35)	(-5.35)	(-5.15)	(-3.59)
CEO Gender	0.146	0.016	0.010	-0.005
	(1.36)	(1.49)	(0.95)	(-0.25)
CEO Age	0.640*	0.044	0.046	0.124**
	(1.66)	(1.33)	(1.43)	(2.14)
CEO Tenure	0.026	0.001	0.002	0.008**
	(0.84)	(0.52)	(0.65)	(2.17)
CEO Ownership	-0.042	-0.003	-0.002	-0.001
	(-0.62)	(-0.64)	(-0.41)	(-0.15)
CEO Chairman	-0.079	-0.005	-0.006	-0.012
	(-1.42)	(-1.23)	(-1.33)	(-1.54)
CEO Founder	0.218**	0.021**	0.016	0.015
	(2.25)	(2.00)	(1.58)	(0.87)
CEO Pay Ratio	1.512***	0.058	0.056	0.064
	(3.38)	(0.97)	(0.93)	(1.12)
CEO Pay Slice	-28.165	-0.763	-0.289	-0.627
	(-1.21)	(-0.37)	(-0.14)	(-0.23)
Constant	-2.845***	0.022	0.001	-0.086
	(-6.07)	(0.74)	(0.02)	(-1.42)
Controls	Y	Y	Y	Y
Fixed Effects	Year	Year	Year/Industry	Year/Firm
Cluster	Firm	Firm	Firm	Firm
N	11,126	12,001	12,001	12,001
adj. R-sq		0.022	0.026	0.099

Table 8.C: CEO Overconfidence (Second Alternative Measure of Holder 67) and Activism

The table presents the results on the relationship between overconfidence of a CEO of a firm and the likelihood of the firm being targeted by an activist. Model 1 is a Probit Model and Models 2, 3, and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by an activist at Year t+1. The main independent variable of interest is an overconfidence dummy. This specification uses a concurrent overconfidence measure (Holder 67): If the CEO has an option that is more than 67% in the money more than once during his tenure but did not exercise it, the CEO is marked overconfident starting the first time they are in the money. Control variables include E-Index, size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides variable definitions. All the linear probability models have industry/firm and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1) Probit	(2) LPM	(3) LPM	(4) LPM
Overconfidence	-0.111**	-0.009**	-0.010**	-0.011
	(-2.04)	(-2.02)	(-2.41)	(-1.53)
E-Index	0.022	0.002	0.002	0.000
	(0.85)	(0.80)	(0.80)	(0.07)
hhi_sic2	0.212	0.018	0.064	0.168**
	(0.70)	(0.67)	(1.43)	(2.22)
hhi_seg	0.106	0.007	0.005	0.013
	(1.12)	(0.92)	(0.61)	(0.74)
Growth	-0.023	-0.003	0.001	0.014
	(-0.18)	(-0.28)	(0.09)	(1.04)
Market Value	-2.778	-0.415*	-0.293	0.254
	(-0.90)	(-1.67)	(-1.14)	(0.36)
Q	-0.104***	-0.004**	-0.006***	-0.008**
	(-2.79)	(-2.17)	(-3.03)	(-2.40)
Return on Assets (ROA)	-0.232	-0.032	-0.047*	-0.071*
	(-0.77)	(-1.38)	(-1.96)	(-1.72)
Leverage	0.100	0.010	0.005	-0.014
	(0.65)	(0.78)	(0.38)	(-0.57)
R&D	0.964**	0.080*	0.076*	0.090
	(2.06)	(1.95)	(1.66)	(0.87)
Dividend Yield	-1.426	-0.168	-0.126	0.222
	(-0.77)	(-1.05)	(-0.76)	(0.83)

