Emerging Aspects of Shareholder Activism

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Abstract

This thesis consists of one comprehensive literature review and two empirical essays on shareholder activism. The literature review on shareholder activism provides a brief discussion on shareholder activism's evolution, highlighting the potential of retail investors' participation in tipping the balance between the activist and the firm. Furthermore, it provides evidence on the activist institutional investors, including the traditional institutional investors such as pension funds and mutual funds, and hedge funds as the latest emerging activists. The literature review identifies some potential for research areas in light of the growing interest in shareholder activism.

This thesis further includes two empirical studies on retail investors and activist hedge funds, respectively. The first essay examines retail investors' attention and participation during shareholder activism with the proliferation of internet from 1990s. This study finds a significant increase in retail investors' attention before the annual general meetings, leading to a subsequent increase in retail investors' participation in the voting process, especially among proposals that resonate with retail investors' preferences. This increase is more pronounced for less transparent firms than transparent firms. Empirical evidence also suggests that retail investors' attention has a more pronounced increase for proposals with a more controversial tone. Overall, this study provides new insights into information technology's role in mitigating retail investors' apathy issues.

The second essay focuses on hedge fund activism, and it is the first study to document the impact of hedge fund activism on firm risk-taking behaviors. This study provides evidence that firms targeted by activist hedge funds, which tend to maximize short-term profits, experience a significant reduction in risk-taking in the long-term. This reduction in risk-taking is more pronounced for myopic and opaque firms. This study also provides new evidence on the impact of target's response on activism outcomes. Management's hostile resistance would offset the initial effect of activism on target firms. Overall, this study provides important implications that activist hedge funds

might not fulfil the role of monitoring as suggested in existing corporate governance literature. The results provide new insights to academics and regulators by adding to the debate on the costs and benefits of activism for the economy.

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Dedication

To the women who shaped me

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Chapter One: Introduction

This chapter provides an introduction and overview of this dissertation. Section 1.1 provides a background of shareholder activism. Section 1.2 discusses some problems during the history of shareholder activism, which motivates this research. This chapter identifies the aim and objectives of this research (Section 1.3) and provides key contributions (Section 1.4). Section 1.5 presents some research outputs from this thesis. This chapter concludes by providing a framework for the remainder of the dissertation, including a concise summary of the essays included in the thesis (Section 1.6).

1.1 Background

In corporate finance, the separation of ownership and management leads to agency problems, especially in large public firms. Effective monitoring would reduce agency problems. Nevertheless, as posed by Alchian and Demsetz posed in 1972, "who will monitor the monitor"? In general, the board of directors oversees the management and is responsible for monitoring the firms. If the board of directors does not perform their monitoring duties, shareholders are left with three options: selling their shares, holding their shares passively, or becoming an activist and voicing their dissatisfaction. These three activities are identified as exit, loyalty, and voice (Hirschman, 1970).

Activist shareholders choose the third option to voice their dissent and challenge management's actions (Bates & Hennessy, 2010). In response to dissatisfaction with corporate managers' actions regarding firm performance, risk management, and governance, activist shareholders generally submit a proposal for voting during annual general meetings. This serves as a cheaper alternative to a hostile takeover. Over the years, shareholder activism has received incremental attention and has become a dynamic corporate governance mechanism.

Shareholder activism in the form of shareholder proposals could be traced back to when the Securities and Exchange Commission (SEC) adopted Rule 14a-8 in 1942.

Between the years 1943 and 1970s, shareholder activism was almost exclusively denominated by retail investors. Large institutional investors started to lead the activism in the 1980s, with public pension funds and labor unions as the most active institutional investors. In recent years, institutional ownership accounts for around 70% of U.S. equities outstanding. Over the last two decades, hedge funds have emerged as the latest type of institutional activists and have since become a distinct and prominent player in corporate governance (Denes, Karpoff, & McWillians, 2017). In general, shareholder proposals and shareholder participation are a useful and relevant means of countering managerial agency problems (Bebchuk, 2005).

In the meanwhile, the information environment plays a vital role in an efficient capital market. The informational mismatch between managers and outsiders is a primary cause of agency problems (Jensen & Meckling, 1976). More corporate disclosure improves firm-level transparency (Healy & Palepu, 2001). Importantly, shareholder activism results in reducing informational mismatch, making additional information available to outside investors (Prevost, Wongchoti, & Marshall, 2016). This is consistent with the role of shareholder activism as an incremental tool for corporate governance.

The evolution of shareholder activism and its role in corporate governance has made shareholder activism one of the key academic focuses. It is well acknowledged that the main motivation for activists' participation during activism is to improve the information flow and enhance firm value. Prior studies show that the market reacts positively to the announcement of shareholder activism in the short term, while the long-term effects are relatively less studied with mixed empirical results.

1.2 The problems and motivation of this research

Shareholder proposals have been subject to intense academic debates in recent years. On one hand, prior empirical literature documents that shareholder proposals have a nontrivial impact on corporate governance, enhancing monitoring, and improving

information flow. On the other hand, there is no clear evidence of how shareholder activism affects firms' operating performance, stock performance, and risk-taking behavior in the long-term. This is particularly relevant with the expanded scope for shareholder activism during the past decade. The advancement of information technology over the past decades, which has facilitated information flow and the process of shareholder activism. Moreover, different types of activists also have various activism demands that differentiate the driving forces and shareholder activism effectiveness. Specifically, this study focuses on the following research gaps.

Firstly, in contrast to institutional investors, who are always actively involved in corporate governance, prior studies report an absence of retail investors from corporate democracy during shareholder activism. This is associated with the costs and benefits for retail investors to make informed decisions. Specifically, activist investors incur all the costs associated with such activism, while activism benefits are shared amongst all shareholders. Holding only small fractions of a firm's equity, retail investors are traditionally considered rationally apathetic towards corporate governance. However, the past decade has witnessed a crucial role of retail investors' participation in deciding the outcomes of activist campaigns. Meanwhile, the advancement in information technology has facilitated retail investors during shareholder activism, reducing their time and cost of being informed.

The above motivates Essay One of this dissertation. The essay argues that it is worth revisiting the retail investors' apathy issues in the wake of the digital age. This setting is particularly relevant for the investigation of retail investors' behaviors during shareholder activism. Most importantly, retail investors are more dependent on public sources to make an informed decision. As a result, the advent of the internet, especially Google search, is expected to benefit retail investors disproportionately.

Secondly, emerging as a prominent activist in monitoring management, hedge fund activism is relatively less studied in academic literature. Prior studies document a significant improvement in target firm value with the announcement of hedge fund

activism, while there is no agreement on the long-term effects of such activism on firm values. More importantly, this is associated with increasing concerns about whether hedge fund activism creates or destructs shareholder wealth in the long-term. This situation might be further exacerbated when little is known about how hedge fund activism affects firm risk-taking behaviors. Although there is growing literature that examines hedge fund activism, prior literature mainly focuses on activists' role and their impact on target firms' performance. Only a few existing studies consider target firms' response to hedge fund activism, such as Brav, Jiang, and Kim (2015) and Boyson and Pichler (2019).

Essay two of the dissertation is motivated by the research gap related to the changes of firm risk-taking behaviors post hedge fund interventions, especially with the interaction with firm-level characteristics of myopic management and information transparency. This research motivation is associated with the concerns that hedge funds are potentially engaged in short-termism.

1.3 Aim and objectives of this research

This research aims to explore the emerging aspects of shareholder activism in the digital age, with the advancement of information technology that facilitates information flow. Essay One and Essay Two focus on retail investors and hedge funds as activist shareholders, respectively.

Essay One examines how information technology and corporate transparency affect retail investors' attention and subsequent participation during shareholder activism. The first essay uses the Google Search Volume Index (GSVI) to explore the dynamics of retail investors' attention and participation preceding annual general meetings. The study examines explicitly whether the sentiment (tone) of the proxy materials (namely shareholder proposals), the level of information transparency, and retail investors' preferences affect retail investors' attention and participation during activism. This study also examines the influence of E-proxy reform on retail investors' participation.

Essay Two examines the relation between hedge fund activism and firm risk-taking behaviors up to five years following interventions. This essay examines explicitly whether management myopia and firm-level transparency make a difference in firms' post-intervention risk-taking behaviors. Additionally, the study aims to investigate how management's resistance to activism affects firm risk-taking behaviors post interventions.

1.4 Contributions of this research

This thesis contributes to the existing literature in several ways. Firstly, it provides new insights into the role of internet in mitigating retail investors' apathy problems. The first essay highlights the use of GSVI as a proxy for retail investors' attention, which captures the demand for information around shareholder activism. The advancement of information technology enables retail investors to collect relevant information and make informed decisions during shareholder activism. Specifically, this study shows that the negative tone in proxy materials draws greater attention from retail investors.

Secondly, Essay One adds to the literature on the "voice" aspect of corporate governance in response to dissatisfaction with the management. In contrast to the traditional view of retail investors being rationally apathetic, the first essay provides new evidence that retail investors can and do engage in shareholder activism through the voting process, especially when it resonates with their interests and preferences.

Thirdly, Essay One is the first paper to document how firm-level information transparency impacts retail investors' attention and subsequent participation during shareholder activism. Less information transparent firms attract significantly higher attention from retail investors, further leading to substantially higher participation in the voting process.

Fourthly, Essay Two is the first study to explore the link between activist hedge funds and firm risk-taking. Empirical findings provide direct evidence that target firms

experience a significant reduction in risk-taking relative to their matched peers following hedge fund activism. This provides evidence that activist hedge funds tend to engage in short-termism, so that target firms become more conservative in the long-term. The reduction in risk-taking is more pronounced for myopic managed firms or opaque firms.

Furthermore, Essay Two adds to the literature that examines the impact of target firms' responses on activism outcomes. It provides new evidence that management's hostile resistance to activism would offset the initial effect of hedge fund activism, leading to a less pronounced reduction in firm risk-taking. Overall, the essay serves as a piece of negative evidence on hedge fund activism by highlighting its short-termism nature.

1.5 Research outputs from the thesis

Essay One:

Hafeez, B., Kabir, M.H., & Wongchoti, U. Are retail investors really passive? Shareholder activism in the digital age.

- Accepted for presentation at the conference Financial Management Association (FMA) Annual, New York, U.S., October 2020 (Virtual Conference)
- Accepted for presentation at the 11th conference on Financial Markets and Corporate Governance, La Trobe University, April 2020 (Conference canceled)
- Accepted for presentation at the 10th conference on Financial Markets and Corporate Governance, Macquarie University, April 2019
- Accepted for presentation at the 9th conference on Financial Markets and Corporate Governance, La Trobe University, April 2018
- Presented at Massey University Seminar Series, Palmerston North, 2019

Essay Two:

Hafeez, B., Kabir, M.H., & Wongchoti, U. Hedge fund activism and firm risk-taking.

- Presented at Massey University Seminar Series, Palmerston North, 2020

1.6 An outline of the dissertation

The rest of the dissertation is organized as follows. Chapter Two provides a review of existing literature on shareholder activism based on the types of activists, including retail investors, traditional types of institutional investors and activist hedge funds as the latest prominent activist.

Chapter Three and Chapter Four are the two main empirical essays included in this thesis. Chapter Three (Essay One) explores the role of retail investors during shareholder activism under the background of the digital age, and Chapter Four (Essay Two) examines the impact of hedge fund activism on firm risk-taking, covering all hedge fund activism events in the U.S. during the period 2000-2016.

Chapter Five concludes the thesis by summarizing the key hypotheses, major findings, and policy implications. It also provides with limitation of this study, along with potential future studies.

Chapter Two: Literature Review on Shareholder activism

This chapter provides a literature review on shareholder activism. Section 2.1 provides an overview of shareholder activism, including the history of shareholder activism and the major types of activists. Section 2.2 discusses the importance of retail investors as activists. Section 2.3 focuses on institutional investors as traditional activists, who serve as the most prominent activists since the 1980s. This section explicitly discusses the driving forces, outcomes, and shortcomings of shareholder campaigns by conventional types of institutional investors. Section 2.4 provides a review of the studies on hedge fund activism. This section discusses the unique characteristics of hedge funds as an emerging activist, and presents empirical evidence on hedge fund activism. A relevant reference list is provided at the end of this thesis.

2.1 Overview of shareholder activism

In modern corporations, the separation of ownership and management leads to agency problems that managers' interests diverge from those of the shareholders (Jensen & Meckling, 1976). The board of directors plays a significant role in controlling such agency problems. The demand for shareholder activism arises when the board fails to perform the monitoring duties. Shareholder activism, or investor activism, is defined as "actions taken by shareholders with the explicit intention of influencing corporations' policies and practices" (Goranova & Ryan, 2014).

The current form of shareholder activism has a relatively short history. In 1942, the Securities and Exchange Commission (SEC) adopted a rule that granted shareholders an opportunity to place certain types of proposals in the corporate proxy statements, which paved the way for the current Rule 14a-8 (SEC, 1942). This rule allowed shareholders to address the agency conflict, especially at large corporations. At the start of shareholder activism, the activists mainly aimed at improving firm performance or corporate governance, while in the 1970s, a lawsuit against Dow Chemical successfully called attention to issues other than performance (American

Society of Corporate Secretaries, 1953).

