Hedge fund activism and internal control weaknesses

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Abstract

Purpose – The aim of the paper is to investigate the associations between hedge fund activism and corporate internal control weaknesses.

Design/methodology/approach – In this paper, the authors identify hedge fund activism events using 13D filings and news search. After matching with internal control related information from Audit Analytics, the authors utilize ordinary least square (OLS) and propensity score matching (PSM) to analyze the data.

Findings – The authors find that after hedge fund activism, target firms report additional internal control weaknesses, and these identified internal control weaknesses are remediated in subsequent years, leading to better financial-reporting quality.

Originality/value – The findings indicate that both managers and activists have incentives to develop a stronger internal control environment after targeting.

Keywords Hedge fund activism, Internal control weakness, Targeting, Intervention

Paper type Research paper

1. Introduction

Over the past two decades, activist hedge funds have become a significant market force that impacts public firms' behavior. A recent report (Schulte Roth & Zabel, 2019) documents that activist investors targeted over 4,600 firms worldwide from 2013 to 2018. In the USA, more than 100 hedge funds frequently engage in activism; and 300 additional hedge funds, which are estimated to have more than $100 bn in assets under their management (Lipton, Lipton, & Katz, 2019), have launched activism campaigns in recent years. The academic literature has shown that activist hedge funds are associated with substantial posttarget changes in target companies that create additional value for investors [1]. In this study, we examine how firms' internal control environments change after being targeted by activist investors, both in the short and long run, and whether such changes lead to better financial-reporting quality.

Internal control over financial reporting consists of the mechanisms, rules and procedures that an organization employs to achieve timely and accurate financial reporting and to comply with applicable laws, regulations and policies. In the setting of hedge fund activism, both aspects of internal control are relevant. First, as investors, hedge fund activists rely on financial statements and other available internal accounting data to obtain information regarding the target firm [2]. This information is valuable both before and after hedge fund activists procure shares of target firms. Timely and accurate financial reporting assists activist investors to choose appropriate targets and to remediate problems in targeted firms after investment. Second, hedge fund activists may resort to lawsuits or proxy contests against managers if negotiations between investors and managers fail to produce desired changes, with one typical accusation being managers' misreporting of relevant financial and operational data [3]. Since passage of the Sarbanes–Oxley (SOX) Act of 2002, chief executive officers (CEOs) are personally liable for the information provided in the financial statements of their firms. Public scrutiny associated with hedge fund activism may act as a trigger that causes managers to increase assessments of misreporting risk. Therefore, after being targeted by activists and facing potential activist litigation, CEOs have incentives to protect themselves by creating and/or maintaining a functional internal control system so that financial reports are prepared in compliance with accounting standards. Another reason why activist hedge funds demand well-functioning internal control systems is to reduce the possibility of restatements and/or fraud and the associated risk to the firm. Restatements, class-action shareholder litigation and Securities and Exchange Commission (SEC) enforcement actions are often associated with significant adverse capital market reactions and reduction of shareholder wealth (Khurana, Li, & Wang, 2017; Richardson, Tuna, & Wu, 2002; Kinney & McDaniel, 1989). Therefore, activist hedge funds have incentives to ensure that target firms' possess well-functioning internal control systems to mitigate these potential adverse outcomes on firm value.

The current literature provides various explanations as to why activist hedge funds potentially increase firm value in the long term beyond the capability of other shareholders. First, activist hedge fund managers have greater monitoring incentives than do dispersed retail investors because their compensation incentives are stronger (Cheng, Huang, Li, & Stanfield, 2012). Activist hedge funds often take large stakes in target firms, making fund managers' compensation directly linked to the operational and market performance of these firms rather than to a diversified portfolio of firms (Clifford, 2008). In contrast, dispersed retail shareholders lack strong incentives to monitor individual firms, since the cost of such monitoring is often greater than its expected pro rata benefits in a diversified portfolio. These incentives make activist hedge funds less subject to free-rider problems than are retail investors. Second, in contrast to other large shareblockholders, activist hedge funds have fewer conflicts of interest because they are unlikely to have nonshareholder business relations with target firms. This independence allows hedge funds to focus on decisions that will increase firm value and ignore other potentially value-reducing incentives arising from related party interactions (Clifford, 2008).

We argue that activist investors have incentives to examine a target firm's internal control environment as part of their intervention activities. Internal control weakness is defined as a material misstatement of a firm's annual or interim financial reports that will not be prevented or detected on a timely basis by the company's internal controls (Costello & Wittenberg-Moerman, 2011). Recent literature shows how internal control over financial reporting affects firm operational efficiency and how the remediation of internal control weaknesses appears to create improvements in operational efficiency (Cheng, Goh, & Kim, 2018). To capture gains related to the remediation of internal control problems, we expect activist hedge funds to ask managers and outside auditors, postintervention, to examine the current internal control environment more closely, to identify any previously overlooked control weaknesses in targeted firms and to help remediate such weaknesses. A stronger internal control environment also often helps activist hedge funds improve monitoring

efficiency to mitigate adverse outcomes associated with financial reporting failures. Therefore, hedge fund activists are likely to demand strong internal control environments from their targeted firms.

The data we employ in our paper are collected from various archives that are publicly available. We use internal control weaknesses reported under Section 404(b) of SOX Act as our measure for the strength of a firm's internal control environment. These data come from Audit Analytics. For hedge fund activism data, we gather all Schedule 13D filings from the SEC's EDGAR (the Electronic Data Gathering, Analysis, and Retrieval system) database from 2003 through 2014 and then identify those filed by activist hedge funds through Internet searches following Brav, Jiang, Frank, & Thomas (2008a, b). We further eliminate those 13D filings related to risk arbitrage, distressed financing and other unusual reasons for hedge funds to target firms [4]. Firm fundamentals are from Compustat. Our final sample consists of 20,060 firm-year observations (including both targeted and nontargeted firms) and 1,030 activism targeting events.

Consistent with our expectations, we document that, on average, firms targeted by activist hedge funds increase their reported internal control weaknesses in the year following activist intervention. This result is robust to different multivariate model specifications and the inclusion of year and industry fixed effects.

After identifying existing firms' internal control weaknesses, we next examine if firms targeted by activist hedge funds remediate these identified weaknesses. Utilizing a dynamic change model, we find that the increase in internal control weaknesses one year after hedge fund activism become insignificant in year two, and targeted firms report significantly fewer internal control weaknesses in year three and year four. The result is robust to an array of different model specifications, including a propensity score matching (PSM) estimation. The timing of the change is also consistent with prior research [5]. Also consistent with expectations, we document that targeted firms experience better financial-reporting quality after being targeted by activist hedge funds. In cross-sectional tests, we further investigate governance mechanisms that may affect an activist hedge fund's ability to change a target firm's internal control environment. In support of our conjecture, we find targeted firms with director changes after the activist campaign report more internal control weaknesses.