Institutional Ownership	0.579***	0.027**	0.021*	0.014
	(3.33)	(2.38)	(1.82)	(0.83)
Illiquidity (Amihud)	1.619***	0.126*	0.115*	0.126
	(2.96)	(1.95)	(1.76)	(1.17)
No. Analyst Following	2.530	0.505	0.230	-0.606
	(0.47)	(1.13)	(0.48)	(-0.68)
Stock Return	-0.409***	-0.031***	-0.030***	-0.025***
	(-4.38)	(-5.39)	(-5.20)	(-3.65)
CEO Gender	0.136	0.015	0.009	-0.005
	(1.28)	(1.44)	(0.89)	(-0.27)
CEO Age	0.683*	0.047	0.050	0.129**
	(1.77)	(1.42)	(1.55)	(2.21)
CEO Tenure	0.028	0.002	0.002	0.008**
	(0.88)	(0.59)	(0.70)	(2.04)
CEO Ownership	-0.040	-0.003	-0.002	-0.001
	(-0.59)	(-0.63)	(-0.40)	(-0.12)
CEO Chairman	-0.081	-0.006	-0.006	-0.012
	(-1.46)	(-1.27)	(-1.36)	(-1.53)
CEO Founder	0.222**	0.021**	0.016	0.015
	(2.29)	(2.03)	(1.61)	(0.86)
CEO Pay Ratio	1.504***	0.059	0.057	0.062
	(3.26)	(0.98)	(0.94)	(1.09)
CEO Pay Slice	-28.297	-0.830	-0.391	-0.689
	(-1.21)	(-0.41)	(-0.19)	(-0.25)
Constant	-2.905***	0.019	-0.004	-0.094
	(-6.23)	(0.65)	(-0.14)	(-1.55)
Controls	Y	Y	Y	Y
Fixed Effects	Year	Year	Year/Industry	Year/Firm
Cluster	Firm	Firm	Firm	Firm
N	11,126	12,001	12,001	12,001
adj. R-sq		0.022	0.026	0.099

Table 8.D: CEO Overconfidence (Holder 100) and Activism

The table presents the results on the relationship between overconfidence of a CEO of a firm and the likelihood of the firm being targeted by an activist. Model 1 is a Probit Model and Models 2, 3, and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by an activist at Year t+1. The main independent variable of interest is an overconfidence dummy. This specification uses a concurrent overconfidence measure (Holder100): If the CEO has an option that is more than 100% in the money at least twice during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure. Control variables include size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides the variable definitions. All the linear probability models have industry/firm and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1) Probit	(2) LPM	(3) LPM	(4) LPM
Overconfidence	-0.163***	-0.011**	-0.013***	-0.019**
	(-2.81)	(-2.54)	(-2.97)	(-2.07)
E-Index	0.022	0.002	0.002	0.000
	(0.85)	(0.78)	(0.78)	(0.07)
hhi_sic2	0.210	0.017	0.059	0.166**
	(0.68)	(0.64)	(1.32)	(2.20)
hhi_seg	0.109	0.007	0.005	0.014
	(1.13)	(0.94)	(0.62)	(0.78)
Growth	-0.018	-0.003	0.001	0.015
	(-0.15)	(-0.25)	(0.12)	(1.06)
Market Value	-2.787	-0.412*	-0.292	0.161
	(-0.90)	(-1.65)	(-1.13)	(0.23)
Q	-0.102***	-0.004**	-0.006***	-0.008**
	(-2.73)	(-2.10)	(-2.94)	(-2.33)
Return on Assets (ROA)	-0.232	-0.033	-0.048**	-0.071*
	(-0.76)	(-1.43)	(-2.01)	(-1.71)
Leverage	0.089	0.009	0.004	-0.017
	(0.58)	(0.74)	(0.31)	(-0.66)
R&D	0.973**	0.080*	0.077*	0.090
	(2.07)	(1.94)	(1.67)	(0.87)
Dividend Yield	-1.564	-0.180	-0.139	0.210
	(-0.84)	(-1.13)	(-0.82)	(0.78)