Shareholder activism was dominated by retail investors at its outset, i.e. from 1942 till the end of the 1970s. Institutional investors, who held only 10% of U.S. equities outstanding in 1953, has increased exponentially in their ownership to around 70% in recent years (ProxyPulse, 2020). Hence, institutional investors started to play a more active role in corporate governance in the 1980s, with public pension funds and labor unions being the most active institutional investors (Gillan & Starks, 2007).

Institutional shareholder activism has increased over time. The current wave of shareholder activism is fueled by changes in the market for corporate control (Qiu & Yu, 2009). The increase of various anti-takeover defenses paves the way to an alternative approach to discipline the managers or the market for corporate influence (Cheffins & Armour, 2011). On the other side, events like the tech-bubble, global financial crises, and Principles of Responsible Investments provide opportunities for shareholder to target firms.

Moreover, shareholder activism has become a dynamic force and an incremental tool for corporate governance. In response to dissatisfaction with management, Shareholders communicate their displeasure using various channels, including in-person meetings, emails, and letters to management. If their concerns are not adequately addressed, the shareholders submit a shareholder proposal. Under the SEC Rule 14a-8, a company is obligated to include the shareholder proposal in its proxy material (Form DEF-14A), and present for voting at the annual general meetings. In addition to shareholder proposal, large institutional shareholders are able to influence management by acquiring more than 5% beneficial ownership, in which case the institutional shareholders must furnish SEC-13D filing within ten days of acquiring the beneficial ownership.

Activist shareholders seek to not only alter corporate strategy and improve performance (Song & Szewczyk, 2003; Westphal & Bednar, 2008), but also target other

key areas such as social, political and environmental issues (David, Bloom, & Hillman, 2007). In this sense, shareholder activism can be broadly divided into two categories, namely financial activism and social activism. Financial activism primarily focuses on activism relating to corporate governance and financial performance, and the main focus of activism is value maximization (Thomas & Cotter, 2007; Goranova & Ryan, 2014). Financial activism is regarded as "shareholder primacy". In contrast, social activism deviates the focus from the financial outcomes, and considers activism relating to social, environment and political issues (Gillan & Starks, 2007). Social activism is regarded as "stakeholder primacy".

On one hand, research on financial activism, especially governance-related activism, is mainly based on the theoretical foundation in agency theory (Greenwood & Schor, 2009; Edmans, Fang, & Zur, 2013). The majority of literature on financial activism deals with activists' concerns on the issues such as management incentives (Marler & Faugère, 2010), CEO pay (Ertimur, Ferri, & Muslu, 2011; Cai & Walkling, 2011), corporate boards (Ertimur, Ferri, & Stubben, 2010; Marquardt & Wiedman, 2016), and shareholder rights (Van der Elst, 2012). More recently, hedge funds as the latest emergence on the activism stage, have rapidly gained prominence in financial activism. Unlike the traditional types of institutional investors, such as pension funds or mutual funds, which seek to reform governance deficiencies, hedge fund activism focuses more specifically on firms' financial performance. It seeks more direct and immediate outcomes (Cheffins & Armour, 2011), such as increased share prices, operating performance, and other managerial actions (Brav, Jiang, Partnoy, & Thomas, 2008).

On the other hand, research on social activism is predominately based on stakeholder theory (McWilliams & Siegel, 2001; Goranova & Ryan, 2014). Literature on social activism explores the effect of activism on broader corporate outcomes and stakeholder issues, such as corporate social responsibility (David *et al.*, 2007; Neubaum & Zahra, 2006; Chen, Dong & Lin, 2020), environmental issues (Monks, Miller, & Cook, 2004), human and animal rights, health and safety (Grewal, Serafeim

& Yoon, 2016; Baloria, Klassen, & Wiedman,2019; He, Kahraman, & Lowry 2018), and political activities (Clark & Crawford, 2012). In practice, both financial and social activists aim to deter or remedy managerial deficiencies. Activism acts as an expression of dissatisfaction with corporate governance, firm or corporate social performance (Becht, Franks, Mayer, & Rossi, 2009).

The rest of this chapter is developed based on different types of activists. Section 2.2 discusses the importance of retail investors in corporate governance. Section 2.3 presents the monitoring role of traditional institutional investors during shareholder activism. Section 2.4 focuses on hedge funds as the latest player on the stage of shareholder activism.

2.2 The importance of retail investors

Throughout the history of corporations, retail shareholders were the most dominant type of owners until the shape rise of institutional ownership in the 1970s. Retail investors at odds with management were the pioneers who raised their voice against corporate malfeasance.

The earliest example of shareholder activism, which was referred to as shareowner advocacy in the early years, could be traced to Isaac Le Maire, who sent a letter to the most powerful politician in the Netherlands and highlighted the shareholder abuse by Dutch East India Company (Koppell, 2011). Even after the advent of modern corporations with separated ownership, corporate control, and conflicting interests between shareholders and management (Berle & Means, 1932; Jensen & Meckling, 1976), retail investors were still pioneers at confronting corporations, aiming to influence governance and address social issues. The most notable example was related to the Gilbert brothers, who spearheaded several campaigns decades before pension funds and other institutional investors began confronting corporate management (Gillan & Stark, 2000).

The importance of retail investors has increased dramatically over the years, especially during the voting process. Management and the board of directors exercise significant discretion over corporate affairs. In order to preserve shareholder supremacy, all major decisions regarding organization need to be approved through shareholders' voting during annual general meetings[1]. These voting rights provide shareholders with the power to assert control over the management and hold them accountable (Apostolides, 2010). In this sense, annual general meetings have been historically considered as a mechanism to regulate the agency conflict, in the absent of which, shareholders would lack the incentive to invest in corporations (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). At the annual general meetings, the voting rights serve as the most imperative control right for shareholders (Zingales, 1994).

However, despite the importance of participating in the annual general meetings, retail investors are mostly absent from this proxy process. Retail investors, who individually hold only small fractions of a firm's equity, often have little incentive to monitor management, especially when considering the time and efforts in the costly process of collecting information to make an intelligent voting decision. Prior studies indicate that retail investors exercise only one-third of their voting rights (ProxyPulse, 2016). In other words, retail investors are traditionally considered as rationally apathetic towards the corporate proxy fight. Indeed, retail investors' rational apathy is a natural result of the dispersion of ownership and diversification of investor portfolios in corporations (Easterbrook & Fischel, 1983). However, retail investors play an important role in monitoring management, and low retail investors' participation can have detrimental consequences for corporation decision-making.

Firstly, although retail investors individually account for only small fractions of a firm's equity, when a substantial number of retail investors avoid voting, the aggregate

[1] An annual general meeting provides shareholders with information on financial performance, and seeks shareholders' consent on decisions and transactions, which are beyond the discretion of management. The annual general meeting also acts as a platform for shareholders to interact with one another as well as management (Strätling, 2003).

absence might distort the voting outcomes. The distortion often works in favor of management, and the distortion in favor of management occurs when absent retail investors are more likely to vote against management than the proportion of investors who participate in elections (Gulinello, 2010; Lee & Souther, 2020). It is also possible that the distortion is in favor of activists.

Secondly, the absence of retail investors would also limit shareholders' ability to initiate governance changes. The SEC Rule 14a-8 allows a shareholder who meets certain criteria[2] to submit a proposal to be voted during an annual general meeting. During the past decade, shareholder proposals, although usually presented in a non-binding form, have become an important mechanism to drive governance reforms. However, retail investors' apathy would hinder the implementation of corporate governance changes, which require more than half of the votes outstanding or sometimes even more stringent criteria such as supermajority (Kastiel & Nili, 2016). In this sense, the absence of retail investors from the voting process might lead to a reduced number of votes in favor of potential governance changes.

Thirdly, the non-participation of retail investors might also lead to deadlock situations, in which a governance change would not pass due to non-compliance with the minimum shareholder turnout, even when the change is desirable to both management and shareholders (Kastiel & Nili, 2016). In extreme cases called "frozen charters", corporations would not be able to amend their charter despite receiving more than 90% support owing to either low shareholder turnout or quorum requirement (Hirst, 2017).

Moreover, the regulatory and governance changes over the past decade, along with the rise of shareholder activism, have significantly highlighted the importance of retail investors' votes. With institutional shareholders voting more than 90% of their shares

[2] The criteria includes holding at least $2,000 in market value, or 1%, of the company's securities. Source: SEC Rule 14a-8, https://www.sec.gov/divisions/corpfin/cf-noaction/14a-8/2015/johnchevedden102215-14a8-incoming.pdf

held, the retail investor's votes can significantly influence voting outcomes, which is especially important in a close proxy contest. A famous example is the proxy fight between DuPont Co. and Trian Fund Management LP in 2015, in which case DuPont's management successfully defended its position against one of the most influential activist hedge funds by reaching out to its retail investors. Furthermore, proxy advisors' increasing importance also leads corporations to pay closer attention to approved shareholder proposals. Specifically, proxy advisors recommend an "against vote" on the re-election of directors if management ignores approved shareholder proposals. This essentially transforms non-binding shareholder proposals into "quasi-binding" proposals (Choi, Fisch, & Kahan, 2010; Kastiel & Nili, 2016). There is also evidence that retail investors' participation can make a difference even when shareholder campaigns are not "successful" (e.g. Ertimur, Ferri, & Muslu, 2010; Iliev, Lins, Miller, & Roth, 2015).

Notably, the advancement of information technology in recent years has changed the environment of shareholder activism. The internet has emerged as a leading source of information on firm performance, press releases, annual reports, and other SEC reports (Healy & Palepu, 2001; Drake, Thornock, & Twedt, 2017; Lei, Li, & Luo, 2019), and it has dramatically reduced the time and cost of acquiring information especially for retail investors (Bimber, Flanagin, & Stohl, 2005). Hence, this affects retail investors' willingness to engage in activism. The ease of gathering information has prompted several research studies on retail investors' attention in recent years (e.g., Da, Engelberg, & Gao, 2011; Drake, Roulstone, & Thornock, 2012).

In conclusion, retail investors' rational apathy is primarily stemmed from dispersed ownership. Activist investors bear all the costs associated with monitoring, while the benefits are shared among all shareholders (Grossman & Hart, 1980). With small fractions of equity held, retail investors historically choose to be rationally apathetic. However, anecdotal examples have highlighted the increasing importance of retail investors' participation in the proxy contest during the past decades. There are limited studies on retail investors' participation in existing corporate governance literature,

especially regarding information technology advancement that facilitates information collection.

2.3 Institutional investors as a traditional activist

2.3.1 The growing role of institutional investors

Institutional activism expanded greatly in the 1980s, as mentioned in Sub-section 2.1. Until the recent emergence of hedge funds, public pension funds and labor unions are the most active institutional investors (Gillan & Starks, 2007).

According to Hirschman (1970), in response to dissatisfaction with management, institutional investors have two options, either to engage with management and effect change (namely "voice" or direct intervention) or to sell the shares (namely "exit" or "voting with their feet"). The threat of exit can discipline management (e.g. Admati & Pfleiderer, 2009; Edmans, 2009; Edmans & Manso, 2011). Shleifer and Vishny (1986) also propose that large shareholders serve as a solution to the free-rider problem, as indicated in Grossman and Hart (1980). Subsequently, prior studies provide substantial theoretical and empirical evidence on the monitoring role of institutional investors (e.g. Kahn & Winton, 1998; Del Guercio & Hawkins, 1999; Almazan & Suarez, 2003; Hartzell & Starks, 2003).

Research on shareholder activism is a vibrantly published topic in top management, finance, and accounting journals in recent years. A significant strand of literature is developed on institutional investors as activist shareholders, focusing on their motivations and effects.

2.3.2 Driving forces of shareholder activism

Prior studies have widely examined the reasons that make a firm prone to be targeted. Shareholder activism is initially a response to the agency conflict in large publicly traded companies, and thus the demand for activism arises from managerial

deficiencies, mostly the firm-level characteristics. In addition, the driving forces of shareholder activism also consist of activist-level and environmental characteristics (Ryan & Schneider, 2002). Amongst these three drivers, the firm-level characteristics are the most commonly tested by empirical studies.

2.3.2.1 Firm-level characteristics

The firm-level antecedents generally include firm size, firm performance, and other corporate-governance oriented explanations. Traditionally, institutional investors usually target large firms (Ertimur *et al.*, 2011; Cai & Walkling, 2011). This is consistent with the agency problem that it is more difficult for shareholders to effectively monitor large firms (Jensen & Meckling, 1976). Activists could create more value by targeting large firms (Del Guercio & Hawkins, 1999). Alternatively, social activism also prefers to target large firms. Large firms are more visible (Rehbein, Waddock, & Graves, 2004), and thus targeting them would attract more attention from the public and media, leading to spillover effects to non-targeted firms (Ferri & Sandino, 2009), or attracting more public's support (Rehbein *et al.*, 2004).