Our paper contributes to the literature studying hedge fund activism by examining the understudied area of target firm internal control environments and how activist hedge funds reshape these environments in both the short and the long run. While recent literature in this area focuses on the role of hedge fund activism in influencing operational decisions and corporate governance in target firms (Brav *et al.*, 2008a, b; Klein & Zur, 2009), we find that managers report more internal control weaknesses when firms are targeted by activist hedge funds and then work to remediate them. Our work complements the findings of Guo, Lin, Masli, & Wilkins (2021) that also show increases in adverse internal control opinions after a firm is targeted by activist shareholders. Guo *et al.* (2021) argue that auditor reputational concerns impel these increases after activist shareholder interventions, while we posit that pressures from activist shareholders on firm managers also drive these disclosure choices. As described above, the prior literature has focused on managers and auditors as the major forces shaping a corporation's internal control environment. By showing how activist campaigns lead to additionally identified internal control weaknesses and how they are remediated in subsequent years, we argue that external monitoring is an important factor in governing a corporation's internal control environment [6]. Using identified internal control weaknesses as our measure, we provide evidence that hedge fund activism leads to better financial-reporting quality by first identifying previously overlooked internal control weaknesses and subsequently remediating them.

Our paper also helps explain how activists internally and operationally change target firms. The prior literature has argued that hedge fund activists create both short- and long-

term value for target firms, and these arguments are supported by increased profitability for posttarget firms using accounting-based measures. How this is achieved internally, however, is unclear. One exception is the study by Brav, Jiang and Kim (2015), who find that the removal of stagnating working hours and wages by selling inefficient plants contributes to increases in real productivity. By examining internal control weaknesses, we provide evidence that besides deploying physical assets and motivating employees, activist hedge funds cause positive outcomes by changing the internal rules, policies and procedures that affect a firm's internal and external informational environment on a day-to-day basis.

The rest of the paper is organized as follows: Section 2 discusses hypothesis development; Section 3 presents sample selection, data and descriptive statistics; Section 4 provides empirical tests of our hypotheses; and Section 5 concludes the paper.

2. Hypothesis development

Brav *et al.* (2008a, b) study how activist hedge funds impact future firm performance across a variety of dimensions. They find that hedge fund activists identify undervalued firms with potential for future operational improvements. Thus, in choosing targets, activist hedge funds often find currently problematic firms that also exhibit underlying fundamentals consistent with the potential to generate future profits. After investment, these funds provide guidance to target firm management about how to overcome identified difficulties to improve future profitability.

Activist hedge funds may exert impact on targeted firms in the following ways. When activist hedge funds target a firm, they often provide additional information and expertise that inside managers and audit firms may not possess. Activists themselves usually have years of experience in their specific industry, and when they initiate activist activities (i.e. "the attack"), they usually come prepared [7]. Typically, activist hedge funds will prepare a "white book," where the target firm's current deficiencies and possible remedies are listed, providing information that can be initially transmitted to the firm's managers through private communications. Later, if the activists obtain board seats, the information in the book can be used as a "road map" for changes. Thus, the information and expertise provided by activist investors, together with public scrutiny and the potential litigation risk that comes with activist campaigns, often force managers of target firms to change numerous aspects their operational and corporate structure. Activist hedge funds also have the motivation to improve financial reporting quality of targeted firms. After targeting a firm, activist hedge funds rely on timely and accurate financial information to monitor the progress of their investments and to communicate this progress to potential buyers in the marketplace. In most cases, after purchasing a stake in a target firm, activist hedge funds will first actively negotiate with current management to obtain a more detailed understanding of the target firm and to convey their demands for change (Gantchev, 2013). During this negotiation and throughout the partnership, both activist and target have incentives to access timely and accurate information. Thus, both parties benefit from strong and healthy internal controls over financial reporting to ensure that the financial information communicated to current and potential investors is of high quality.

Internal controls over financial reporting are essentially the mechanisms, rules and procedures that an organization employs to achieve timely and accurate financial reporting and to comply with laws, regulations and policies. Identification and remediation of internal control weaknesses improve a firm's information environment and provide positive externalities for the firm. Recent literature has shown how internal controls over financial reporting affect firms' operational efficiency and the remediation of internal control weaknesses are associated with improvements in operational efficiency (Cheng *et al.*, 2018). Enhanced financial information generally helps investors to better monitor firms more

effectively (Diamond & Verrecchia, 1991; Beasley, 1996). The internal control environment reflects an important aspect of financial statement quality because internal control weaknesses are more likely to result in unintentional errors in the financial-reporting process, which makes monitoring more difficult. Effective internal controls help to curtail both procedural and estimation errors, as well as intentional earnings management (Donelson, Ege, & McInnis, 2016; Doyle, Ge & Mcvay 2007; Ashbaugh-Skaife, Collins, Kinney, & LaFond, 2008). These preventive measures also decrease potential litigation risk for both firms and their auditors. Thus, effective remediation of weaknesses in internal controls provides many positive benefits for firms and their shareholders.

Because of the importance of a well-functioning internal control system, activists may monitor and examine the effectiveness of a target firm's internal controls more closely. The associated scrutiny may cause managers to increase assessment of internal control weaknesses. We expect that, as a result of such close investigations, firms are likely to find issues in the control system that need to be addressed. Once these issues are identified, firm management is required by SOX provisions to report these deficiencies as internal control weaknesses. This logic leads to our first hypothesis as follows:

H1. Firms targeted by activist hedge funds report more internal control weaknesses in the year after being targeted than do nontargeted firms.

Activist hedge funds often work with target firms to improve operational and financial performance. Brav et al. (2008a, b) find that activist hedge funds propose remedies for observed issues in the target firm and successfully assist them to overcome them in about two-thirds of such interventions. If activist hedge funds assess and find additional internal control weaknesses in target firms after investment (Hypothesis 1), these hedge funds should work with target firms to remediate internal control weaknesses and strengthen the internal control environment. A strong internal control environment leads to better reporting quality, higher operational efficiency and lower litigation risk, thereby providing many benefits to the firm, its investors (including activist hedge funds) and its auditors. For example, Dhaliwal, Hogan, Trezevant and Wilkins (2011) and Ashbaugh-Skaife et al. (2008) find that adverse internal control opinions can lead to higher costs of debt and of equity. Remediating such problems should lower these financing costs. Li, Sun and Ettredge (2010) find that Chief Financial Officers (CFOs) have higher turnover in firms with internal control weaknesses. Moreover, identified internal control weakness may be used as evidence in lawsuits against incumbent managers. We therefore expect that managers of targeted firms will remediate identified internal control weakness and reduce the possibility of such weaknesses in the future, either in response to activists' demand for changes or in self-protection. Both activist hedge funds and target firm executives have incentives to create and maintain a strong internal control system to prevent future adverse outcomes by remediating identified internal control weaknesses. These arguments lead to our second hypothesis as follows:

H2. After an initial increase in internal control weaknesses identified immediately after an activist intervention, targeted firms will remediate and subsequently have fewer future internal control weaknesses.