Institutional Ownership	0.580***	0.026**	0.021*	0.014
	(3.32)	(2.38)	(1.82)	(0.83)
Illiquidity (Amihud)	1.613***	0.124*	0.113*	0.127
	(2.93)	(1.92)	(1.73)	(1.17)
No. Analyst Following	2.455	0.490	0.210	-0.648
	(0.46)	(1.10)	(0.44)	(-0.73)
Stock Return	-0.407***	-0.030***	-0.030***	-0.024***
	(-4.38)	(-5.33)	(-5.15)	(-3.57)
CEO Gender	0.131	0.015	0.009	-0.006
	(1.22)	(1.38)	(0.85)	(-0.29)
CEO Age	0.640*	0.043	0.046	0.125**
	(1.66)	(1.32)	(1.43)	(2.14)
CEO Tenure	0.031	0.002	0.002	0.008**
	(0.97)	(0.64)	(0.75)	(2.10)
CEO Ownership	-0.036	-0.003	-0.002	-0.001
	(-0.54)	(-0.59)	(-0.34)	(-0.09)
CEO Chairman	-0.081	-0.006	-0.006	-0.012
	(-1.47)	(-1.31)	(-1.42)	(-1.52)
CEO Founder	0.234**	0.022**	0.017*	0.015
	(2.41)	(2.09)	(1.67)	(0.84)
CEO Pay Ratio	1.533***	0.059	0.057	0.064
	(3.35)	(0.98)	(0.94)	(1.12)
CEO Pay Slice	-27.301	-0.794	-0.334	-0.712
	(-1.17)	(-0.39)	(-0.16)	(-0.26)
Constant	-2.883***	0.022	-0.001	-0.082
	(-6.17)	(0.73)	(-0.02)	(-1.35)
Fixed Effects	N	Year	Year/Industry	Year/Firm
Cluster	N	Firm	Firm	Firm
N	11,126	12,001	12,001	12,001
adj. R-sq		0.022	0.026	0.099

Table 8.E: CEO Overconfidence (Holder 30) and Activism

The table presents the results on the relationship between overconfidence of a CEO of a firm and the likelihood of the firm being targeted by an activist. Model 1 is a Probit Model and Models 2, 3, and 4 are Linear Probability Models. The dependent variable is a dummy indicating whether a firm is targeted by an activist at Year t+1. The main independent variable of interest is an overconfidence dummy. This specification uses a concurrent overconfidence measure (Holder 30): If the CEO has an option that is more than 30% in the money at least twice during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure. Control variables include size (Market Value), Market-to-Book ratio, Return on Assets, Book Leverage, Dividend Yield, Research & Development, Number of Analyst following, Institutional Ownership, Amihud's measure of illiquidity, Stock Return, HHI(SIC) is the Herfindahl-Hirschman index of sales within 2-digit SIC industries; HHI(Seg) is the Herfindahl-Hirschman index of sales in different business segments, CEO gender, CEO age, CEO Tenure, CEO ownership dummy, CEO chairman dummy, CEO Founder dummy, pay ratio and pay slice. Appendix B provides variable definitions. All the linear probability models have industry/firm and year fixed effects and have been clustered at the firm level. t-statistics are reported in parentheses (* p<0.10, ** p<0.05, *** p<0.010).

	DV: Dummy = Hedge Fund Activism			
	(1)	(2)	(3)	(4)
	Probit	LPM	LPM	LPM
Overconfidence	-0.156***	-0.013***	-0.016***	-0.020**
	(-2.72)	(-2.59)	(-3.10)	(-2.15)
E-Index	0.025	0.002	0.002	0.000
	(0.96)	(0.91)	(0.93)	(0.07)
hhi_sic2	0.195	0.016	0.061	0.163**
	(0.64)	(0.63)	(1.35)	(2.14)
hhi_seg	0.101	0.007	0.004	0.013
	(1.06)	(0.86)	(0.55)	(0.77)
Growth	-0.032	-0.004	0.000	0.014
	(-0.26)	(-0.35)	(0.01)	(1.00)
Market Value	-2.106	-0.371	-0.235	0.289
	(-0.68)	(-1.49)	(-0.91)	(0.41)
Q	-0.107***	-0.004**	-0.006***	-0.008**
	(-2.89)	(-2.27)	(-3.17)	(-2.47)
Return on Assets (ROA)	-0.210	-0.030	-0.045*	-0.071*
	(-0.70)	(-1.31)	(-1.90)	(-1.71)
Leverage	0.089	0.009	0.004	-0.014
	(0.58)	(0.70)	(0.32)	(-0.57)
R&D	1.002**	0.082**	0.077*	0.098
	(2.15)	(1.99)	(1.67)	(0.94)
Dividend Yield	-1.520	-0.182	-0.134	0.211
	(-0.83)	(-1.14)	(-0.80)	(0.79)