Regarding the performance of target firms, prior empirical studies find mixed results on the relationship between firm performance and shareholder activism. Some researchers find that underperforming firms are usually more attractive to shareholder activists (Renneboog & Szilagyi, 2011; Ertimur *et al.*, 2011), consistent with agency theory. Firms with worse stock market performance are also more likely to be targeted (Wahal, 1996; Bradley, Brav, Goldstein, & Jiang, 2010; Renneboog & Szilagyi, 2011). Based on accounting measures of performance, firms with the lower return to sales, sales growth (Karpoff, Malatesta, & Walkling, 1996), or return on assets (Wahal, 1996; Ertimur *et al.*, 2011) are more likely to be targeted by the activists. Furthermore, several papers indicate that firms' cash holdings contribute to shareholder activism, particularly when they have lower wealth distribution (Faleye, 2004). In line with agency theory, managers prefer to spend cash on value-decreasing investments rather than distributing cash to shareholders (Jensen, 1986). In contrast, several studies find

an insignificant relation between stock or operating performance and shareholder activism (Smith, 1996; Carleton, Nelson, & Weisbach, 1998; Ferri & Sandino, 2009).

Moreover, prior studies also find that ownership structure, executive compensation, and independent boards would also explain corporate governance-related activism targets. Consistent with agency theory, managers who have higher levels of ownership tend to be more responsible for their decision-making, and thus firms with higher managerial ownership are less likely to be targeted by shareholder activists (Carleton *et al.*, 1998; Bizjak & Marquette, 1998; Faleye, 2004; Prevost & Rao, 2000). The misalignment between firm performance and executive compensation might also lead to shareholder activism (Ferri & Sandino, 2009; Ertimur *et al.*, 2011; Cai & Walkling, 2011). Moreover, there is also evidence of a positive relationship between institutional ownership and shareholder activism (Carleton *et al*., 1998; Bizjak & Marquette, 1998; Renneboog & Szilagyi, 2011). The greater shareholding by institutions lowers the cost of activism, and thus these firms are more prone to be targeted by the activists (Prevost & Rao, 2000).

The existence of independent boards is also considered as a firm-level antecedent. Prior studies find mixed results regarding the relationship between independent boards and the agency conflict. Theoretically, more independent boards could reduce agency problems (Fama & Jensen, 1983), and those firms are less likely to be targeted (Prevost & Rao, 2000). However, empirical studies find that firms with more independent boards tend to be attractive to shareholder activists (Ertimur et al., 2011). A possible explanation could be that the activists might expect more independent boards to be more responsive.

To conclude, the overall evidence suggests that large firms or firms suffering from poor performance are more likely to attract activists' attention. Such activism seems to be motivated by attempts to improve firm performance. Moreover, other firm-level characteristics, such as ownership structure and executive compensation, are also significantly associated with shareholder activism.

2.3.2.2 Other characteristics

Prior research findings suggest that activist shareholders would target firms for reasons other than the firm-level characteristics. Goranova and Ryan (2014) argue that only focusing on the firm-level characteristics would tell a partial story of shareholder activism at best and a misleading one at worst. Activist-level characteristics, such as activists' interests, identity, concerns, and considerations, prove to be among the imperative factors in targeting firms (Ryan & Schneider, 2002; Sikavica & Hillman, 2008).

Activists' ability and incentive to engage in shareholder activism are affected by activism costs. Ertimur *et al.* (2011) find that low-cost activism tools are positively associated with the frequency of compensation-related activism. The 1992 SEC proxy reform aims to increase investors' communication ability during a proxy contest, and in turn, lowering the activism costs (Choi, 2000). Business relationships with target firms (Romano, 2001), investment portfolio characteristics, and investment horizons (Rubach & Sebora, 2009) also affect shareholders' willingness to engage in activism.

Stakeholder salience also contributes to the success of shareholder engagements (James & Gifford, 2010). Shareholders expect better returns on the activism investments. Hence, the shareholders are more willing to engage in activism if they can negotiate with corporate managers or gain support from other shareholders (Greenwood & Schor, 2009; Chowdhury & Wang, 2009). James and Gifford (2010) show that a strong business case and the values of target firms' managers are the most important contributors to stakeholder salience. Activists' interests and social identity can also explain why a firm is targeted (Rowley & Moldoveanu, 2003).

The macro-environment can also explain the rise of shareholder activism, development and constraints, namely the environmental characteristics. With the concentration of shareholdings of U.S. corporations into institutional investors' hands in the past few decades, it is expected that institutional investors can not only monitor

management more effectively but they are also able to seek changes in corporations' social-political environment and organizational legitimacy (Davis & Thompson, 1994; Zajac & Westphal, 1995). The 1992 SEC proxy reform that enhances shareholders' ability to communicate during a proxy contest also provides a more favorable environment for shareholder activism (Choi, 2000).

2.3.3 Effectiveness of shareholder activism

Measuring the effectiveness of shareholder activism is a difficult task. Gillan and Starks (2007) identify different ways of evaluating such activism's effectiveness, including short-term market reactions, long-term performance, voting outcomes on shareholder activism, voting on management proposals, and other potential changes in target firms. The majority of empirical research focuses on the effects of activism on the firm value, which is typically measured by the changes in stock prices around the announcement date of the activism.

Firstly, prior studies widely investigate the impact of shareholder activism on the firm value and performance. In most studies, researchers find a negative but insignificant abnormal stock return in a short event window around the announcement date (e.g., Carleton *et al.*, 1998; Becht *et al.*, 2009; Cai & Walking, 2011). Exceptions include Prevost and Rao (2000) which report a significantly negative average stock return two days around the proxy mailing date, and Renneboog and Szilagyi (2011) which report a significantly positive stock price reaction around the event window. A potential explanation for the equivocal findings resides in the difficulty in deciding the exact date when investors are being informed that a firm has been targeted by activists. Empirical research usually considers the proxy mailing date as the earliest release of shareholder proposals, while the proposals are generally negotiated between corporate managers and activists before their appearance in a proxy statement. The release of proposals thus might or might not lead to the reassessment of a firm's value. Moreover, some shareholder proposals are advisory in nature, which do not necessarily lead to changes in the target firms' value. Cai and Walkling (2011) show that the market reactions to

shareholder activism are associated with the implementation of the proposals.

The effects of shareholder activism might also show up slowly and gradually over time. Prior studies also examine the long-term performance of target firms, both operating performance and long-term stock return, to investigate the gradual effects of such activism. However, prior studies cannot find consistent evidence on the improvements in firms' long-term performance. Some studies find a significant improvement in firms' operating and stock performance (Del Guercio, Seery, & Woidtke, 2008), while others find significant underperformance after the activism (Prevost & Rao, 2000). Some studies even find insignificant changes in firm performance (Wahal, 1996; Del Guercio & Hawkins, 1999; Song & Szewczyk, 2003; Gillan & Starks, 2007). A probable explanation is that these studies primarily focus on governance-related activism, which does not report a consistent relation with firms' performance (Daily, Dalton, & Cannella, 2003).

Secondly, the investigation of voting outcomes is another way to evaluate the effectiveness of shareholder activism. Shareholder proposals are usually voted during an annual general meeting or through other proxy processes, and management cannot adopt the proposal in the absence of the majority support. An increase in voting support is associated with factors, such as type of issues addressed in the proposals (Gordon & Pound, 1993; Bizjak & Marquette, 1998), sponsor identity (Gordon & Pound, 1993; Haan, 2016), business ties with target firms (Davis & Kim, 2007; Calluzzo & Kedia, 2019), insider ownership (Gordon & Pound, 1993), institutional ownership (Gordon & Pound, 1993), governance or management structure (Agrawal, 2012; Butler & Gurun, 2012; Iliev *et al.*, 2015), and past firm performance (Iliev *et al.*, 2015). Specifically, proposals involving rescind poison pills and relax supermajority amendment, proposals sponsored by public funds, and firms' proposals with fewer insider or worse firm performance are likely to get more favorable votes. Shareholder voting is an effective mechanism for exercising governance or sharping corporate practices (Thomas & Cotter, 2007; Iliev *et al.*, 2015).

The third strand of literature focuses on the impact of shareholder activism, mostly governance-related proposals, on target firms' corporate governance features and executive compensation. However, empirical results are mixed. Wu (2004) and Del Guercio *et al.* (2008) find an increase in board and management turnover following direct negotiation, while Karpoff *et al.* (1996), Smith (1996), and Del Guercio *et al.* (1999) argue that target firms do not experience a high CEO turnover following activism using shareholder proposals. Notably, target firms would adopt specific governance changes by activists, and prior literature indicates that activists achieve at least modest success in this regard (Denes *et al.*, 2017).

Regarding the impact on executive compensation, earlier studies find little effect of compensation-related shareholder proposals submitted under the SEC Rule 14a-8 on CEO pay (Thomas & Martin, 1998), while compensation-related shareholder proposals have changed gradually since the 1990s (Gillan & Starks, 2007). The House of Representatives passed the "say-on-pay" Bill in 2007, allowing shareholders to have an annual advisory vote on executive compensation. In adiition, "vote-no" campaigns that intend to obtain changes in executive pay also become more frequent. Ertimur *et al.* (2011) find a significant relationship between the "vote-no" campaigns and the reduction of excess CEO pay. Cai and Walkling (2011) also indicate that "say-on-pay" proposals create value in companies with inefficient compensation.

Another strand of literature argues that shareholder activism can also affect firms' corporate social performance. David *et al.* (2007) discuss two competing arguments on the relation between shareholder activism and corporate social performance, namely disciplining or signaling. From the "disciplining" perspective, activism serves a disciplining role to pressure the managers to improve subsequent corporate social performance, as implied by Johnson and Greening (1999). In contrast, from the "signaling" perspective, shareholder proposals essentially signal management's reluctance to enhance corporate social performance (Prevost & Rao, 2000). Empirical results in David *et al.* (2007) are consistent with the "signaling" argument that

shareholder proposals negatively affect subsequent corporate social performance. Chen, Dong, and Lin (2020) also find that institutional investors can influence firms' corporate social responsibility (CSR) through CSR-related proposals and that institutional shareholders can generate real social impact.

Furthermore, in addition to the firm-level outcomes, prior studies also find that shareholder activism would affect firms' environmental or ethical issues, mainly when the firms are targeted by social or environmental shareholder proposals (Reid & Toffel, 2009). Moreover, some researchers also find that even if a particular firm is not an activism target itself, the shareholder activism events at peer firms might still cause a spillover effect, as firms tend to respond to shareholder activism at their competitors (Ferri & Sandino, 2009).

To summarize, prior empirical results generally conclude that institutional investors as traditional activists prompt firms to adopt specific but limited governance structure changes. There is mixed evidence on the impact of non-hedge fund activism on firm value and performance.

2.3.4 Shortcomings of institutional investors as traditional activists

There is also evidence that institutional investors as traditional activists, might have constraints in their monitoring role. The incentives and capabilities for monitoring might differ among different types of institutional investors. On one hand, corporate pension funds or insurance companies are less likely to undertake activism against other corporations, particularly in corporations with business relations, as institutional investors may feel compelled to vote with management (Gillan & Starks, 2007). In other words, institutional investors may face potential conflicts of interest in their monitoring role (Romano, 1993).

On the other hand, being one of the significant activists, public pension funds have been praised for their shareholders' interest advocacy, while prior literature also

provides evidence that the incentives of decision-makers at public pension funds might not align with the value-increasing objectives (Gillan & Starks, 2007; Woidtke, Bierman, & Tuggle, 2003). Woidtke (2002) finds that corporate values are positively related to private pension fund ownership but negatively related to public pension fund ownership. An explanation is that the political and social influences of public pension fund managers might diverge from the focus on shareholder value maximization.

In general, there is acknowledgment that institutional investors have conflicts of interest in acting their monitoring role as activists. This might contribute to the emergence of activist hedge funds, which are considered to have a less conflicting interest.

2.4 Hedge funds as an emerging activist

2.4.1 Definition of hedge fund activism

The last two decades have seen a tremendous growth of hedge fund assets under management, from US$118 billion in 1997 to US$3.1 trillion in 2019 (Rudden, 2020). This leads to the creation of more hedge funds and a subsequent increase in hedge fund activism. Hedge funds have now emerged as a new class of active monitors in corporate management, providing shareholders with an alternative channel to influence managerial decisions (Denes *et al.*, 2017).

There is no universally accepted definition of hedge funds, with 14 different definitions selected by the SEC roundtable on hedge funds[3]. Based on these selected definitions, hedge funds are usually characterized in the following aspects. Firstly, hedge funds are pooled investment vehicle that is privately organized. Secondly, hedge funds are administered by professional investment managers, who are paid by performance-based compensations. Thirdly, hedge funds are generally not widely available to the public. Fourthly, hedge funds operate outside the stringent regulations and restrictions

[3] Available at https://www.sec.gov/spotlight/hedgefunds/hedge-vaughn.htm

as imposed on other institutional investors (Partnoy & Thomas, 2006). In other words, hedge funds are not subject to the Investment Company Act of 1940 by involving a relatively small number of sophisticated investors (Brav *et al.*, 2008).