3. Sample selection, data and descriptive statistics
We gather archival data from various sources. We collect internal control weakness disclosures, auditor information and director/officer data from Audit Analytics. We also use Compustat to obtain firms' accounting information. Only publicly traded firms that could be targets of activist hedge funds are included in the sample.

To collect data related to hedge fund activism, we follow the selection process outlined in Brav et al. (2008a, b). First, we gather all Schedule 13D filings from the SEC's EDGAR

database. We then exclude 13D filings that were refiled by banks, brokerage companies, regular corporations, foreign institutions, individuals, insurance companies, pension funds and trusts based on information in Item 2 of Schedule 13D. We then perform Internet searches to further refine our list of activist hedge funds. We further eliminate the Schedule 13D filings completed by activist hedge funds that are related to risk arbitrage, distress financing and various other factors as outlined in Brav *et al.* (2008a, b). The remaining 13D filings constitute the activism events in our sample, where activists acquire more than five percent of outstanding shares as required by 13D filings. From these sources, we create an indicator variable (labeled *Hedge Fund Intervention*) equal to one if the firm was initially targeted by an activist hedge fund in year *t*, and zero otherwise.

We also create various empirical proxies to capture the reporting of internal control weaknesses as required under SOX 404 (b). We collect data from Audit Analytics for these variables. *ICW* is an indicator variable that equals one if a firm reports at least one internal control weakness during a given year, and zero otherwise. If data for reported internal control weaknesses is missing in Audit Analytics, we assume no internal control weaknesses were reported for the related firm year. We also calculate the changes in the number of reported internal control weaknesses over various time intervals (variables labeled *Change ICW,* with appropriate time subscripts).

Our final sample consists of 20,060 firm-year observations coming from 3,464 unique firms spanning the years 2003 to 2014 where all variables are not missing in our baseline model (Table 3). We exclude firms in the financial and utility industries. We also winsorize all variables at the 1 and 99% levels to mitigate the effect of outliers. Definitions for all variables used in this study are included in Appendix 1.

Table 1 presents sample descriptive statistics, including the mean, median, first quartile, third quartile for the main variables of interest in our study. In our sample, 6.4% of firm years have at least one internal control weakness disclosed, while 2.3% of sample firm years represent a year where the firm was targeted by an activist hedge fund. Summary statistics indicate that our variables are within expected ranges and consistent with prior studies examining internal control environments such as Rice and Weber (2012).

Table 2 tabulates the Pearson pair-wise correlation table for the main variables in our study. We do not observe any pairs that exhibit a particularly high correlation, indicating that our control variables are well balanced.

4. Empirical tests of hypotheses

4.1 Changes in internal control weaknesses after hedge fund activism

Hypotheses 1 and 2 conjecture that the discovery, reporting and remediation of internal control weaknesses will vary in predictable ways after hedge fund activism intervention. Specifically, Hypothesis 1 indicates that immediately after an intervention, firms experiencing campaign by an activist investor should report additional internal control weaknesses as the activist hedge fund investigates and pressures the targeted firm. Hypothesis 2 suggests that targeted firms should report fewer internal control weaknesses (after the initial increase) as the activist hedge fund works with firm management to remediate internal control problems. We first examine if these expected patterns exist in the raw data collected during our sample period. To do this, we track the average number of reported internal control weaknesses for targeted firms around the targeting event and compare against a set of propensity-scored matched firms [8] not subject to hedge fund activist interventions over the same time period. Graphical results are documented in Figure 1.

As seen in Figure 1, the average number of internal control weaknesses follows the pattern predicted in hypotheses 1 and 2 for firms targeted by activist hedge funds. In the year

Variable	N	Mean	P25	P50	P75
ICW	20,060	0.064	0.000	0.000	0.000
Hedge fund intervention	20,060	0.023	0.000	0.000	0.000
Size	20,060	6.408	5.092	6.396	7.705
Prior loss	20,060	0.316	0.000	0.000	1.000
ROA	20,060	−0.002	−0.029	0.053	0.110
Leverage	20,060	0.458	0.004	0.141	0.434
Sales growth	20,060	0.116	−0.032	0.066	0.181
PPE	20,060	1.063	1.033	1.069	1.099
Return	20,060	0.141	−0.238	0.038	0.331
Big4	20,060	0.643	0.000	1.000	1.000
Auditor change	20,060	0.052	0.000	0.000	0.000
Firm age	20,060	22.106	11.000	17.000	29.000
KZ index	20,060	−10.188	−7.797	−1.860	0.598

Table 1.
Descriptive statistics

Note(s): This table reports the descriptive statistics of our sample. Our sample consists of 20,060 firm-year observations in total. All variables are defined in Appendix 1. The sample period is from 2002 to 2014

immediately following the intervention by the activist hedge fund (i.e. year zero or the target year), we see a large increase in reported internal control weaknesses by targeted firms. The average reported internal control weaknesses then decrease in years two and three and then appear to level out in year four. Interestingly, the reported average level of internal control weaknesses falls to the same average level as nontargeted control firms by year three. Visually, these patterns appear to support both hypotheses 1 and 2.