Institutional Ownership	0.599***	0.027**	0.021*	0.014
	(3.45)	(2.44)	(1.85)	(0.83)
Illiquidity (Amihud)	1.679***	0.129**	0.119*	0.133
	(3.08)	(2.01)	(1.83)	(1.23)
No. Analyst Following	2.013	0.471	0.193	-0.624
	(0.38)	(1.05)	(0.40)	(-0.70)
Stock Return	-0.405***	-0.031***	-0.030***	-0.024***
	(-4.37)	(-5.35)	(-5.15)	(-3.60)
CEO Gender	0.149	0.016	0.010	-0.005
	(1.39)	(1.49)	(0.97)	(-0.23)
CEO Age	0.625	0.042	0.045	0.119**
	(1.63)	(1.29)	(1.37)	(2.03)
CEO Tenure	0.030	0.002	0.002	0.008**
	(0.95)	(0.62)	(0.77)	(2.17)
CEO Ownership	-0.038	-0.003	-0.002	-0.001
	(-0.56)	(-0.64)	(-0.39)	(-0.12)
CEO Chairman	-0.079	-0.005	-0.006	-0.012
	(-1.42)	(-1.21)	(-1.30)	(-1.54)
CEO Founder	0.213**	0.020*	0.016	0.014
	(2.20)	(1.95)	(1.51)	(0.82)
CEO Pay Ratio	1.496***	0.058	0.056	0.064
	(3.40)	(0.97)	(0.93)	(1.13)
CEO Pay Slice	-26.092	-0.612	-0.130	-0.726
	(-1.13)	(-0.30)	(-0.06)	(-0.27)
Constant	-2.880***	0.022	0.001	-0.083
	(-6.20)	(0.74)	(0.03)	(-1.37)
Fixed Effects	N	Year	Year/Industry	Year/Firm
Cluster	N	Firm	Firm	Firm
N	11,126	12,001	12,001	12,001
adj. R-sq		0.022	0.026	0.099

Table 8.F: CEO vs Other Executives Overconfidence and Activism

Table 8.F presents empirical evidence on how the CEO and other executives overconfidence relates to the probability of activist targeting. The dependent variable is a binary indicator that equals one if a firm experiences activist targeting in year t+1 and zero otherwise. The primary explanatory variables of interest are binary measures of overconfidence separately defined for CEOs and other executives, based on the Holder 67 criterion: executives are classified as overconfident if they hold vested options at least 67% in the money on two separate occasions during their tenure, yet refrain from exercising. Model 1 analyzes Hedge Fund activism episodes between 2006 and 2019, whereas Model 2 restricts the sample to events from 2010 to 2019, excluding recessionary impacts from the financial crisis period. Both models incorporate a comprehensive set of firm- and executive-level control variables. Definitions for all variables are detailed in Appendix B. We estimate linear probability models incorporating firm and year-fixed effects, with standard errors clustered at the firm level. Reported t-statistics appear in parentheses with significance levels denoted as follows: (* p<0.10, ** p<0.05, *** p<0.01).

	DV: Dummy = Hedge Fund Activism	
	(1) >2005	(2) >2009
CEO Overconfidence	-0.022**	-0.030***
	(-2.34)	(-2.63)
Other Execs Overconfidence	-0.005**	-0.006***
	(-2.43)	(-2.70)
hhi_sic2	0.222**	0.229*
	(2.24)	(1.87)
hhi_seg	0.001	0.015
	(0.04)	(0.61)
E-Index	-0.002	-0.003
	(-0.36)	(-0.59)
Growth	0.012	0.008
	(0.82)	(0.47)
Market Value	1.700**	2.131**
	(2.00)	(2.25)
Q	-0.014***	-0.016***
	(-3.72)	(-4.07)
Return on Assets (ROA)	-0.040	-0.014
	(-0.87)	(-0.27)
Leverage	-0.051*	-0.047
	(-1.89)	(-1.59)
R&D	0.195	0.290*
	(1.32)	(1.91)
Dividend Yield	0.410	0.271
	(1.50)	(0.90)
Institutional Ownership	-0.011	-0.015
	(-0.72)	(-0.91)
Illiquidity (Amihud)	0.093	0.042
	(0.63)	(0.23)