Hedge fund activism has also evolved over time. During the 1980s, activist hedge funds started pursuing activism, mostly through hostile takeovers and tender offers, which are currently considered as the most expensive activism form. Over the years, instead of relying on tender offers, activist hedge funds mostly employ proxy contests with the support of other shareholders, seeking to bring about changes in target firms. In hedge fund activism, activist hedge funds need to file an SEC-13D within ten days to disclose their ownership, if the activist hedge funds acquire more than 5% beneficial ownership in the target firms. This serves as a first signal of activism. Evidence shows that activist hedge funds would be successful at influencing the target firms once acquiring 5% or more beneficial ownership (Brav *et al.*, 2008). In more recent years, non-13D activism presents an exciting evolution of hedge fund activism. There has been a steady increase in campaigns during which activist hedge funds do not file the SEC-13D (namely ownership level of 5% or less). These non-13D filing campaigns generally target significantly larger firms (Bebchuk, Brav, Jiang, & Keusch, 2020). Meanwhile, the importance of communication has increased considerably over the years, represented by a continuous decline in non-publicly disclosed activism (Bebchuk *et al.*, 2020; Kraut, Mukhopadhyay, Szczypula, Kiesler, & Scherlis, 1998). As activist hedge funds mostly rely on support from other shareholders, effective communication between activists and other shareholders is central to rally support from other shareholders.

In contrast to retail investors or other types of institutional investors, activist hedge funds focus more on direct interventions to improve financial performance with immediate outcomes. The success of activist hedge funds in reshaping corporate democracy is attributed to their unique standing in contrast to other types of institutional investors, including sophisticated and professional investment management (Brav *et al.,* 2008). Moreover, as hedge funds can operate outside the

regulations imposed on institutional investors, they can concentrate investment in fewer companies and expand influence using leverage. Hence, hedge fund activism has now been recognized as a key mechanism in the market of corporate influence.

2.4.2 Empirical evidence of hedge fund activism

There are several strands of the empirical literature on hedge fund activism. A summary of relevant research is provided in Denes et al. (2017). The first strand of literature, which is also the most well-established literature, examines the effects of hedge fund activism on target firm value. Most of the prior studies find evidence that hedge fund activism significantly increases target firms' value in the short-term (Brav *et al.*, 2008; Brav, Jiang, & Kim, 2015; Klein & Zur, 2009).

However, prior literature finds mixed results regarding the long-term effects of hedge fund activism on firm value. Some studies show that target firms experience positive long-term economic consequences post activism, with significant increases in abnormal returns or production efficiency (e.g., Klein & Zur, 2009; Greenwood & Schor, 2009). Other researchers find additional evidence. Clifford (2008) finds positive but statistically insignificant long-term returns. More recently, deHaan, Larcker, & McClure (2019) also find an insignificant difference in pre-and post-activism long-term returns. This is consistent with the argument of myopic management that short-termism tends to create short-term value at the expense of long-term performance.

The second strand of literature examines the impact of hedge fund activism on other features of target firms, such as earning, operation, and governance features. Most researchers find evidence that stock performance, operating performance, or payout of earnings significantly improve post hedge fund intervention (Brav *et al.*, 2008; Clifford, 2008; Brav, Jiang, & Kim, 2009; Boyson & Mooradian, 2011). Return on assets, return on sales, return on equity, and cash flows from the operation are common proxies for operating performance. On the contrary, some literature finds insignificant changes in profitability of hedge fund targets regarding return on assets or cash flows

from operation (Klein & Zur, 2009). Additionally, Cheng, Huang, Li, and Stanfield (2012) document an increase in tax avoidance post-activism. For governance features, hedge fund activism is associated with the highest organizational change rates than other types of shareholder activism (Denes *et al.*, 2017).

Hedge fund activism also impacts capital expenditures and corporate innovation. There is some evidence that target firms' capital expenditures drop significantly post hedge fund activism (Greenwood & Schor, 2009; Brav *et al.*, 2015). An explanation provided by Brav *et al.* (2015) is that capital reallocation is an essential channel for value creation and productivity improvement. Brav, Jiang, Ma, and Tian (2018) also provide evidence that target firms experience a reduction in R&D expenditures, while their innovation output increases significantly post activism.

In addition to the numerous studies that document the positive impacts of hedge fund activism on firm-level characteristics, Chen and Jung (2016) and Flugum and Howe (2020) are amongst the few studies that report the negative consequences of activism. Chen and Jung (2016) report that target firms tend to reduce financial guidance and relevant information after investment by activist hedge funds, while the authors interpret the reduction as an unintended consequence of activism. Flugum and Howe (2020) focus on analyst earnings forecasts, and they show a decline in analyst forecasts' accuracy and activity post activism. These results suggest an increase in analyst uncertainty post hedge fund intervention, limiting analysts' ability to add value in this setting.

To examine why firms get targeted, the third strand of literature focuses on firm-level characteristics that attract activist hedge funds. In general, activist hedge funds tend to target more "value" firms, typically with poor performance. Almost all the empirical studies, with the only exception of Klein and Zur (2009), report the finding that target firms have significantly lower stock performance relative to the market or control firms (e.g., Brav *et al.*, 2008; Clifford, 2008; Boyson & Mooradian, 2011; Bebchuk *et al.*, 2015). Proxied by book-based measures of performance, there is also consistent evidence

that activist hedge funds tend to target firms with a low level of sales (Brav *et al.*, 2008; Brav *et al.*, 2009; Boyson & Mooradian, 2011) or a low market-to-book ratio (Brav *et al.*, 2008; Clifford, 2008; Klein & Zur, 2011). Notably, firms with higher profitability (return on assets or return on equity) are more likely to attract hedge fund activism (e.g., Brav *et al.*, 2008; Clifford, 2008; Brav *et al.*, 2009; Klein & Zur, 2009, 2011; Boyson & Mooradian, 2011; Boyson, Gantchev, & Shivdasani, 2017).

Other firm-level characteristics also explain the reasons that firms get targeted. Prior studies generally agree that activist hedge funds are more likely to target smaller firms (measured by the book value of assets or market value of equity), firms with higher institutional ownership, firms with a smaller amount of R&D expenditures, or firms with lower dividend yield (Brav *et al.*, 2008; Clifford, 2008; Boyson & Mooradian, 2011; Klein & Zur, 2009, 2011). In other words, hedge funds are less likely to acquire a sizeable firm, which might create massive portfolio risk even for activist hedge funds (Brav *et al.*, 2008). Higher institutional ownership in target firms also provides an easier channel for activist hedge funds to communicate, owing to the existence of fewer but larger shareholders. Apart from these characteristics, Boyson *et al.* (2017) and Norli, Ostergaard, and Schindele (2015) argue that firms with higher share liquidity are more likely to get targeted, as the liquidity facilitates activist hedge funds' acquisition of shares.

Overall, shareholder activism has developed into a useful mechanism to "monitor the monitor" (Alchian & Demsetz, 1972), with hedge funds emerging as the latest activist. Shareholder activism as a whole makes a significant contribution to improve monitoring and reduce agency costs. The past few decades have seen advancement in relevant academic research, while there are several potentials for empirical studies. Retail investors and hedge funds as activist shareholders are relatively less studied in prior literature, which are the main focus in this research.

Chapter Three: Essay One: Are retail investors really passive? Shareholder activism in the digital age

This chapter presents the first essay of the thesis, which explores the role of retail investors in corporate governance with the arrival of digital age. Covering all shareholder activism events in the U.S. between 2005 and 2016, this study examines the dynamics of retail investors' attention before annual general meetings and its impact on subsequent participation in the voting process. A brief overview of this study is presented in Section 3.1. Section 3.2 overviews the literature and develops the hypotheses. Section 3.3 describes the data and key variables used in this study. Section 3.4 presents models and reports the core empirical results. Section 3.5 provides the robustness tests, and Section 3.6 concludes. An appendix to this chapter and the relevant reference list are provided at the end of the thesis.

Are retail investors really passive? Shareholder activism in the digital age

Abstract

Academics traditionally view retail investors as rationally apathetic towards corporate proxy fights due to their higher cost of individual information gathering and the inability to collectively coordinate. In the wake of the digital age and social media, this study re-examines retail investors' attention and their participation during the shareholder activism process. Using a sample covering the period 2005-2016, this study finds that abnormal Google Search activities (a proxy for retail investors' attention in literature) on tickers of firms that receive a shareholder proposal increase significantly during the three weeks leading up to the voting and this increase is more pronounced for less transparent firms. The textual analyses of proxy statements also show that attention increases for proposals with more negative or controversial tone. Importantly, retail investors' attention leads to higher participation in the voting process, especially among proposals that resonate with shareholders' preferences and interests (high salience activism). This study also finds that the higher participation by the retail investors is positively associated with the level of institutional ownership. Finally, even though the overall participation did not increase, this study shows that investors' sentiment resulted in higher participation for high salience proposals after E-proxy regulation became fully effective in 2009. Overall, this study highlights the role of information technology in mitigating retail investors' apathy issues.

Keywords: Shareholder activism, retail investors' attention, information asymmetry, E-proxy, rational apathy

It has become commonplace to hear the corporate proxy voting system described as "broken" or "dysfunctional," yet its most fundamental defect is mostly ignored: the absence of retail investor participation. If the voters from an entire region of the

country – say the Southwest – did not show up at the polls for presidential elections, most would agree that there was a problem. At the very time when shareholders are calling for greater access to the corporate proxy, it is more important than ever that proxy voting represent the views of all shareholder constituencies in rough proportion to their numbers.
– Frank G. Zarb Jr. & John Endean[4]

3.1 Introduction

Corporate governance literature typically views the non-participation of retail investors in the corporate proxy fight (e.g., retail investors' apathy) as a rational lost cause and thus a given (e.g., Kastiel & Nili, 2016). Retail investors, who hold only small fractions of a firm's equity, are traditionally considered to lack the incentive to engage in management. This lack of interest is attributed to the time and cost involved in becoming informed and the relatively small marginal benefit they could earn from making an informed decision. As a result, the traditional view suggests that retail investors choose to become rationally ignorant. Perceived as unsolvable, the corporate governance problems caused by rationally apathetic investors are relatively less studied in corporate governance literature.

Traditionally, battle lines were drawn between incumbent management and large institutional shareholders. But recent evidence has shown that retail investors' attention and their participation in corporate proxy fight are specifically not negligible, especially with the surge in competition for corporate control. For example, the proxy fight between Nelson Peltz and P&G, dubbed as the most expensive shareholder activism campaign with a cost of over 100 million dollars, was decided by a margin of 0.0016% of votes cast (Benoit, 2017). As a premise, mutual funds, the largest of institutional investors, collectively own about 22% of stocks outstanding and have a fiduciary duty to vote (Duan & Jiao, 2016). In contrast, with a staggering 30%

[4] Restoring Balance in Proxy Voting: The Case for "Client Directed Voting" from the Harvard Law School Forum on Corporate Governance and Financial Regulation (Feb. 14, 2010): https://corpgov.law.harvard.edu/2010/02/14/restoring-balance-in-proxy-voting-the-case-for-client-directed-voting/

ownership in listed firms across the U.S., retail investors only exercise one third of their voting rights. In other words, retail investors present a massive pool of untapped voting power to tip the scales during shareholder activism. Over the years, the retail investors have taken center stage in deciding the outcomes of the most prolific activist campaigns.

Hence, this study argues that it is imperative to revisit the retail investors' apathy issues with the arrival of the digital age. As retail investors are less sophisticated than their institutional counterparts in generating relevant research, they are more likely to use existing and public sources to gather information to make an informed decision. The advancement of technology and the advent of the internet disproportionately benefit retail investors, significantly reducing their time and cost of making informed decisions. In this context, the participation of retail investors in shareholder activism is noteworthy. As an incremental tool for corporate governance, shareholder activism enables retail shareholders to express their dissatisfaction by submitting proposals for voting at the annual general meetings. Despite the non-binding nature of shareholder activism, it has emerged as a potent mechanism to influence managerial behaviors.

This study starts the empirical investigation by exploring the role of the internet in alleviating retail investors' apathy. The internet is undisputedly amongst the leading source of information. As Google's search engine accounts for more than 88% of all internet searches originating in the U.S., this study employs the proprietary data of Google Trends (referred to Google Search Volume Index, or GSVI[5] hereof) as a proxy for retail investors' attention. Compared to proxies for retail investors' attention such as news coverage, extreme returns, and trading volume, GSVI can capture the demand side of information[6]. Following Da, Engelberg, and Gao (2011), Drake, Roulstone, and

[5] GSVI is a measure which provides an index based the number of daily searches by users on a certain term or topic on Google's search engine, which indicates the propensity to search for that certain term/topic. More details are provided in Section 3.2.1 and Section 3.3.

[6] According to Ben-Rephael *et al.* (2017), institutional investors usually acquire information and news of specific stocks on Bloomberg terminals (and other proprietary platforms like Thomson Reuters, FactSet etc.), and the mostly common Terminal users include portfolio/fund/investment managers, analysts, traders, executives, directors, presidents, and managing directors (i.e., institutional investors).

Thornock (2012), and Ben-Rephael, Da, and Israelsen (2017), this study argues that GSVI is an ideal proxy for exploring the dynamics of retail investors' attention and their demand for information, especially around shareholder activism.