To test hypothesis one more rigorously, we estimate the following linear regression model using a sample of both targeted firms and control firms from the Compustat universe:

$$
\begin{aligned}
\text{ICW}_{i,t+1} = {} & \alpha_0 + \beta_1 \text{Hedge Fund Intervention}_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{Prior Loss}_{i,t} \\
& + \beta_4 \text{ROA}_{i,t} + \beta_5 \text{Leverage}_{i,t} + \beta_6 \text{Sales Growth}_{i,t} + \beta_7 \text{PPE}_{i,t} \\
& + \beta_8 \text{Return}_{i,t} + \beta_9 \text{Big 4}_{i,t} + \beta_{10} \text{Auditor Change}_{i,t} + \beta_{11} \text{Firm Age}_{i,t} \\
& + \beta_{12} \text{KZ Index}_{i,t} + \text{Industry Dummy} + \text{Year Dummy} + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

where $\text{ICW}_{i,t+1}$ is the reported firm internal control weaknesses in year $t+1$ while year t is the current year. Hedge Fund Intervention$_{i,t}$ is an indicator that equals one if the firm was targeted by a hedge fund activist in the measurement year, and zero otherwise. We include a variety of control variables from prior literature (see Rice & Weber, 2012), including firm size (Size), an indicator for having a loss in the prior year (Prior Loss), accounting pre-tax return on assets (ROA), firm leverage (Leverage), year-to-year sales growth percentage (Sales Growth), capital assets (PPE), stock market return profitability (Return), an indicator is the firm has a "Big Four" auditor (Big 4), an indicator if the firm changes auditors (Auditor Change), firm age (Firm Age) and the level of financial constrain (KZ Index). Descriptions of these variables can be found in Appendix 1. We also include industry-fixed effects, year-fixed effects and adjust for Huber–White standard errors.

In the model, *Size* could have a positive coefficient because large firms have superior resources to test internal controls and therefore have higher likelihoods of detecting internal control weaknesses. On the other hand, larger firms may also have complex organizational and operational environments which can increase the difficulty of detecting internal control weakness. Therefore, the effect of size on internal control weakness is undetermined. Firms with poor financial health may lack necessary resources to effectively test or create effective internal control environments. However, firms in poor financial health may have added

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. ICW	1.00																
2. Hedge fund intervention	0.03	1.00															
3. Size	−0.11	−0.02	1.00														
4. Prior loss	0.09	0.06	−0.36	1.00													
5. ROA	−0.08	−0.03	0.41	−0.67	1.00												
6. Leverage	0.06	0.05	0.15	0.20	−0.10	1.00											
7. Sales growth	0.01	−0.02	−0.03	−0.04	0.01	−0.04	1.00										
8. PPE	−0.09	−0.01	0.88	−0.35	0.42	0.20	−0.04	1.00									
9. Return	−0.02	−0.03	−0.03	−0.06	0.06	−0.11	0.04	−0.05	1.00								
10. Big4	−0.13	−0.02	0.52	−0.22	0.20	−0.01	0.01	0.44	0.01	1.00							
11. Auditor change	0.08	0.01	−0.10	0.06	−0.05	0.03	0.01	−0.08	0.02	−0.14	1.00						
12. Firm age	−0.05	−0.01	0.35	−0.20	0.19	−0.01	−0.11	0.32	−0.02	0.14	−0.04	1.00					
13. KZ index	0.02	0.02	0.16	0.01	−0.04	0.14	−0.09	0.38	−0.06	0.05	−0.01	0.06	1.00				

Note(s): This table presents the Pearson correlations between the variables in the sample. Variable definitions can be found in Appendix 1

Table 2.
Pearson correlation
statistics

|	(1) ICW_{t+1}	(2) ICW_{t+1}
Hedge fund intervention	0.472*** (2.821)	0.530*** (3.108)
Size	−0.157*** (−4.227)	−0.208*** (−4.978)
Prior loss	0.139* (1.764)	0.155* (1.863)
ROA	−0.234*** (−3.220)	−0.246*** (−3.368)
Leverage	0.188*** (7.954)	0.235*** (9.203)
Sales growth	0.116* (1.891)	0.111* (1.647)
PPE	0.818 (0.567)	1.613 (0.924)
Return	−0.084* (−1.822)	−0.104* (−1.848)
Big4	−0.671*** (−9.102)	−0.679*** (−8.835)
Auditor change	0.758*** (7.758)	0.726*** (7.233)
Firm age	−0.007*** (−2.598)	−0.009*** (−3.292)
KZ index	0.003** (2.287)	0.003** (2.142)
Constant	−2.435* (−1.802)	−3.096* (−1.810)
Adjusted R^2	0.064	0.095
Industry-fixed effects	No	Yes
Year-fixed effects	No	Yes
Observations	20,060	20,060

Note(s): This table reports the effect of hedge fund activism on the reported internal control weaknesses in the year subsequent to the activism event. The dependent variable is the reported firm internal control weaknesses in the next year. The regressions are clustered by White standard errors. Column (2) includes industry-fixed effects (using Fama and French 48 industry classifications) and year-fixed effects. Variable definitions can be found in Appendix 1. The superscripts ***, ** and * indicate the statistical significance at the 1, 5 and 10% levels, respectively

Table 3.
Hedge fund activism and changes in reported internal control weaknesses

incentives to disclose internal control weaknesses to preemptively mitigate litigation. Auditors also play a key role in reporting internal control weakness due to their attestation responsibilities under SOX 404 (b). We include proxies for "Big 4" auditors under the assumption these firms have more resources to perform higher quality audits of internal controls. We also control for recent auditor changes with the assumption that newly appointed auditors may be more diligent in testing for internal control problems. Additional controls such as leverage, sales growth, capital assets, firm age and firm profitability measures are also included to control for cross-sectional differences in firms' fundamentals.

The results of our estimation of equation (1) are reported in Table 3. The reported regression coefficient estimate on Hedge Fund Intervention is positive and significant at one percent level, indicating that firms report additional internal control weaknesses one year after being targeted by activists, which is consistent with our expectation in hypothesis one. Thus, firm years in which the firm is targeted by hedge fund activists appear to have greater increases in reported internal control weaknesses shortly after the target year than nontargeted firm years [9] An alternative explanation for our findings in Table 3 is that instead of discovering and reporting additional ICW, activist hedge funds might target firms with existing internal control weaknesses and our results capture the coincidental, concurrent reporting of ICW with activist interventions. However in untabulated results, we find no significant correlation between existing ICW and activist hedge funds' targeting behavior, suggesting activist hedge funds are uncovering previously unknown internal control weaknesses after intervention.