No. Analyst Following	0.005	0.095
	(0.01)	(0.09)
Stock Return	-0.032***	-0.037***
	(-4.48)	(-4.67)
CEO Gender	0.010	0.007
	(0.60)	(0.37)
CEO Age	0.111	0.147*
	(1.57)	(1.95)
CEO Tenure	0.003*	0.003*
	(1.89)	(1.72)
CEO Ownership	-0.008	-0.011
	(-1.01)	(-1.21)
CEO Chairman	-0.007	-0.002
	(-0.89)	(-0.20)
CEO Founder	0.024	0.016
	(1.17)	(0.71)
CEO Pay Ratio	0.001	0.001
	(1.02)	(1.05)
CEO Pay Slice	0.381	0.047
	(0.15)	(0.02)
Other Executive Gender	-0.004*	-0.005**
	(-1.92)	(-2.36)
Other Executive Age	-0.021*	-0.024*
	(-1.76)	(-1.94)
Other Executive Tenure	0.000	0.001*
	(0.68)	(1.80)
Other Executive Ownership	-0.001	-0.002
	(-0.34)	(-0.91)
Other Executive Chairman	0.002	0.006
	(0.56)	(1.35)
Other Executive Founder	0.008	0.005
	(1.04)	(0.62)
Other Executive Pay Ratio	0.001	0.002
	(0.21)	(0.58)
Other Executive Pay Slice	-0.805	-2.730
	(-0.24)	(-0.75)
Constant	-0.133	-0.157
	(-1.49)	(-1.63)
Fixed Effects	Year/Firm	Year/Firm
Cluster	Firm	Firm
N	42,955	39,042
adj. R-sq	0.219	0.217

Table 8.G: CEO vs CFO Overconfidence and Activism

This table presents empirical evidence on how CEO and CFO overconfidence relates to the probability of activist targeting. The dependent variable is a binary indicator that equals one if a firm experiences activist targeting in year t+1, and zero otherwise. The primary explanatory variables of interest are binary measures of overconfidence separately defined for CEOs and CFOs, based on the Holder 67 criterion: executives are classified as overconfident if they hold vested options at least 67% in-the-money on two separate occasions during their tenure yet refrain from exercising. Model 1 analyzes Hedge Fund activism episodes occurring between 2006 and 2019, whereas Model 2 restricts the sample to events from 2010 to 2019, excluding recessionary impacts from the financial crisis period. Both models incorporate a comprehensive set of firm- and executive-level control variables. Definitions for all variables are detailed in Appendix B. We estimate linear probability models incorporating industry or firm and year fixed effects, with standard errors clustered at the firm level. Reported t-statistics appear in parentheses with significance levels denoted as follows: (* p<0.10, ** p<0.05, *** p<0.01).

	DV: Dummy = Hedge Fund Activism	
	(1) >2005	(2) >2009
CEO Overconfidence	-0.020**	-0.029**
	(-2.08)	(-2.48)
CFO Overconfidence	-0.008	-0.003
	(-0.89)	(-0.36)
hhi_sic2	0.204**	0.212
	(2.00)	(1.59)
hhi_seg	0.009	0.005
	(0.43)	(0.24)
E-Index	-0.001	-0.002
	(-0.24)	(-0.32)
Growth	0.006	0.005
	(0.40)	(0.28)
Market Value	1.808**	1.790*
	(2.01)	(1.79)
Q	-0.013***	-0.014***
	(-3.23)	(-3.43)
Return on Assets (ROA)	-0.022	-0.011
	(-0.45)	(-0.21)
Leverage	-0.046	-0.042
	(-1.53)	(-1.34)
R&D	0.245	0.277*
	(1.62)	(1.67)
Dividend Yield	0.295	0.301
	(1.10)	(0.98)
Institutional Ownership	-0.006	-0.009
	(-0.35)	(-0.53)
Illiquidity (Amihud)	0.220	0.056
	(1.23)	(0.28)
No. Analyst Following	-0.134	-0.263