Taking into account all the available shareholder activism events in the U.S. during the 2005-2016 period, the empirical results show that firms that receive a shareholder proposal (i.e. target firms) have 1.5% more attention before the annual general meetings relative to their matched control firms (namely firms without shareholders proposals). Focusing on target firms only, retail investors' attention for target firms increases by 1.8% before the annual general meetings, and this increase is more pronounced for less transparent firms, which is 2.6% higher relative to more transparent firms. The results are meaningful, given that Drake *et al.* (2012) reported a 1.3% increase in GASVI six days prior to an earnings announcement. Moreover, campaign-level characteristics also impact retail shareholders' attention. Specifically, the negative tone in proxy materials results in higher retail investors' attention. These findings are robust after controlling for the earnings announcement effect.

Does attention materialize into actions? To better understand the impact of retail investors' attention on their (proxy fight) participation behavior, this study uses the existing theories related to voter turnout in political science literature. In doing so, this study finds that high salience activism[7] is more likely to motivate retail investors to participate in shareholder activism. By examining the retail investors' non-participation rate in the voting process, the empirical findings show that the incremental non-participation rate by retail investors decreases significantly (i.e. the participation rate increases significantly) for firms targeted with high salience proposals. The result is more pronounced for less transparent firms relative to

On the contrary, retail investors are more likely to collect information from the internet. In this sense, GSVI serves as a direct measure of retail investors' attention which captures the demand of information from retail investors.

[7] In this paper, several types of proposals are identified as high salience proposals, namely closely contested governance proposals, social and environmental related proposals and governance related proposals for firms in financial distress. Firms that receive these types of proposals are collectively considered to experience high salience activism.

transparent firms. In other words, retail investors respond more actively to issues that resonate with them. This study also documents that investors' participation in the voting process is significantly higher for firms with higher institutional ownership, implying that such participation positively correlates with the target's institutional ownership during high salience activism. Lastly, this study explores whether the implications of E-proxy legislation and the electronic dissemination of proxy materials have real consequences to retail investors' participation during shareholder activism. The empirical evidence indicates that the introduction of E-proxy resulted in higher retail investors' attention, leading to higher participation during high salience activism, even though the overall participation did not increase, consistent with predictions of Cvijanović, Groen-Xu, and Zachariadis (2020).

This study contributes to the existing literature in the following aspects. Firstly, this study adds to the literature on retail investors' apathy and provides new evidence on institutional ownership of the firm targeted with high salience proposals in mitigating retail investors' apathy problems. With the use of GSVI and its ability to capture the demand side of information, this study documents how retail investors use the information to make an informed decision during shareholder activism, especially if the targeted issues resonate with their preferences. Moreover, this study also provides evidence regarding the content of proxy materials. The empirical evidence suggests that a more controversial tone gets more attention from retail shareholders during shareholder activism.

Secondly, this study adds to the literature on shareholder governance and provides new insights into the "voice" aspect following Hirschman's (1970) framework of "voice or exit" in response to dissatisfaction with management. In other words, this study provides evidence that retail investors use their voting power to engage with management and the board when they are dissatisfied with management. More importantly, this study is amongst the few empirical studies that explore retail investors' voting, particularly Brav, Cain, and Zytnick (2019) and Geoffary (2018),

providing a new lens to look at retail investors' participation by exploring the impact of technological and regulatory improvements in the digital age. This study also highlights that shareholders' preferences are pivotal in the voting process, consistent with Cvijanović *et al.* (2020) and Brav *et al.* (2019).

Thirdly, this paper adds to the literature on corporate transparency, information flow, and decision making, and it is the first paper to document how firm-level information transparency impacts retail investors' attention and participation during shareholder activism. This study finds a more significant increase in retail investors' attention and subsequent participation for less informationally transparent firms. Furthermore, this study also provides evidence on the enabling role of E-proxy regulation as an effective tool to increase retail investors' participation, even though overall participation did not increase.

Overall, this study provides new evidence that stands in contrast to the traditional perception of retail investors as apathetic. With the advancement of information technology in the digital age, retail investors can and do engage in monitoring through the voting process. In general, this study provides implications for policymakers, corporations, and activist shareholders by highlighting the role of information technology in the digital age, providing actionable insights into retail shareholders' behavior and decision-making around shareholder activism.

The rest of this chapter's organization is as follows. Section 3.2 reviews relevant literature and develops the hypotheses. Section 3.3 describes the data and key variables used in this study. Section 3.4 and Section 3.5 report the core results and robustness results, respectively. Section 3.6 concludes.

3.2 Literature review and hypothesis development

3.2.1 Information, attention, and retail investors

The flow of information is a fundamental requirement for an efficient capital market,

and it encourages investors to make informed decisions. The differences in the level and quality of information between shareholders and management can lead to the "lemons effect," which in extreme cases would lead to a meltdown in financial markets (Akerlof, 1978). The information asymmetry between shareholders and management is the primary cause of the agency conflict (Jensen & Meckling, 1976). Hence, improving a firm's information environment has important implications for monitoring management.

Historically, the annual general meetings allow shareholders to have a face-to-face interaction with the management, communicate with them on critical issues, ask them relevant questions, or seek further clarifications. This serves as an essential mechanism to protect the interest of shareholders[8]. In the absence of such a mechanism, the shareholders would lack the incentive to invest in corporations (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). Shareholder activism has evolved recently to serve as an additional monitoring tool to the existing corporate governance mechanism, in which process activist shareholders can pursue changes in the target firms without taking control of the firms. The activist shareholders generally submit a proposal[9] for ballots during the annual general meetings if they are dissatisfied with corporate managers on issues including operational performance, stock performance, risk management, governance, and social and environmental issues (Boyson & Mooradian, 2011; Brav, Jiang, Partnoy, & Thomas, 2008; Goranova & Ryan, 2014; Ma & Liu, 2016). In recent years, shareholder activism has not only amplified its legitimacy, but it has also significantly increased its potency in corporate governance.

To make an informed voting decision, institutional investors can gather information

[8] The key activities undertaken during an annual general meeting can be divided into three broad categories: firstly, inform the shareholders about financial performance and other strategic decisions, secondly, seek shareholders' approval on matters that are beyond managerial discretion, and thirdly, serve as forum between shareholders and managers to discuss various past and future aspects relevant to firms (Martinez-Blasco, Garcia-Blandon, & Argiles-Bosch, 2015).

[9] According to the SEC Rule 14a-8, a shareholder proposal is a recommendation or requirement for a company and/or its board of directors to take actions. Once the recommendation is deemed proper, it would be included in the company's proxy material, together with any supporting statements. These provide shareholders with relevant information.

from propriety resources, generate their research, or rely on the proxy advisors' service (Ben-Rephael *et al.*, 2017; Malenko & Shen, 2016). In contrast, retail investors have to resort to publicly available or free resources to gather information. Traditionally, retail investors would gather firm related information directly through published financial reports, news, or other public sources, and the time and cost for retail investors far exceeded their benefit in making an informed proxy voting decision. However, since the retail investors' shareholdings are relatively small in size, they are expected to be rationally apathetic (Easterbrook & Fischel, 1983; Grossman & Hart, 1980; Strätling, 2003, 2012).

The advancement in information technology in the past decades has facilitated retail investors during shareholder activism. The internet has emerged as a leading source of information, providing efficient access to information on firm performance, press releases, annual reports, and other SEC reports (Healy & Palepu, 2001; Drake *et al.*, 2017; Lei, Li, & Luo, 2019). The internet has dramatically reduced the time and cost of acquiring and processing information (Bimber, Flanagin, & Stohl, 2005). Retail investors are disproportionate beneficiaries of this advancement. The search for information has become incredibly easy and efficient with the search engines, and shareholders from different geographical locations can interact with each other. Hence, the lowering cost of gathering and disseminating information is expected to impact the apathy issue of retail investors in corporate governance.

Internet search volume data has been increasingly used as a proxy for retail investors' attention in academic research. An early study on internet search by Mondria, Wu, and Zhang (2010) use America Online (AOL) search volume data as a proxy for retail investors' attention. Another innovative study by Da *et al.* (2011) shows that GSVI is a better proxy for retail investors' attention over traditional indirect proxies, such as advertising, extreme returns, trading volume, and news and headlines. The unique feature of resorting on the GSVI lies in its ability to capture the demand side of information, while the traditional sources of information are viewed as the supply side

of firm-specific information. The use of GSVI is specially advantageous in the context of North America, with Google's search engine accounting for more than 88% of all internet search queries. Drake *et al.* (2012) find that GSVI (namely retail investors' attention) increases before the earnings announcement and that higher GSVI results in greater changes in prices and volumes. Aouadi, Arouri, and Teulon (2013) and Ruan and Zhang (2016) find that GSVI is significantly related to stock market liquidity and volatility[10]. Several other studies (e.g., Gwilym, Kita, & Wang, 2014; Bank, Larch, & Peter, 2011; Joseph, Wintoki, & Zhang, 2011) also confirm that GSVI of a firm's ticker symbol is a suitable proxy for retail investors' attention.

Specifically, retail investors are more likely to gather information on stocks they already own, and their interest is piqued during an attention-grabbing event such as shareholder activism (Barber & Odean, 2007). The non-routine nature of shareholder activism also makes it more likely to grab the attention of retail shareholders. Thus, shareholder activism serves as a natural experiment to explore the dynamics of retail investors' attention. Consequently, it is expected that retail investors' attention significantly increases prior to an annual general meeting, especially for firms that receive shareholders' proposals. This study hypothesizes:

Hypothesis 1: Retail investors' attention increases for firms that receive shareholders' proposals prior to the annual general meetings.

3.2.2 Retail investors' attention, transparency, and proxy sentiments

The "Definitive Proxy Statement" is a mandatory statement filed by the proxy soliciting firms or on their behalf according to SEC Act of 1934 Section (DEF-14A). The proxy materials contain the activist shareholders' proposals, supporting statements and the

[10] GSVI is also widely used in various academic areas to predict individual level outcomes. GSVI is used to predict epidemics of influenza (Ginsberg, Mohebbi, & Patel, 2009; Polgreen, Chen, Pennock, Nelson, & Weinstein, 2008), unemployment, demand for new cars, and the destinations for vacations (Choi & Varian, 2012). Bimber *et al.* (2005) and Lindberg (2011) use Google search data to predict retail sales and consumption. Moat, Olivola, Chater, and Preis (2016) find that individuals use Google search data to complement their decision-making. GSVI is also used to explore individual choices such as smoking (Troelstra, Bosdriesz, De Boer, & Kunst, 2016).

company's response to the activists' demands (Bratton & McCahery, 2015). The proxy filings in pursuance of the SEC Rule 14a-8 are a vital source of information regarding the upcoming shareholder activism, as these filings, in most cases, are the first official communication about the shareholder activism, especially for retail investors.

Meanwhile, managers tend to have more relevant insider information, and their views might also differ from those expressed by outside sources of information. Hence, the qualitative information in the proxy statements might influence retail investors' decision making. The sentiment and tone expressed in firms' proxy statements and other corporate reports convey important qualitative information in addition to quantitative numbers in financial statements. In particular, the sentiment and tone expressed in proxy filing documents would provide the incentives and perspectives of underlying managers and activist investors (Tudor & Vega, 2014). Furthermore, prior studies show that the linguistic tone in the text serves as an indicator of firms' expected future performance and stock pricing (Kearney & Liu, 2014). Sometimes the "soft (namely qualitative) information" even explains more of the abnormal stock returns than the "hard (namely quantitative) information" (Brockman & Cicon, 2013). Managers also make use of qualitative disclosures to report bad news (Skinner, 1994).

In recent years, the availability of listed firms' proxy filings on the SEC-EDGAR website has paved the path for analyzing the "soft" information incorporated within the firms' filings. Textual analysis is widely used to explore the impact of sentiment in news articles, SEC filings, or texts from social media. Following pioneering studies by Antweiler & Frank (2004), Das & Chen (2007), Tetlock (2007), and Li (2008), researchers have been actively examining the impact of qualitative information on stock valuations. Prior literature finds evidence that the words selected by managers in the disclosure reports and media coverage are correlated with firms' future stock returns and earnings (Loughran & McDonald, 2015; Gandhi, Loughran & McDonald, 2019). The impact of underlying sentiment and tone is asymmetric. Edmans, Garcia, and Norli (2007) and De Neve, Ward, De Keulenaer, Van Landeghem, Kavetsos, and Norton (2018)

find evidence that the adverse events produce much larger and more consistent consequences than the positive events[11]. Loughran and McDonald (2013) also show that the negative sentiment embedded in the prospectus is positively associated with the level of underpricing. The negativity bias suggests that negative information tends to attract more attention from investors than comparable positive information (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Jordan, 1965).

Such findings motivate this study to explore whether the sentiment and tone of the proxy statements generate any impact on retail investors' attention during shareholder activism. Following the negative-positive attention asymmetry, it is expected that there is more attention from retail investors if the tone or sentiment is negative or controversial. In this context, this study hypothesizes that:

Hypothesis 2a: Retail investors' attention is positively related to a negative sentiment expressed in the proxy statements.

Corporate transparency also impacts investors' decision-making. Broadly defined as the extent to which there is credible disclosure of the firm-specific information, corporate transparency is measured by corporate transparency is measured by the level of information[12] supplied by the corporation to its stakeholders, and more information disclosure increases transparency (Healy & Palepu, 2001). Corporate transparency is an outcome of multi factors, including the quality of reporting standards and the intensity of private information acquisition and dissemination (Bushman, Piotroski, & Smith, 2004). Increased corporate transparency makes the stakeholders' (boards of directors, managers, and shareholders) decisions more efficient (Firth, Wang, & Wong, 2015).