Next, we examine the relative impact of hedge fund activism on reported changes in internal control weaknesses in the long term. In Hypothesis 1, we conjecture that reported internal control weaknesses will decrease after the initial increase. We hypothesize this
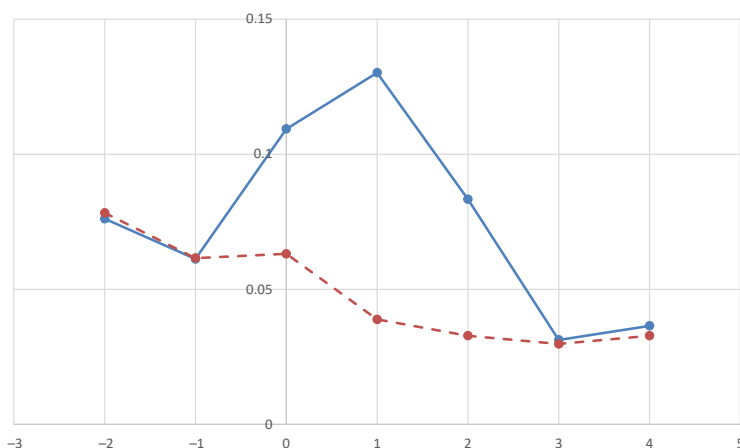
Note(s): *The blue line is for targeted firms and the red line is for matched control firms*. This figure shows the average number of internal control weaknesses reported by target firms in the years surrounding the activism event. The examining window is from two years prior the targeting event to four years subsequent to the event. On the X axis, "0" represents the year when a firm is initially targeted by a hedge fund activist. The Y axis represents the average number of reported internal control weaknesses. Control firms are identified using a match sample based on a propensity-scoring matching model (See section 4.2 for more details)

decrease in reported internal control weaknesses occurs because firms and activists work together to remediate previously identified control weaknesses. To empirically test this idea and better understand the process of identifying and remedying internal control weaknesses, we utilize a dynamic change model that focuses on the yearly effect of hedge fund activism. Specifically, for all targeted firms, we exam a window from two year before the targeting event to four years after. We choose the number of internal of internal control weaknesses that is two years before the target year as the default group and examine changes from this baseline in the following model:

$$\text{Internal Control Weakness}_{i,t+1} = a_0 + \beta_1 \text{Before1}_{i,t} + \beta_2 \text{Current} + \beta_3 \text{After1}_{i,t} + \beta_4 \text{After2}_{i,t}$$
$$+ \beta_5 \text{After3}_{i,t} + \beta_6 \text{After4}_{i,t} + \beta_7 \text{Size}_{i,t} + \beta_8 \text{Loss}_{i,t}$$
$$+ \beta_9 \text{ROA}_{i,t} + \beta_{10} \text{Leverage}_{i,t} + \beta_{11} \text{Sales Growth}_{i,t}$$
$$+ \beta_{12} \text{PPE}_{i,t} + \beta_{13} \text{Return}_{i,t} + \beta_{14} \text{Big 4}_{i,t}$$
$$+ \beta_{15} \text{Auditor Change}_{i,t} + \beta_{16} \text{Firm Age}_{i,t} + \beta_{17} \text{KZ index}_{i,t}$$
$$+ \text{Industry Dummy} + \varepsilon_{i,t}$$

$$(2)$$

where Before1 is an indicator that equals one for years that are one year before the hedge fund activism event. Current is an indicator that equals one for year that is the hedge fund target

year. After1, After2, After3 and After4 are indicators that each equal one for years that are one, two, three or four years after the hedge fund activism event year, respectively. In this model, the comparative yearly effects can be identified with their corresponding coefficients. For example, β_4 indicates the difference in reported internal control weaknesses between observations that are two years after activism and the average of reported weaknesses in the omitted baseline group (i.e. two year before the event). If no preexisting trend in internal control weakness exists, we expect β_1 to be insignificant. If internal control weaknesses are more likely to be identified after the activist intervention, we expect β_2/β_3 to be positivity significant. If these identified internal control weaknesses are remediated in the subsequent years, we expect β_5 and β_6 to be negatively significant. Such negative coefficients indicate that, compared to the number of reported internal control weakness in the baseline year, reduced numbers of internal control weaknesses are reported three and four years after the targeting event. We also include industry fixed effects to account for unobservable industry-invariant heterogeneity.

The results of the dynamic change model are reported in Table 4. We find β_1 to be indifferent from zero statistically, suggesting there is no preexisting trend in reported internal control weaknesses before activists' targeting. β_2 is positive and significantly different from zero – consistent with our prior results that new internal control weaknesses are identified

	(1) ICW_{t+1}	(2) ICW_{t+1}
Before1	0.127 (0.501)	0.182 (0.695)
Current	0.439** (1.970)	0.474** (2.021)
After1	0.336 (1.503)	0.385 (1.628)
After2	−0.157 (−0.609)	−0.087 (−0.323)
After3	−0.568* (−1.799)	−0.595* (−1.784)
After4	−0.727** (−1.965)	−0.651* (−1.718)
Size	−0.130 (−1.165)	−0.100 (−0.797)
Prior loss	0.350* (1.849)	0.375* (1.898)
ROA	−0.426 (−0.862)	−0.633 (−1.162)
Leverage	1.065*** (3.310)	1.124*** (3.265)
Sales growth	0.209 (1.315)	0.217 (1.296)
PPE	−0.010 (−0.125)	−0.014 (−0.146)
Return	−0.055 (−1.134)	−0.050 (−1.039)
Big4	−0.526*** (−2.993)	−0.531*** (−2.717)
Auditor change	1.100*** (4.633)	1.119*** (4.493)
Firm age	0.009 (1.429)	0.004 (0.568)
KZ index	−0.000 (−0.155)	−0.002 (−0.701)
Adjusted R^2	0.084	0.114
Constant	−0.358 (−0.292)	−1.865 (−1.228)
Industry-fixed effects	No	Yes
Observations	2,240	2,240

Note(s): This table reports the dynamic changes of reported internal control weaknesses around an activism event. Columns (1) and (2) use a window from two years prior to the event until four years after with Year$_{t-2}$ being the benchmark year. Before1 is an indicator that equals one for years that are one year before the hedge fund activism event. Current is an indicator that equals one for year that is the hedge fund target year. After1, After2, After3 and After4 are indicators that each equal one for years that are one, two, three or four years after the hedge fund activism event year, respectively. In all regressions, the dependent variable is ICW$_{t+1}$. All data are winsorized at the one and 99% level. Column (2) includes industry-fixed effects (using Fama and French 48 industry classifications). Only firms that were targeted are included in the analysis. Variable definitions can be found in Appendix 1. The superscripts ***, ** and * indicate the statistical significance at the 1, 5 and 10% levels, respectively

Table 4.
Dynamic change model examining the effect of hedge fund activism on reported internal control weaknesses

and reported soon after activists' targeting. Most importantly, when comparing to the same baseline group, β_4 is not significantly different from zero, suggesting the internal control weaknesses identified in the previous year are remediated. Further, β_5 and β_6 are negative and statistically significant, suggesting that comparing to the years before activism, there are even less reported internal control weaknesses, reflecting activists' long-lasting impact on the firm. These findings provide evidence supporting Hypothesis 3.