	(-0.12)	(-0.23)
Stock Return	-0.034***	-0.036***
	(-4.46)	(-4.13)
CEO Gender	0.002	-0.002
	(0.10)	(-0.11)
CEO Age	0.125*	0.138*
	(1.66)	(1.82)
CEO Tenure	0.002	0.003
	(1.38)	(1.48)
CEO Ownership	-0.008	-0.010
	(-0.90)	(-1.03)
CEO Chairman	-0.006	-0.003
	(-0.72)	(-0.32)
CEO Founder	0.012	0.009
	(0.53)	(0.37)
CEO Pay Ratio	0.001	0.001
	(0.94)	(0.95)
CEO Pay Slice	1.087	1.229
	(0.37)	(0.38)
CFO Gender	0.002	-0.000
	(0.15)	(-0.01)
CFO Age	-0.116*	-0.154**
	(-1.75)	(-2.22)
CFO Tenure	0.002	0.003*
	(1.22)	(1.81)
CFO Ownership	0.002	-0.001
	(0.26)	(-0.12)
CFO Chairman	0.017	0.024
	(0.48)	(0.61)
CFO Founder	-0.041*	-0.021
	(-1.77)	(-1.36)
CFO Pay Ratio	0.006	0.012
	(0.62)	(1.02)
CFO Pay Slice	-3.226	-7.752
	(-0.38)	(-0.82)
Constant	-0.226**	-0.064
	(-2.08)	(-0.59)
Fixed Effects	Year/Firm	Year/Firm
Cluster	Firm	Firm
N	10,002	9,140
adj. R-sq	0.119	0.104

Appendix A: Item 2 of 13D Filings

These screenshots show two examples of Item 2 in 13D filings from SEC's EDGAR filing system.

Item 2. Identity and Background

The persons filing this statement are CVR Refining Holdings, LLC ("CVRR Holdings"), Coffeyville Resources LLC ("Coffeyville"), Coffeyville Refining & Marketing, Inc. ("Marketing"), Coffeyville Refining & Marketing Holdings, Inc. ("Marketing Holdings"), CVR Energy, Inc. ("CVI"), IEP Energy LLC ("IEP Energy"), IEP Energy Holding LLC ("Energy Holding"), American Entertainment Properties Corp. ("AEP"), Icahn Building LLC ("Building"), Icahn Enterprises Holdings L.P. ("Icahn Enterprises Holdings"), Icahn Enterprises G.P. Inc. ("Icahn Enterprises GP"), Beckton Corp. ("Beckton"), and Carl C. Icahn, a citizen of the United States of America (collectively, the "Reporting Persons").

The principal business address of each of (i) CVRR Holdings, Coffeyville, Marketing, Marketing Holdings and CVI is 2277 Plaza Drive, Suite 500, Sugar Land, TX 77479, (ii) IEP Energy, Energy Holding, AEP, Building, Icahn Enterprises Holdings, Icahn Enterprises GP and Beckton is White Plains Plaza, 445 Hamilton Avenue - Suite 1210, White Plains, NY 10601, and (iii) Mr. Icahn is c/o Icahn Associates Holding LLC, 767 Fifth Avenue, 47th Floor, New York, NY 10153.

CVI is the sole stockholder of Marketing Holdings, which is the sole stockholder of Marketing, which is the manager of Coffeyville, which is the sole member of CVRR Holdings. IEP Energy holds approximately 82.0% of the outstanding common stock of CVI. Icahn Enterprises Holdings is the sole member of Building, which is the sole stockholder of AEP, which is the sole member of Energy Holding, which is the sole member of IEP Energy. Beckton is the sole stockholder of Icahn Enterprises GP, which is the general partner of Icahn Enterprises Holdings. Carl C. Icahn is the sole stockholder of Beckton. As such, Mr. Icahn is in a position indirectly to determine the investment and voting decisions made by each of the Reporting Persons. In addition, Mr. Icahn is the indirect holder of approximately 93.2% of the outstanding depositary units representing limited partnership interests in Icahn Enterprises L.P. ("Icahn Enterprises"). Icahn Enterprises GP is the general partner of Icahn Enterprises, which is the sole limited partner of Icahn Enterprises Holdings.