In essence, corporate transparency lowers the agency costs, and increased

[11] The few exceptions that provide opposite findings include Ahern & Sosyura (2014) and Huang, Zang & Zheng (2014).

[12] Substantial information incorporates "the relevance, clarity, completeness, accuracy, reliability and verifiability of information" (Rawlins, 2008).

transparency leads to a reduction in the demand for monitoring (Ma, Shang, & Wang, 2017). However, the level of transparency varies across firms. Firms with a high level of transparency may voluntarily disclose reliable information. In contrast, firms with a low level of transparency would reduce the supply of firm-specific information, heightening information asymmetry between managers and external investors. The information environment thus restricts external stakeholders' ability to learn about the firms and make appropriate decisions, especially when the power distribution in the firms is unbalanced (Firth *et al.*, 2015). In other words, corporate transparency would have important implications for retail investors and minority shareholders, who are more reliant on information disclosed by firms.

Moreover, a lack of corporate transparency also creates difficulties in firm valuation for external investors, owing to the uncertainties of the firm's business activities and operating environment. To gather relevant information and facilitate the decision-making, external investors, particularly retail investors, are expected to have a higher demand for information for less transparent firms, especially during shareholder activism. Consequently, it is expected that the increase in retail investors' attention during activism would be more pronounced for less transparent firms. In this context, this study hypothesizes that:

Hypothesis 2b: The increase of retail investors' attention is more pronounced for less transparent firms.

3.2.3 Retail investors' attention and participation during shareholder activism

The regulatory, ownership, and corporate governance environment have changed over the decades. Institutional ownership has seen a dramatic increase from around 10% of shares outstanding in 1953 to 47% in 1999, and it accounts for about 70% of U.S. equities outstanding in recent years. Meanwhile, retail investors collectively hold around 30% of shares outstanding across the U.S. listed firms (GoldmanSachs, 2013;

ProxyPulse, 2016). Institutional investors have a fiduciary duty to participate in proxy voting[13]. In contrast, retail investors do not have any such compulsion, and they traditionally have a low participation rate in proxy voting. Hence, the institutional investors are traditionally considered as the solution to weak monitoring, and retail investors are viewed as rationally apathetic. The shift in corporate ownership will significantly compound this problem (Gillan & Starks, 2007).

In 2004, the SEC implemented the mandatory disclosure of mutual fund voting decisions, paving the path for empirical examination of their monitoring role. The institutional investors also tend to vote with management (Cvijanović, Dasgupta & Zachariadis, 2016) or even delegate the voting decision to proxy advisor firms (Choi, Fisch, & Kahan, 2013). Specifically, when the firm's executives or directors serve on the board of institutions, the institutions tend to overlook proxy advisors' recommendations and continue to support incumbent management even if the overall support is low (Calluzzo & Kedia, 2019). Additionally, passive funds[14] are more likely to leave the monitoring to the invisible hand of the market or engage in a one-size-fits-all approach to governance. On the contrary, acting as "skin in the game"[15] (Fisch, 2017), retail shareholders would mitigate this monitoring problem, thus ensuring higher participation of retail investors will have important implications for corporate governance.

Consequently, in recent years, activist investors have recognized the importance of retail investors and increased their efforts to attract and encourage more retail shareholders to participate in the proxy contest[16]. For example, in a campaign between

[13] This is required by the SEC Investment Company Act and Employee Retirement Income Security Act (ERISA).

[14] Passive investing has already outpaced active investing in recent years. The big three passive funds together (vanguard, BlackRock and State Street Global Advisers) have already been the largest shareholder in 88% of major U.S. firms (Lund, 2017).

[15] As retail investors own the companies directly, this acts as "skin in the game".

[16] The SEC also conducted a roundtable in 2015 to discuss dismal situations with retail investors' participation in the proxy voting process. The target was not simply to increase retail shareholders' participation, but rather to increase informed participation in this proxy voting process. The roundtable participants also suggested latest information technology should be better incorporated in proxy voting process, so that shareholders were more likely to participate and make informed decisions. With

the activist Perishing Square Capital Management and Automatic Data Processing (ADP) in 2017, Perishing Square reached out to ADP's retail investors through a letter stating that "they had the key to Auto Data Processing's future" (Herbst-Bayliss, 2017). In a proxy fight between DuPont Co. and the activist Trian Fund Management LP in 2015, DuPont's management successfully defended its position against one of the most influential activist hedge funds by reaching out to its 33% retail investors. Similarly, the 2015 campaign of Starboard Value against Darden Restaurant only gained a landslide victory due to retail investors' support. Another instance was the proxy contest between Nelson Peltz and P&G in 2016, which was considered "the most-expensive shareholder war" by the Wall Street Journal. The outcome of the contest was decided by the retail investors of P&G in favor of the activist Nelson Peltz by a hairline margin of 0.0016% of votes cast (Benoit, 2017). More importantly, the success of the shareholder campaigns, despite the non-binding nature of shareholder activism, is significant in corporate governance, as the proxy advisory firms would essentially transform it into a quasi-binding on firms[17].

Moreover, retail investors' participation also has important implications for target firms, even if shareholder campaigns are unsuccessful. For example, during directors' elections, if a director receives a 30% dissent vote, he/she is more likely to resign (Iliev, Lins, Miller, & Roth, 2015). Ertimur, Ferri, and Muslu (2010) find that just receiving a shareholder proposal on "say on pay" results in a significant reduction in executive compensation. Kastiel and Nili (2016) also find that a 5% increase in retail investors' participation would theoretically alter the outcomes of 15% governance-related proposals in case of contested elections. These studies all highlight the importance of retail investors' participation during shareholder activism. Lack of retail investors' participation might distort voting outcomes, limit the ability to implement governance

increased accessibility to information technology, shareholders can more effectively receive and understand information of firm performance, and better put the performance into perspective. This enables informed investors to participate more in the proxy voting process (SEC, 2015).

[17] The proxy advisor firms tend to vote against the re-election of directors who have failed to implement an approved shareholder proposal (Kastiel & Nili, 2016).

changes, and create a standstill situation (Kastiel & Nili, 2016).

However, the shareholding voting literature has previously overlooked that retail shareholders, unlike their institutional counterparts, have a choice whether to participate in the corporate ballot. According to Brunswick (2015), two-thirds of retail investors consider shareholder activism a value-adding activity, with 82% of them willing to participate during shareholder activism that resonates with their preferences. To understand shareholder voting patterns, this study builds on established theories to explore the impact of retail investors' preferences on corporate voting.

Firstly, according to the instrumental/pivotal voting theory[18] in political science literature (Downs, 1957; Owen & Grofman, 1984), when majority shareholders support a specific proposal, discretionary voters (retail investors) with a similar preference would choose not to vote, since their votes are not pivotal (Cvijanović *et al.*, 2020). On the contrary, retail investors are more likely to participate in corporate governance-related activism, especially during a contentious proxy fight, as they may believe that their vote is more likely to affect the outcome (Bolodeoku, 2007). Geys (2006) also argues that closeness is the most analyzed element in the turnout literature, and the probability of being decisive is determined by the individual's subjective estimate of how close the candidates are in the competition. In this sense, this study considers contentious (i.e. "votes-for" between 40% and 60% of votes outstanding) corporate governance-related activisms[19] as the first type of high salience proposals that resonate with retail investors' preferences. The ex post approach, which uses the actual election result, has become a standard measure of the closeness variable.

[18] Instrumental/pivotal voting theory suggests that participation is based on the cost and degree to which the vote would be detrimental to the outcome (Downs, 1957; Owen & Grofman, 1984).

[19] Based on the sample of this study, there are 675 contentious corporate governance proposals (i.e. "votes-for" between 40% and 60% of votes outstanding), which accounts for 28.61% of corporate governance proposals in sample (675 out of 2,359 corporate governance proposals in total). Assuming that retail investors' participation increases by 10%, the outcome of these contentious proposals would be different. This highlights the importance of retail investors' participation during a contentious proxy voting. For more details, please refer to Table 3.1.

Secondly, according to the ethical/altruistic voter theory, people might choose to vote no matter the electoral outcome if it fulfills their self-interest by considering broader welfare, such as environmental and social issues. Brunswick (2015) shows that environmental and social issues are considered as the middle tier of important issues by retail investors, only following the management issues of the company. ProxyPulse (2016) also indicates that around 78% of all retail investors are more inclined towards green products and services. In this sense, this study considers environmental and social related proposals as the second type of high salience proposals that might attract retail investors' higher participation.

Lastly, the minimax regret theory[20] also incorporates retail investors' presences, which is likely to result in increased retail investors' participation. According to the National Financial Capability Study by Lin, Bumcrot, Mottola, and Walsh (2016), avoiding loss is the second most important motivator for retail investors to seek professional help, preceded by improving performance. To draw a parallel in shareholder activism, it is expected that retail shareholders would like to participate more in the wake of financial distress. In this sense, this study considers corporate-related proposals for financially distressed firms as the third type of high salience proposals that might pique retail investors' attention and subsequent participation.

Consequently, in this study, the three types of proposals, namely contentious corporate governance proposals, environmental and social related proposals, and corporate governance-related proposals for financially distressed firms, are collectively referred to as high salience proposals. Higher participation of retail investors is expected during these high salience activism events. In this respect, this study hypothesizes that:

Hypothesis 3a: Retail investors' attention is positively associated with their participation during high salience activism that resonates with retail investors'

[20] According to minimax regret approach, individuals vote under uncertainty and they are likely to choose an outcome that would result in minimum regret in the worst-case scenario (Geys, 2006).

interests and preferences.

Retail investors would monitor and engage only if they are adequately informed (Fisch, 2017). To gather information about shareholder activism, retail investors choose to search online, including annual reports, research reports, broachers, newsletters, blogs, and websites[21]. In line with *Hypothesis 2b*, corporate transparency would be instrumental for retail investors, especially during shareholder activism, when the retail investors need to decide between an activist shareholder and incumbent management. Consequently, compared to firms with higher levels of transparency, it is expected that firms with lower levels of information transparency would have a more pronounced increase in retail investors' attention and subsequent participation during high salience activism. In this respect, this study hypothesizes that:

Hypothesis 3b: The impact of retail investors' attention on their participation during high salience activism is more pronounced for less transparent firms.

3.2.4 E-proxy reform and participation

SEC proposed an E-proxy rule in 2005, with full implementation from January 1st, 2009. Before the E-proxy rule, companies were required to disseminate proxy materials through postal delivery. The E-proxy rule offers the companies two options for making the proxy materials publicly available, namely "full set delivery option" and "notice only option." Under the "full set delivery option," companies are required to send shareholders all proxy materials by physical mails and post proxy materials on their website on the same day. Under the "notice only option," companies are only required to send shareholders a notice including the web address of materials along with the date of availability. The investors are also given a choice to continue to receive proxy

[21] According to Brunswick (2015), 84% of retail investors would choose to conduct a search online. National Financial Capability Study (2018) also documents that around 75% of retail investors conduct their own research using the free information available on the internet to make a decision regarding their investment.

materials by physical mails if the companies switch to electronic dissemination[22].

There are limited studies on the impact of E-proxy. The only existing literature on E-proxy is Geoffroy (2018), which finds a negative effect of E-proxy on retail shareholders' participation, arguing that retail investors would treat electronic communications less important because electronic dissemination of proxy documents is cheaper.

However, in this context, it is expected that the introduction of E-proxy would facilitate retail shareholders to access proxy materials online, extract relevant information, and communicate and share information through the internet. Investors can also co-ordinate their efforts to conduct further research and analysis on proxy materials with the availability of online documents (Kraut, Mukhopadhyay, Szczypula, Kiesler, & Scherlis, 1998; Wagenhofer, 2007). Consequently, given the convenience of information collection and sharing, which would facilitate retail investors' attention and participation (based on *Hypotheses 1* and *3a*), it is expected that there would be a further increase in retail investors' participation during high salience activism after the introduction of E-proxy. In this respect, this study hypothesizes that:

Hypothesis 4: Retail investors' participation during high salience activism is facilitated by E-proxy.

3.3 Data and variable descriptions

3.3.1 Sample description

This study uses Google's Proprietary Trends dataset to explore retail investors' attention. As the Google Trends data is only available from 2004 onwards, the sample period is 2005-2016. The shareholder activism data is obtained from the FactSet SharkRepellent dataset, which provides all shareholder activism events in the U.S.

[22] However, according to SEC, only 1% investors choose to return by physical delivery.

The sample period consists of a total of 8,786 shareholder proposals. This study first excludes 1,195 shareholder proposals for utilities, banking, insurance, and other financial firms due to their different reporting and regulatory requirements. This study further excludes 976 shareholder proposals with missing voting outcome data, pending results, or never voted on. Another 980 shareholder proposals are excluded due to their generic ticker symbols[23], such as "AN," "ASH," and "BIG." In addition to valid search volume[24], this study also requires the firm's coverage in the COMPUSTAT, CRSP, and FactSet ownership dataset. Thus, the final sample ends with up 4,022 shareholder proposals.