4.2 Difference-in-difference and propensity scoring matching test design

To better address potential endogeneity concerns and to provide better identification, we employ a PSM-based difference-in-difference empirical test following (Brav, Jiang, Ma, & Tian, 2018). We first use a PSM mechanism to create a comparable control group. To do so, we view hedge fund activism as a "program." We classify firms that face hedge fund activism as the treatment group and those that do not as the control group. By matching treatment firms with control firms via estimated propensity scores in the year before hedge fund activism, we eliminate various observable differences between treatment firms and control firms. We then compare mean differences in pre to post change in internal control weaknesses between treatment firms and control firms, allowing our matching program to rule out alternative explanations stemming from potentially correlated firm characteristic. After PSM, we are able to more directly estimate the effect of hedge fund activism on firms' internal control weakness.

Following prior literature (Brav *et al.*, 2008a, b, 2018; Klein & Zur, 2009), we utilize an array of variables that are found to be determinants of activist hedge funds' targeting behavior to predict the probability of a firm being targeted. The determinants include *ROA, Leverage, Size, Tobin Q, Sales Growth, Payout Yield, R&D, Institution, Analyst Following, Segment HHI* and *Tangibility Ratio*. Probit regression is used, and we tabulate the results of this estimation procedure in Panel A of Table 5.

After generating coefficient estimates in the Probit model, we then use the estimated propensity score to match a targeted firm with three other nontargeted but otherwise similar firms. We next verify our matching procedures were successful that treated firms and control firms are indeed similar. The results are reported in Panel B of Table 5. As shown, all variables are statistically indifferent except for size and tangibility ratio, which are significantly different at a significance level of 10%.

In Panel C of Table 5, we report our results for estimated differences in changes in internal control weaknesses between targeted and control Firms. Specifically, we find that firms targeted by activist hedge funds have significantly greater increases in reported internal control weakness from year $t-1$ to year to $t+1$ (consistent with hypothesis one) and that targeted firms have significantly greater reductions in reported internal control weaknesses from year $t+1$ to year $t+4$ (consistent with hypothesis two).

4.3 Changes in financial reporting after activist intervention

Prior literature suggests that improved internal control environments provide firms with numerous predicable benefits. For example, Doyle *et al.* (2007) find that better internal control environments lead to better financial reporting quality. Also, internal control weaknesses are found to be positively associated with future litigation risk and the remediation of reported internal control weakness can reduce such risks (Hee, 2013). Firms identified with internal control weaknesses have also been found to experience inferior performance and valuation (Li, Yu, Zhang, & Zheng, 2016; Lai, Li, Lin, & Wu, 2017). In this section, we examine if target firms experience long-term improvements to financial reporting quality, reduced litigation risk and firm performance after mitigating internal control weaknesses.

Specifically, we examine if these effects are centralized in targeted firms that also have a change in reported internal control weaknesses after the activist event. To do this, we interact

Panel A: Probit regression to match hedge fund activism firms with control firms

	(1) Probit (hedge fund intervention)
ROA $_{t-1}$	−0.328 (−1.565)
Leverage $_{t-1}$	−0.222 (−1.172)
Size $_{t-1}$	−0.100*** (−2.644)
Tobin Q_{t-1}	−0.055* (−1.682)
Sales growth $_{t-1}$	−0.000 (−0.011)
Payout yield $_{t-1}$	−0.020 (−0.018)
R&D $_{t-1}$	−0.264 (−0.710)
Institution $_{t-1}$	0.697*** (4.319)
Analyst following $_{t-1}$	−0.006 (−0.691)
Segment HHI $_{t-1}$	−0.014 (−0.050)
Tangibility ratio $_{t-1}$	0.200** (2.037)
Constant	−1.790*** (−8.037)
Adjusted R^2	0.033
Industry- and year-fixed effects	Yes
Observations	20,060

Note(s): This panel reports the results of a probit regression used to estimate the propensity that a firm will be targeted by an activist hedge fund. The model and control variables are comparable to those used by Brav *et al.* (2008a, b), where various covariants explaining the propensity of hedge fund activist interventions are determined. We use these results to match targeted firms to non-targeted firms by utilizing an estimated PSM procedure

Panel B: Differences in firm fundamentals between treatment and control firms

Variable	Treatment	Control	Difference	T value
ROA $_{t-1}$	−0.002	0.018	−0.020	−0.870
Leverage $_{t-1}$	0.167	0.168	−0.002	−0.060
Size $_{t+1}$	5.988	6.316	−0.329	−1.740*
Tobin Q_{t-1}	1.629	1.786	−0.157	−1.120
Sales growth $_{t-1}$	0.240	0.068	0.172	1.030
Payout yield $_{t-1}$	0.012	0.007	0.005	1.540
R&D $_{t-1}$	0.064	0.067	−0.003	−0.240
Institution $_{t-1}$	0.713	0.745	−0.032	−1.020
Analyst following $_{t-1}$	6.276	7.158	−0.882	−1.180
Segment HHI $_{t-1}$	0.337	0.379	−0.042	−1.630
Tangibility ratio $_{t-1}$	0.514	0.434	0.080	1.790*

Note(s): Panel B tabulates the differences in characteristics between firms that are targeted by hedge fund activists (treatment firms) and nontargeted firms (control firms) that are matched using propensity scores based on the Probit model in Panel A. For each treatment firm year, we find three matched control firms

Panel C: Differences in changes in internal control weaknesses between targeted and control firms

Variable	Treatment	Control	Difference	T value
Change ICW $_{t-1,t+1}$	0.034	−0.045	0.079	2.280**
Change ICW $_{t+1,t+4}$	−0.054	0.011	−0.065	−3.050***

Note(s): Panel C tabulates the differences in reported internal control weaknesses between firms that are targeted by hedge fund activists (treatment firms) and nontargeted firms (control firms) that are matched using propensity scores based on the Probit model in Panel A. For each treatment firm year, we find three matched control firms. The variables under comparison are the change in internal control weaknesses from $t-1$ to $t+1$ and change from $t+1$ to $t+4$, where t is the year of the activism event

Table 5.
PSM and difference-in-difference estimation

the pre–post event change in reported internal control weaknesses (Change $ICW_{t-1,t+1}$) with the time indicators in a model similar to equation (2). We use performance-adjusted discretionary accruals (Kacc) from Kothari, Leone, & Wasley (2005) and the propensity of having a restatement after hedge intervention as proxies of financial reporting quality. We also use Litigation Risk, which equals to one if the firm is sued for accounting related litigation in the year, and changes in accounting returns (ROA) to examine how firms' litigation risk and financial performance change after being targeted.