CVI is a diversified holding company primarily engaged in the petroleum refining and nitrogen fertilizer manufacturing industries through its holdings in two limited partnerships, the Issuer and CVR Partners, LP. Each of Marketing Holdings, Marketing, Coffeyville and CVRR Holdings is primarily engaged in the business of holding interests in CVI's subsidiaries. IEP Energy is primarily engaged in the business of holding common shares of CVI. Each of Building, AEP and Energy Holding is primarily engaged in holding interests in Icahn Enterprises Holdings' subsidiaries. Icahn Enterprises Holdings is primarily engaged in the business of holding direct or indirect interests in various operating businesses. Icahn Enterprises GP is primarily engaged in the business of serving as the general partner of each of Icahn Enterprises and Icahn Enterprises Holdings. Beckton is primarily engaged in the business of holding the capital stock of Icahn Enterprises GP.

Carl C. Icahn's present principal occupation or employment is serving as (i) Chief Executive Officer of Icahn Capital LP, a wholly owned subsidiary of Icahn Enterprises, through which Mr. Icahn manages various private investment funds, (ii) Chairman of the Board of Icahn Enterprises GP, the general partner of Icahn Enterprises, a Nasdaq listed diversified holding company engaged in a variety of businesses, including investment management, metals, energy, automotive, real estate, railcar, food packaging, gaming, and home fashion, and (iii) Chairman of the Board and a director of Starfire Holding Corporation ("Starfire"), a holding company engaged in the business of investing in and/or holding securities of various entities, and as Chairman of the Board and a director of various of Starfire's subsidiaries. In addition, Mr. Icahn is Chairman of the Board of each of CVI and CVR Refining GP, LLC, the general partner of the Issuer (the "General Partner"), and various employees of Mr. Icahn serve as directors of each of CVI and the General Partner.

The name, citizenship, present principal occupation or employment and business address of each director and executive officer of the Reporting Persons are set forth in Schedule A attached hereto.

None of the Reporting Persons nor any manager or executive officer of the Reporting Persons, has, during the past five years, (a) been convicted in a criminal proceeding (excluding traffic violations or similar misdemeanors), or (b) been a party to a civil proceeding of a judicial or administrative body of competent jurisdiction and as a result of such proceeding was or is subject to a judgment, decree or final order enjoining future violations of, or prohibiting, or mandating activities subject to, Federal or State securities laws or a finding of any violation with respect to such laws.

Source: https://www.sec.gov/edgar/searchedgar/companysearch.html

Item 2. IDENTITY AND BACKGROUND
This statement is filed on behalf of Bulldog Investors,
Brooklyn Capital Mangement, Phillip Goldstein,
60 Heritage Drive Pleasantville, NY 10570 a principal of Bulldog Investors
and Andrew Dakos, Park 80 West,Saddle Brook, NJ 07663, also a principal
of Bulldog Investors. Mr.Goldstein and Mr. Dakos are self-employed
investment advisors.

On October 17, 2007 the Massachusetts Secretary of State issued a permanent
"obey the law" injunction and fined Bulldog Investors, Messrs. Goldstein and
Dakos and certain related parties (the "Respondents") $25,000 for operating
an open website containing information about certain unregistered
investments and sending an e-mail about such investments to a Massachusetts
resident who requested information. On April 5, 2012, the President signed the
JOBS Act which expressly permits such acts. Consequently, on June 29, 2012,
the Respondents submitted a motion to the Secretary to vacate his order.