Table 3.1 provides information on the sample proposals. Panel A shows the temporal distribution of shareholder activism over the sample period. Across all years, sample firms received the largest number of proposals in 2009 (390 proposals or 9.70%) and 2015 (395 proposals or 9.82%), mostly owing to the increasing number of corporate governance proposals. Firms received the least amount of proposals in 2012 (189 proposals or 4.70%).

Panel B shows the subcategories of proposals, i.e. social and environmental proposals, corporate governance proposals, and other types of proposals. This study further distinguishes corporate governance proposals that are related to close voting or firms in financial distress[25]. Overall, more proposals are related to corporate governance (2,359 proposals), accounting for 58.66% of total proposals, while there are 1,307 social and environmental proposals (32.49%). The high salience proposals (namely social and environmental proposals, and governance proposals related to close voting or for firms in distress) account for almost 56.84% of the sample proposals. Panel C reports the major proponents of the sample proposals. 23.69% of the proposals come

[23] Following the prior literature, most notably Da *et al.* (2011), Drake *et al.* (2012) and Ben-Rephael *et al.* (2017), this study also makes use of stock ticker symbols to source the Google Trends data.
[24] Firms that have zero search volume throughout the sample period are considered as invalid SVI.
[25] In this study, firms whose z-score is below 1.83 are considered as financially distressed firms.

from retail investors, followed by labor unions (19.42%), other stakeholders (15.89%), and public pension funds (12.53%).

Table 3.1 Overview of shareholder activism

This table provides an overview of shareholder activism events in this study. The full sample consists of 4,022 shareholder proposals covering the period of 2005-2016.

Panel A: Temporal distribution		
Year	**No. of Proposals**	**Proportion**
2005	308	7.66%
2006	332	8.25%
2007	368	9.15%
2008	351	8.73%
2009	390	9.70%
2010	348	8.65%
2011	263	6.54%
2012	189	4.70%
2013	345	8.58%
2014	354	8.80%
2015	395	9.82%
2016	379	9.42%
Sum	4,022	100%
Panel B: Proposal subcategory		
Social and environmental proposals		
Social issues	961	23.89%
Environmental issues	346	8.60%
Corporate governance (CG) proposals		
Close CG voting	675	16.78%
CG for financially distressed firm	414*****	10.29%
Remaining CG proposals	1380	34.31%
All other proposals	356	8.85%
Panel C: Proponent type		
Corporation	35	0.87%
Hedge fund company	222	5.52%
Individual	953	23.69%
Investment adviser	245	6.09%
Labor unions	781	19.42%
Named stockholder group	7	0.17%
Other institutions	108	2.69%
Other stakeholders	639	15.89%
Public pension funds	504	12.53%
Religious groups	321	7.98%

***Note*: * Overlap; Contains 110 closely contested shareholder proposals for firms in financial distress.**

3.3.2 Variables description

3.3.2.1 Google Search Volume

As retail shareholders lack resources and time to generate their research, they are more likely to rely on external sources, especially the internet. Google search volume provides an index, namely the Google Search Volume Index (GSVI), based on the number of searches for a term or topic on a specific day on Google's search engine. In this study, a geographical limit of the U.S. is imposed further to fine-tune the proxy for retail investors' attention. In this way, GSVI around annual general meetings is used to capture the dynamics of retail investors' attention. The daily[26] raw GSVI is gathered using Google's Application Programming Interface (API) around each annual general meeting. Raw GSVI is standardized using fixed scaling. In this study, the raw GSVI is scaled in such a way so that the average value of GSVI is one[27]. Standardizing the raw GSVI is advantageous, as it benchmarks the search volume with a scalar, which facilitates the interpretation of the results and allows for comparisons within and across firms.

After computing the standardized GSVI, this study computes the Abnormal Google Search Volume Index (GASVI), a more direct measure of retail investors' attention. The GASVI captures any abnormal changes in GSVI by comparing it to the benchmark. It thus controls for the average level of search volume and improves predictive ability. The GASVI also reduces the possibility that an omitted variable that happens to be correlated with GSVI would cause confounding results (Ben-Rephael *et al.*, 2017; Da *et al.*, 2011; Drake *et al.*, 2012).

Following Drake *et al.* (2012), GASVI is calculated as GSVI for firm "j" at time "t" ($GSVI_{jt}$) minus the average of GSVI for the same day over the past ten weeks, scaled by the

[26] According to Drake *et al.* (2012), the daily GSVI is considered to be better than the weekly GSVI, as it can better isolate the dynamic of search behaviors of investors.

[27] According to Da *et al.* (2011), any constant scaling can be applied as long as the same constant scaling is used for each stock. The choice of scalar has no impact on the analysis.

average GSVI for the same day over the past ten weeks. The Drake *et al.*'s (2012) method is advantageous, as it controls the day-of-the-week effect of the retail investors' search[28]. It also enables the comparisons of within-firm variation of GASVI.

$$\boldsymbol{GASVI_{jt} = \frac{GSVI_{jt} - Average\ GSVI_{jt}}{Average\ GSVI_{jt}}} \qquad \textbf{Equation 1}$$

where

$$Average\ GSVI_{jt} = \frac{x\sum_{3}^{13} GSVI_{j(t-7x)}}{10} \qquad \textbf{Equation 2}$$

This study further constructs Cumulative Abnormal Search Volume (CGASVI) for the window [-22, 0] (i.e. from 22 days before annual general meetings till the meeting date[29]) using the following equation[30]:

$$CGASVI[22]_j = \ln\left(1 + \frac{\mathrm{t}\sum_{0}^{22} \mathrm{GASVI_{j,t}}}{23}\right) \qquad \textbf{Equation 3}$$

3.3.2.2 Non-participation rate

Retail investors' participation cannot be directly measured. Instead, this study measures retail investors' participation using a non-participation rate. There are several reasons for using the non-participation ratio instead of the participation ratio. Firstly, institutional investors hold around 70% of outstanding equity holdings, and legislation (e.g. Investment Act 1940, ERISA 1974) makes it fiduciary duty of institutional investors to participate during proxy voting. In other words, they have an obligation to vote. According to ProxyPulse (2016), institutional investors tend to vote

[28] The retail investors search patterns vary over the days of the week.

[29] The 23-day window (i.e. [-22, 0]) is used because firms usually require retail investors to furnish their completed proxy cards between 2 and 7 days prior to annual general meetings, if they are not going to cast their vote in person at the meeting. Some brokers also require the completed proxy instructions to be received around 10 days prior to annual general meetings. Thus, the day of 22 is selected by adding 15 days on the most conservative deadline required by firms, i.e. 7 days. A longer event window enables this study to incorporate the behavior of a vast majority of retail investors.

[30] It is notable that there is still an overlap for the first two days. Specifically the meeting day (day 0) is included in the event window, because retail investors can still search on the day of the meeting and vote physically by attending the meeting. Hence, including the meeting day in the event window does not work against the results. However, to make sure the results are robust, this study further adjust the calculation of GASVI to avoid the overlap. Relevant calculation and results are reported in robustness checks.

more than 93% of the shares held. This leads to a dominant percentage of the overall participation from institutional investors. Secondly, contrary to institutional investors, retail investors do not have any obligations to vote, and retail investors' participation is, on average, around 30% of their collective voting rights (ProxyPulse, 2016). In this sense, the non-participation during proxy voting predominately comes from retail investors. Thirdly, with the "non-routine" nature of shareholder activism, brokers cannot cast discretionary votes, and the non-participation is more likely to be a direct consequence of retail investors' inactivity during shareholder activism. In short, the non-participation rate serves as a relevant proxy to understand the dynamics of retail investors' voting patterns.

Following Geoffroy (2018), this study constructs the non-participation rate using the following equation:

$$NPR = \frac{Non{-}Participation}{Shares\ Outstanding} \qquad \textbf{Equation 4}$$

$$Non - Participation\ =\ Shares\ outstanding\ -\ Participation \qquad \textbf{Equation 5}$$

where

$$Participation = Votes\ For\ +\ Votes\ Against\ +\ Votes\ Abstained \qquad \textbf{Equation 6}$$

To address the possible endogeneity issues arising from unobserved heterogeneity, this study further follows Aggarwal, Dahiya, and Prabhala (2018) to control for unobservables that vary across firms and years, and also unobservables that are unique to a firm and year by comparing overall non-participation relative to firm-level non-participation. After accounting for these differences, the remaining non-participation rate would potentially address endogeneity issues. In other words, this would only reflect the non-participation rate related to the specific proposal under consideration.

Voting outcome data for each shareholder proposal are collected from the FactSet SharkRepellent database. The dataset source provides detailed information on the

final tally of votes on each shareholder proposal. Relevant information includes outstanding votes, votes for, votes against, votes abstained, and broker non-votes[31].

3.3.2.3 L-M Tone

To extract sentiment from the proxy filings, this study downloads all the filings for respective shareholder proposals from the SEC-EDGAR website. Following the process designed by Li (2008), this study prepares each of the documents for textual analysis. To identify the sentiment in the text, this study creates a measure of tone using a dictionary created by Loughran and McDonald (2011). This dictionary provides a comprehensive and exhaustive list of the most commonly used words in accounting and finance, and it also reclassifies several words to reflect their connotation. This study processes the proxy materials and collates the number of words included in Loughran and McDonald's list of positive and negative words[32]. There is a total of 2,355 negative words and 354 positive words.

After deriving the count of positive and negative words, this study transforms them as percentages using total words in the respective proxy filing documents. Following Loughran and McDonald (2015), the *LM-Tone* for firm "j" at time "t" is calculated as the difference between the percentage of positive words and the percentage of negative words in the proxy filings for firm "j" at time "t," as follows:

$$\mathrm{LM-Tone}_{j,t} = \%Postivie\ Words_{j,t} - \%Negative\ Words_{j,t} \qquad \textbf{Equation 7}$$

When $\%Negative\ Words$ exceeds $\%Postivie\ Words$, the L-M tone becomes negative. This is what is defined as the negative sentiment expressed in the proxy statement. Based on *Hypothesis 2a*, the negative sentiment is expected to drive higher retail investors' attention.

[31] If the tally of votes is "votes against", and votes abstained and broker non-votes are unavailable, the votes are assumed to be zero.

[32] This study uses Master Dictionary updated in 2016, which is available from https://sraf.nd.edu/textual-analysis/resources/#LM%20Sentiment%20Word%20Lists

3.3.2.4 Firm-level Transparency

This study measures firm-level transparency following Llorente, Michaely, Saar, and Wang (2002) (LMSW hereafter) model. Stock return autocorrelation conditional on trading volume serves as a proxy for firm-level transparency. Specifically, this measure is constructed from the following regression estimated for each firm-year:

$$r_{j,t} = \alpha_j + \gamma_j r_{j,t-1} + \vartheta_y r_{j,t-1} V_{j,t-1} + e_{j,t} \qquad \textbf{Equation 8}$$

where $r_{j,t}$ and $r_{j,t-1}$ are contemporaneous and lagged weekly stock returns, respectively, and $V_{j,t-1}$ is lagged log turnover detrended by subtracting the moving average of logged turnover over the prior 26 weeks. The key estimate is the coefficient of the interaction term, namely ϑ_y, which reflects the amount of information-based trading.

According to Llorente *et al.* (2002), firms with less transparency should have a positive value of ϑ_y due to partial adjustments to the prices, whereas firms with higher transparency would have a negative value of ϑ_y due to return reversal. Hence, this study creates a dummy variable, LMSW, which takes the value of one if $\vartheta_y > 0$, and zero otherwise. This dummy variable helps isolate the impact of transparency on retail investors' participation in the voting process.

3.3.2.5 Other control variables

This study includes a comprehensive set of control variables known in the literature to ensure that omitted variable issues do not plague the empirical findings. A list of variables, including their definitions, is presented in Table 3.2. *#News* is constructed as the natural logarithm of one plus the number of news articles mentioning the target firm within a 10-day window preceding the annual general meetings, where the number of news articles is collected by searching for the name of the respective target firms in the Factiva database. Institutional ownership (*InstOwn*) is sourced from the FactSet ownership dataset. The analyst following (*Analyst*) data comes from the

I/B/E/S dataset. Stock returns, turnover, and firm age data are collected from CRSP. The data for all the remaining control variables are gathered from COMPUSTAT, including market capitalization (*Mcap*), Tobin's Q (*TobinQ*), preceding three years stock return (*3yrReturns*), number of employees (*#Employees*), advertising expense (*Advertising*), and Z-score.

This study further calculates absolute abnormal return and turnover. Abnormal turnover (*AbTV*) for firm "j" at time "t" is calculated as the difference between the trading volume for firm "j" at time "t" and the average trading volume for the same firm "j" averaged over the past 100 days. The average trading volume scales the difference over the same period.

$$AbTV_{j,t} = \frac{Trading\ Volume_{j,t} - Average\ Trading\ Volume_{j,t}}{AverageTradingVolume_{j,t}} \quad \textbf{Equation 9}$$

where

$$TradingVolume\ = Price_{j,t} \times Turnover_{j,t} \quad \textbf{Equation 10}$$

$$AverageTradingVolume_{j,t} = \frac{\sum_{t=-1}^{-100} TradingVolume_{j,t}}{100} \quad \textbf{Equation 11}$$

Absolute abnormal return (*AbsRet*) for firm "j" at time "t" is calculated as the difference between the return of firm "j" at time "t" and CRSP value-weighted index at time "t."

$$AbsRet_{j,t} = |Return_{j,t} - Retrun\ on\ CRSP\ Value\ Weighted_t| \times 100 \quad \textbf{Equation 12}$$

Table 3.2 Variables description

This table lists the variables used in this study, together with their definitions. Abnormal Google Search Volume Index (GASVI) and Cumulative Abnormal Search Volume (CGASVI) are used to capture the dynamics of retail investors' attention. The non-participation rate is used to measure retail investors' participation during high salience activism. A set of control variables are also included.