The results are reported in Table 6. In Columns 1 and 2, we find that firms that have activist hedge fund interventions and a concurrent increase in reported control weaknesses experience a decrease in discretionary accruals and an increased propensity to restate accounting information in the years surrounding the intervention event. This suggests that if activist hedge fund interventions cause changes in internal controls, these changes also often lead to other changes in financial reporting. We do not find the changes in ROA or litigation risk to be centralized in firms that had changes in control weaknesses (see Columns 3 and 4). This lack of results suggests that the increased reporting of internal control weaknesses may not directly affect firm risk and operating performance.

In sum, consistent with prior literature, firms experience better financial reporting quality, after mitigating identified internal control weaknesses at the behest of activist hedge funds.

4.4 Director turnover and hedge fund activism

We next examine if activist hedge funds that instigate director turnover have differential effects on firms' ICW. Directors are representatives of shareholders and play a crucial role in monitoring the firm's management. When activists target a firm, they usually request to elect one or more of their representatives to the board of directors. This election is achieved either

	(1) $Kacc_{t+1}$	(2) $Restate_{t+1}$	(3) Litigation risk$_{t+1}$	(4) ROA_{t+1}
Before1	−0.001 (−0.066)	−0.015 (−0.613)	0.030 (0.966)	−0.004 (−0.415)
Current&After1	0.011 (0.728)	0.001 (0.058)	0.000 (0.014)	0.015** (2.236)
After2	0.014 (0.831)	0.022 (1.022)	0.001 (0.040)	0.018** (2.318)
After3	0.027 (1.419)	−0.020 (−0.846)	−0.032 (−1.054)	0.026*** (3.142)
After4	0.009 (0.435)	−0.027 (−1.076)	−0.023 (−0.698)	0.012 (1.316)
Before1* change $ICW_{t-1,t+1}$	−0.015 (−0.501)	0.052 (1.404)	−0.031 (−0.652)	−0.001 (−0.086)
Current&After1* change $ICW_{t-1,t+1}$	−0.039* (−1.818)	−0.061** (−2.290)	0.046 (1.347)	−0.013 (−1.344)
After2* change $ICW_{t-1,t+1}$	0.011 (0.149)	−0.031 (−0.374)	−0.121 (−1.134)	−0.030 (−1.040)
After3* change $ICW_{t-1,t+1}$	−0.029 (−0.434)	−0.041 (−0.471)	−0.018 (−0.155)	−0.034 (−1.103)
After4* change $ICW_{t-1,t+1}$	−0.028 (−0.498)	0.048 (0.667)	0.099 (1.061)	0.004 (0.162)
1/Asset	1.846*** (3.517)			
ΔRev-ΔAR	−0.029 (−1.293)			
Constant	0.263 (0.909)	−0.154 (−0.443)	1.699*** (3.764)	−0.381*** (−3.079)
Adjusted R^2	0.033	0.004	0.088	0.496
Industry-fixed effects	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes
Observations	1,030	1,030	1,030	1,030

Note(s): This table reports the dynamic changes of Kacc, Restate, Litigation risk and ROA around an intervention event by an activist hedge fund using the window period from two years prior to the event until four years after. Year$_{t-2}$ is benchmark year for this regression test. We interact a variable capturing the changes in reported ICW from the year prior to intervention to the year after the year intervention (Change $ICW_{t-1,t+1}$). Industry-fixed effects (using Fama and French 48 industry classifications) are included in the regressions. Variable definitions can be found in Appendix 1. The superscripts ***, ** and * indicate the statistical significance at the 1, 5 and 10% levels, respectively

Table 6.
The incremental effects of increased ICW reporting

through friendly negotiation or via proxy contest. We argue that when there is director turnover following an activist campaign, activists are more likely to exert their voice and expertise in changing the internal control environment of target firms, resulting in newly identified internal control weaknesses compared to cases where activists are not able to change the board.

Empirically, we divide the full sample into two subgroups: a subgroup with director turnover and a subgroup without. We expect firms with director turnover to have more identified internal control weaknesses in the year after the activist campaign. Our results are tabulated in Table 7. As shown in Column 1, we find that activist hedge funds' intervention is positively and statistically significantly related with firms' internal control weaknesses when firms have director turnover. Meanwhile, the relationship is not statistically significant when firms do not have director turnover as shown in Column 2. The chi-square test indicates that the two coefficients are statistically different.

5. Conclusion

In this paper, we explore the association between hedge fund activism and internal control weaknesses. We find that after hedge fund activism, target firms report additional internal control weakness next year. We further document that these identified internal control weaknesses are remediated in subsequent years after the intervention event. These findings are consistent with inferences that both managers and activists have incentives to develop stronger internal control environments after the targeting event. Not surprisingly, we find improved internal control environments lead to better financial reporting quality in the long run.

	(1) ICW$_{t+1}$ Director turnover $= 1$	(2) ICW$_{t+1}$ Director turnover $= 0$
Hedge fund intervention	0.475*** (3.246)	0.148 (1.014)
Size	−0.137** (−2.101)	−0.153 (−1.270)
Prior loss	0.336*** (3.137)	−0.314* (−1.677)
ROA	−0.075 (−0.412)	−0.439* (−1.939)
Leverage	0.139*** (4.079)	0.287*** (3.425)
Sales growth	0.163** (2.368)	−0.131 (−0.549)
PPE	−0.078 (−1.471)	−0.115 (−0.064)
Return	−0.136** (−1.998)	−0.133 (−1.015)
Big4	−0.433*** (−4.424)	−0.958*** (−4.127)
Auditor change	0.530*** (3.408)	−0.215 (−0.613)
Firm age	−0.053 (−1.441)	−0.219*** (−3.125)
KZ index	0.002 (1.078)	0.006* (1.901)
Constant	−1.186** (−2.164)	1.228 (1.239)
Industry-fixed effects	Yes	Yes
Year-fixed effects	Yes	Yes
Observations	13,273	5,247

Table 7.
Effect of director turnover on the relationship between hedge fund activism and internal control weaknesses

Note(s): This table analyzes if firms that had director changes experience stronger relationships between hedge fund activism and internal control weaknesses by using logit model. Firms that experienced director changes in the next year are reported in Column (1). Firms that experienced no director changes in the next year are reported in Column (2). All data is Winsorized at the one percent and ninety-nine percent level. Included are industry-fixed effects (using Fama and French 48 industry classifications) and year-fixed effects in the regressions. Variable definitions can be found in Appendix 1. The superscripts ***, ** and * indicate the statistical significance at the 1, 5 and 10% levels, respectively

Our paper contributes to both the hedge fund activism and the internal control literature. First, the effect of hedge fund activism on a firms' internal control environments is largely ignored in prior work [10]. Our study contributes to the literature by filling this gap. More importantly, our findings help to explain how activists change target firms internally, leading to better financial reporting. Second, this paper sheds light on an alternative means to improve firm's internal control environments. Prior literature has mostly focused on the role that auditors and management play in improving a firms' internal control environments. Our paper shows that external monitoring is another important way to remediate internal control weakness. In particular, we document that hedge fund activist intervention can improve a firm's internal control environment.