Source: https://www.sec.gov/edgar/searchedgar/companysearch.html

Appendix B: Variable Definitions

Overconfidence Measures			
1	Holder 67	If the CEO does not exercise the stock options that are 67% or more in the money, *at least twice* during his tenure then the CEO is marked as overconfident throughout his tenure. The 67% option exercise threshold is based on the certainty-equivalence framework of Hall and Murphy (2002). This measure has been used in several empirical papers such as Malmendier and Tate, 2008; Campbell, Gallmeyer, Johnson, Rutherford, and Stanley, 2011, and others. First Alternative Measure of Overconfidence: If the CEO has an option that is more than 67% in the money, *at least once* during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure. Second Alternative Measure of Holder 67: If the CEO has an option that is more than 67% in the money more than once during his tenure but did not exercise it, the CEO is marked overconfident *starting the first time* they are in the money.	Exec Comp
2	Holder 100	If the CEO has an option that is more than 100% in the money at least twice during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure.	Exec Comp
3	Holder 30	If the CEO has an option that is more than 30% in the money at least twice during his tenure but did not exercise it, the CEO is marked overconfident throughout his tenure.	Exec Comp
4	Net Buyer	We labeled a CEO as overconfident in any given year if they made insider purchases within the following three years that underperformed the benchmark on average over their respective six-month periods.	Thomson Reuters Institutional (13f) Holdings -

			Stock Ownership
Hedge Fund Activism Measures			
1	Hedge Fund Activism Data	Time period: 1994-2019 Item 2 (Schedule 13D): Identity of the filer (sample restricted to hedge funds only) Item 4 (Schedule 13D): Provides information on the purpose of transaction. Search in Factiva and Lexis/Nexis for events in which a hedge fund activist did not cross the 5% threshold. Events are classified as hedge fund-initiated events following the methodology in Brav et al. (2008)	EDGAR (Schedule 13Ds/13D/As; Schedule 13Gs)
2	Non-Hedge Fund Activists	Same methodology as above but for non-Hedge Funds. Data is from 1994-2019.	EDGAR (Schedule 13Ds/13D/As; Schedule 13Gs)

Controls			
1	Market Value	Log of Market Capitalization (in millions)	Compustat
2	Tobin's Q	(Total Long-Term Debt + Market Value of Equity) / (Total Long-Term Debt + Book Value of Equity)	Compustat
3	Return on Assets	EBITDA/total assets (lagged)	Compustat
4	Leverage	Debt/ (Debt + Market Value of Equity)	Compustat
5	Dividend Yield	Common Dividend/Market Value of Equity	Compustat
6	Research and Development (R&D)	R&D expenses scaled by lagged assets	Compustat
7	HHI(Sic)	Herfindahl index of sales at the two-digit SIC level	CRSP/Compustat Merged

8	HHI(Seg)	Herfindahl index of business segments within the firm	CRSP/Compustat Merged
7	Analyst Following	Number of analysts covering the firm	I/B/E/S
8	Institutional Ownership	Proportion of shares held by institutions	Thomson Reuters Institutional (13f) Holdings - Stock Ownership
9	Illiquidity	Amihud (2002) illiquidity measure: yearly average (using daily data) of 1000*Sqrt (| Return | / (Dollar Trading Volume))	CRSP
10	Stock Return	Natural log of annualized stock return adjusted by inflation.	CRSP
11	E-Index	Entrenchment Index	Institutional Shareholder Services (ISS)
12	CEO Founder dummy	CEO is founder of the company or not	Exec Comp
13	CEO chairman dummy	Flag = 1 if CEO is also the Chairman	Exec Comp
14	CEO ownership dummy	Flag = 1 if CEO owns more than the median of CEO ownership that given year.	Exec Comp
15	Pay slice	Yearly compensation of CEO /Total compensation of top 5 executives	Exec Comp
16	Pay ratio average	The ratio of CEO pay over the average pay of other executives.	Exec Comp
17	CEO Gender	Flag = 1 if CEO is a female	Exec Comp
18	CEO Age	The age of the CEO	Exec Comp
19	CEO Tenure	The tenure of the CEO	Exec Comp

Appendix C: Covariate Balance for Table 6

	TreatedMean	ControlMean	Diff	Significance
Market Value	7.356	7.229	0.127	0.169
Growth	0.079	0.104	-0.025	0.241
Leverage	0.224	0.233	-0.010	0.448
Dividend Yield	0.009	0.011	-0.002	0.275
R&D	0.050	0.054	-0.004	0.334
Institutional Ownership	0.808	0.814	-0.006	0.593
Illiquidity (Amihud)	0.068	0.069	-0.001	0.826
No. Analyst Following	0.026	0.026	0.000	0.347