Notes

1. Brav *et al.* (2008a, b) and Klein and Zur (2009) find positive, short-term stock market reactions for target firms following the announcement of an activism campaign. Bebchuk, Brav & Jiang (2015) find the positive market effect persists for up to five years, on average. Further, Brav *et al.* (2015) find the target firm's real production efficiency increases after activist intervention.

2. Anecdotally, activist hedge funds often extensively inspect the books and records of their (potential) targets incorporated in Delaware pursuant to Section 220 of the General Corporation Law of the State of Delaware (https://www.jdsupra.com/legalnews/responding-to-books-and-records-demands-32780/).

3. For example, Highland Select Equity Fund, L.P. filed an action in the Court against Motient on April 12, 2006 over concerns related to material weaknesses in financial controls, disclosure inadequacies and other misrepresentations. Also, on May 6th, 2015, Newcastle Partners released a public letter to Vesta Insurance Group, nominating of three directors while citing the poor internal control that resulted in failure to file quarterly reports as one of the underlying reasons.

4. For more detailed information, please refer to Brav *et al.* (2008a, b).

5. For example, Brav *et al.* (2015) find target firms improve their production efficiency three years after the intervention. We argue that real changes such as the internal control environment take time and that, although the mean holding period for activist hedge funds is around one year, they have long-lasting influence on target firms through replacing key personnel and introducing new internal policies and procedures.

6. This report by Ernst and Young shows how audit committees respond to increased pressure from external investors. Available at https://www.ey.com/Publication/vwLUAssets/The_audit_committee_response_to_investor_activism/$FILE/The_audit_committee_response_to_investor_activism.pdf

7. For example, Nelson Peltz's first job was as a truck driver delivering frozen food. Over the next 25 years, he and his brother shifted their family business to institutional frozen foods and eventually took it public in 1972. Subsequently, he became an activist hedge-fund manager targeting multiple companies in the food industry, including Heinz, Kraft Foods and Wendy's. He was appointed to firms' boards of directors on multiple occasions and shared his years of experience from that position. Commenting about Mr. Peltz (and others), Irene Rosenfeld, the CEO of Mondelēz International, said "These guys are smart; they have interesting ideas and I think it's really productive to engage with them."

8. See section 4.2 for more details.

9. We also examine the changes in reported internal control weaknesses from the target year to one year after the target ($t-1$ to $t+1$). The inferences remain unchanged.

10. In a contemporary work, Guo *et al.* (2021) find auditors are more likely to issue adverse internal control opinions (ICOs) following activist hedge fund's intervention. In contrast to our hypotheses, they posit the increased reporting of internal control weaknesses is due auditor reputational concerns because of increases scrutiny after a hedge fund intervention.

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Appendix 1
Variable definitions (Compustat items in parentheses)

Main variables of interest

Hedge fund intervention	Indicator equals one if the firm experiences hedge fund activism in year t, zero otherwise
ICW	Indicator equals one if firms report at least one internal control weakness under section 404 in year t, zero otherwise

Control variables

Analyst following	Number of analysts covering the firm and the data are obtained from I/B/E/S
Auditor change	Indicator equals one if the firm experienced an auditor change within the previous two-year window (as measured in audit analytics), zero otherwise
Audit committee	Indicator equals one if the firm experienced an auditor committee in year t, zero otherwise
Big4	Indicator equals one if a SOX 404 opinion is provided by a "big Four" audit firm, as listed in audit analytics (i.e. Deloitte, Ernst and Young, KPMG or PricewaterhouseCoopers), zero otherwise
Firm age	The difference between year t and the first year a firm appears in the compustat database
Segment HHI	Herfindahl–Hirschman index of sales in business segments, as reported by compustat
Institution	The percentage of ownership held by institutional investors using the most recent 13F filing data. Assume 0 for any period when the company is listed on an exchange, but 13F filling does not have data
KZ index	Measure of financial constrain at the end the of year using the model in Kaplan and Zingales (1997)
Leverage	Sum of long-term debt (DLTT) and current liabilities (DLC) scaled by total market value of common equity at the end of the year (CSHO $\times$ PRCC_F)
Payout yield	Calculated as the sum of dividends (DVC) and preferred dividends (DVP) divided by net income before extraordinary items
Prior loss	Indicator equals one if the firm reports a negative income before extraordinary items (IB), zero otherwise
PPE	Natural log of property, plant, and equipment (PPENT)
Return	Stock-market returns from the previous year
ROA	Pretax income (PI) divided by lagged assets (AT_{t-1})
R&D	Research and development expense (XRD) scaled by lagged assets (AT_{t-1})
Sales growth	Current year's sales (SALE) minus prior year's sales divided by prior year's sales
Size	Natural log of total assets (AT)
Tangibility ratio	Tangibility ratio defined as property plant and equipment (PPEGT) divided by lagged assets (AT_{t-1})
1/Asset	1/Asset equals to one divided by total assets (AT)
ΔRev-ΔAR	ΔRev is change in revenue (REVT) between t and $t-1$. ΔAR is change in receivables (RECCH) between t and $t-1$

Additional variables used in subsequent tests

Litigation risk	Indicator equals one if the firm is sued for accounting-related litigation in the current year, as listed in audit analytics, zero otherwise
Kacc	The performance-adjusted discretionary accruals using the methodology in Kothari *et al.* (2005). Specifically, the residuals from cross-sectional regressions estimated by year and industry (two-digit SIC code) from the following regression model: *Total accruals* $= \beta_0 * 1/Assets_{t-1} + \beta_1(\Delta Rev - \Delta AR) + \beta_2 PPE + \beta_3 ROA + \varepsilon$. Total accrual is calculated using the cash-flow method (IBC-OANCF + XIDOC). ΔRev is change in revenue. ΔAR is change in receivables between t and $t-1$. PPE is property, plant and equipment. ROA is income before extraordinary items. All variables are scaled by total assets measured at the beginning of the year (AT). We include industries with at least ten firm observations in each industry-year
Restate	Indicator equals one if firms announce a restatement during the current fiscal year, as listed in audit analytics, zero otherwise