Variables	Description
Pre[22]	A dummy variable that assumes the value of one if the respective day is within the 22 days prior to the annual general meetings, and zero otherwise.
GASVI	Abnormal Google Search Volume Index following Drake *et al.* (2012); calculated as the average value of raw Google Search Volume Index (GSVI) for a given day *t* minus the average GSVI of the days over the past ten weeks, scaled by the average SVI for the same weekdays over the past ten weeks.
CGASVI[22]	Cumulative Abnormal Google Search Volume for the window [-22, 0], which is calculated as the natural logarithm of (1+ average value of $GASVI_{j,t}$), estimated over 23 days (22 days prior to the annual general meetings to the meeting date).
LMSW	A measure of information transparency suggested by Llorente *et al.* (2002), which is calculated using stock return autocorrelation conditional on trading volume. LMSW assumes the value of one if the firm is less transparent and zero otherwise.
LM-Tone	The tone of proxy documents following Loughran & McDonald (2015), which is calculated as the difference between the percentage of positive words and negative words identified by Loughran & McDonald (2011) dictionary.
NPR	Non-participation rate following Geoffroy (2018), which is calculated as the ratio of non-participation to total votes outstanding. Non-participation is calculated from the difference between outstanding votes and the participating votes (for, against, and withholding).
Highsal	A dummy variable that takes the value of one if the firm receives a proposal related to environmental or social issues, or a proposal related to contentious (i.e. votes-for" between 40% and 60% of votes outstanding) corporate governance, or if the firm receives corporate governance-related proposal and the firm is in financial distress (Z-score below 1.83), zero otherwise.
Eproxy	A dummy variable that assumes the value of one for the years after the full implementation of E-proxy legislation (i.e. 2009), and zero otherwise.

#News	The number of news articles, which is calculated as the natural logarithm of (1+ number of news articles published within 10 days preceding the annual general meetings); data extracted from Factiva.
Advertising	Advertising expense, which is calculated as (Advertising expense)/Sales; data extracted from COMPUSTAT.
Mcap	Market capitalization, which is calculated as the natural logarithm of market capitalization; data extracted from COMPUSTAT.
TobinQ	Tobin's Q, which is calculated as (Total Assets + Market Capitalization - Ordinary Equity)/Total Asset; data extracted from COMPUSTAT.
InstOwn	Institutional ownership, the percentage of shares held by institutional investors; data extracted from the FactSet.
3yrReturns	Stock returns three years preceding annual general meetings; data extracted from COMPUSTAT/CRSP.
#Employees	The number of employees, which is calculated as the natural logarithm of (1+ number of employees); data extracted from COMPUSTAT.
FirmAge	Age of the firm the time of activism, which is calculated as the difference between the time of the annual general meeting and when CRSP first started reporting the firm's stock prices.
Analyst	The number of Analyst following, which is calculated as the natural logarithm of (1+ number of analyst following). Analyst following is the number of analysts who provide a one-year EPS guide for the firm in I/B/E/S dataset.
Tangibility	The ratio of tangible assets to total assets; data extracted from COMPUSTAT.
AbsRet	Absolute abnormal return, which is calculated as a firm's excess return over CRSP value-weighted index.
AbTV	Abnormal turnover, calculated from the ratio of value-weighted turnover for the day to an average of value-weighted turnover over the past 100 days.
Spread	Bid-Ask spread following Corwin & Schultz (2012), which is calculated as the bid-ask spread from high and low prices.

3.4 Core results

3.4.1 Descriptive statistics

Table 3.3 presents descriptive statistics for the variables used in the empirical investigations. The mean value of cumulative abnormal SVI (*CGASVI[22]*) is 0.036, which

indicates that the cumulative investor search volume is 3.60% higher during the window [-22, 0] preceding the annual general meetings. On average, the non-participation rate (*NPR*) is 27.245%, which is close to the median value of 24.649%. The mean (median) of the *LM-tone* is -0.130 (-0.127). The negative mean value of *LM-tone* implies that, on average, there are 0.13% more negative words in the sample proposals. In other words, the negative sentiment is widely expressed in the proxy proposals.

Table 3.3 Descriptive statistics

The table provides descriptive statistics for Google Search Volume, tone of proxy materials, non-participation rate, and other control variables. The sample consists of 4,022 shareholder proposals during the period 2005-2016. The variable definitions are provided in Table 3.2. All variables are winsorized at 1st and 99th percent.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	**Mean**	**Std.dev.**	**p10**	**p25**	**p50**	**p75**	**p90**
CGASVI[22]	0.036	0.178	-0.131	-0.053	0.010	0.098	0.248
NPR	27.245	13.611	14.721	18.459	24.649	32.245	40.556
LM-Tone	-0.130	0.051	-0.199	-0.161	-0.127	-0.095	-0.067
#News	1.285	1.682	0.000	0.000	0.000	2.944	4.043
Mcap	9.667	2.039	6.915	8.423	9.935	11.085	12.151
Advertising	0.013	0.023	0.000	0.000	0.000	0.014	0.039
TobinQ	1.948	0.978	1.077	1.314	1.690	2.203	3.161
InstOwn	75.394	17.646	52.181	65.380	78.039	87.193	94.911
Tangibility	0.307	0.238	0.054	0.110	0.235	0.503	0.673
3yrReturns	8.228	18.802	-14.520	-1.915	7.581	19.730	30.613
#Employees	3.521	1.559	1.318	2.427	3.738	4.540	5.446
FirmAge	3.505	0.778	2.460	2.984	3.622	4.238	4.424
Analyst	2.142	1.411	0.000	0.000	2.890	3.219	3.434
N 4,022							

Table 3.4 reports the Pearson correlation matrix. The correlations among variables are generally low, except for a few cases. Market capitalization (*Mcap*) has a relatively high correlation with the number of employees (*#Employees*), firm age (*FirmAge*), and the number of analysts following (*Analyst*).

Table 3.4 Correlation matrix

This table provides a correlation for all firm-specific variables. The sample size is based on 4,022 shareholder proposals received during the period 2005-2016. The variable definitions are provided in Table 3.2. All variables are winsorized at 1st and 99th percent.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) NPR	1.000												
(2) CGASVI[22]	0.003	1.000											
(3 LM-Tone	-0.067	-0.053	1.000										
(4) #News	0.043	0.015	-0.066	1.000									
(5) Mcap	-0.089	-0.095	-0.056	0.232	1.000								
(6) Advertising	-0.004	-0.004	0.132	0.096	0.031	1.000							
(7) TobinQ	-0.038	0.063	0.071	0.041	0.213	0.228	1.000						
(8) InstOwn	-0.235	0.038	0.230	-0.062	-0.219	0.046	-0.012	1.000					
(9) Tangibility	0.065	-0.016	-0.149	-0.044	0.017	-0.157	-0.199	-0.063	1.000				
(10) 3yrReturns	-0.088	-0.011	0.086	0.005	0.300	0.056	0.411	0.041	-0.055	1.000			
(11) #Employees	-0.085	-0.106	-0.062	0.147	0.706	0.010	-0.040	-0.216	0.074	0.124	1.000		
(12) FirmAge	0.082	-0.057	-0.056	0.264	0.405	-0.082	-0.083	-0.209	0.021	0.013	0.403	1.000	
(13) Analyst	-0.103	-0.070	0.092	0.077	0.444	0.011	0.081	0.007	0.061	0.056	0.305	0.174	1.000

3.4.2 Propensity Score Matching

In order to explore how retail investors' attention changes prior to annual general meetings, this study first identifies matching control firms that do not receive shareholder proposals using the Propensity Score Matching [33]. Following the specification of Prevost, Wongchoti, & Marshall (2016), Da *et al.* (2011), and Drake *et al.* (2012), this study matches the control firms based on firm-specific characteristics, including institutional ownership, market capitalization, Tobin's Q, tangibility, advertising expenses, the number of employees, and firm age, as shown in the following regression:

$$Target_{j,t} = \beta_0 + \beta_1 InstOwn_{j,t} + \beta_2 Mcap_{j,t} + \beta_3 TobinQ_{j,t} + \beta_4 Tangibility_{j,t} + \beta_5 3yrReturns_{j,t} + \beta_6 Advertising_{j,t} + \beta_7 \#Employees_{j,t} + \beta_8 FirmAge_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$$ **Equation 13**

where $Target_{j,t}$ takes the value of one if the firm receives a shareholder proposal in a certain year, and zero otherwise. δ_t and δ_{ind} are year and industry fixed effects. All the variables are defined in the table in Table 3.2, and all continuous variables are winsorized at 1st and 99th percent. Table 3.5 reports results based on the probit regression indicating the firm-specific characteristics of the target firms. Firms with higher market capitalization, higher tangibility ratio, lower institutional ownership, and worse stock performance are more likely to be targeted during shareholder activism. The number of employees and firm age are also positively associated with the likelihood of a firm being targeted.

[33] The target firms are matched with control firms from the same year and same industry, which is based on Fama French 17 industry classification.

Table 3.5 Probit regression of Propensity Score Matching

This table reports results of Propensity Score Matching based on the following probit regression: $Target_{j,t} = \beta_0 + \beta_1 InstOwn_{j,t} + \beta_2 Mcap_{j,t} + \beta_3 TobinQ_{j,t} + \beta_4 Tangibility_{j,t} + \beta_5 3yrReturns_{j,t} + \beta_6 Advertising_{j,t} + \beta_7 \#Employees_{j,t} + \beta_8 FirmAge_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$, which includes the firm-level characteristics of institutional ownership, market capitalization, Tobin's Q, tangibility ratio, three-year stock returns, advertising expenses, the number of employees, and firm age. The variable definitions are provided in Table 3.2. Standard errors are provided below in the parentheses. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)
Variables	**Target**
Mcap	0.256***
	(0.011)
Advertising	-0.054
	(0.466)
TobinQ	-0.006
	(0.007)
InstOwn	-0.002***
	(0.001)
Tangibility	0.199***
	(0.066)
3yrReturns	-0.239***
	(0.019)
#Employees	0.193***
	(0.015)
FirmAge	0.282***
	(0.022)
Constant	-4.953***
	(0.127)
Observations	35,081
Year Fixed Effect	Yes
Industry Fixed Effect	Yes
Pseudo R-squared	0.313

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.6 reports the balance test of the Propensity Score Matching. The matching procedures identify 1,903 control firms without any shareholders' proposals during the annual general meetings. Although the Propensity Score Matching reduces the

sample size[34], the procedure ensures firms matched in the same propensity categories also have a similar average of the covariates.

Table 3.6 Balance test of Propensity Score Matching

This table provides the balance test of Propensity Score Matching. The control sample is formed by matching each event firm to a non-event control firm from the same year and the same industry (following the Fama-French 17 industry classifications) with the closest propensity score. The propensity score is estimated based on firms' institutional ownership, market capitalization, Tobin's Q, tangibility ratio, advertising expenses, the number of employees, and firm age. The variable definitions are provided in Table 3.2.

Variables	Target	Matched	Obs. Target	Obs. Matched	Diff.
Mcap	9.020	8.124	2,034	1,903	-0.896***
Advertising	0.0120	0.0140	2,034	1,903	0.00100
TobinQ	2.039	3.186	2,034	1,903	1.147***
InstOwn	78.63	72.22	2,034	1,903	-6.401***
Tangibility	0.288	0.280	2,034	1,903	-0.00700
3yrReturns	9.097	11.00	2,034	1,903	1.900**
#Employees	3.084	2.684	2,034	1,903	-0.399***
FirmAge	3.355	3.304	2,034	1,903	-0.051**

3.4.3 Does shareholder activism increase retail investors' attention?

This study first explores whether retail investors' attention increases before the annual general meetings for firms that receive shareholder proposals (i.e. target firms) (*Hypothesis 1*). After identifying appropriate control firms, this study first plots the trends of Abnormal Search Volume (GASVI) for target and matched firms over the window [-50, +20] around annual general meetings. The figure is presented in Figure 3.1. The figure clearly shows that target firms have a greater increase in GASVI (retail investors' attention) prior to annual general meetings compared to matched firms.

[34] This study has one-to-one match for each target and control firm to make more precise comparisons. However, it should also be noticed that the significant difference between the target and control firms, as shown in Table 3.6, is not an indicator of an unbalanced match. Instead, the targets and their matched peers are identical in all firm-level characteristics before taking GSVI into consideration. Firms that do not receive shareholder proposals might attract low or even no attention from retail investors (i.e. zero GSVI), leading to the exclusion of these firms from the sample. Results reported in Table 3.6 are based on the final matched sample.

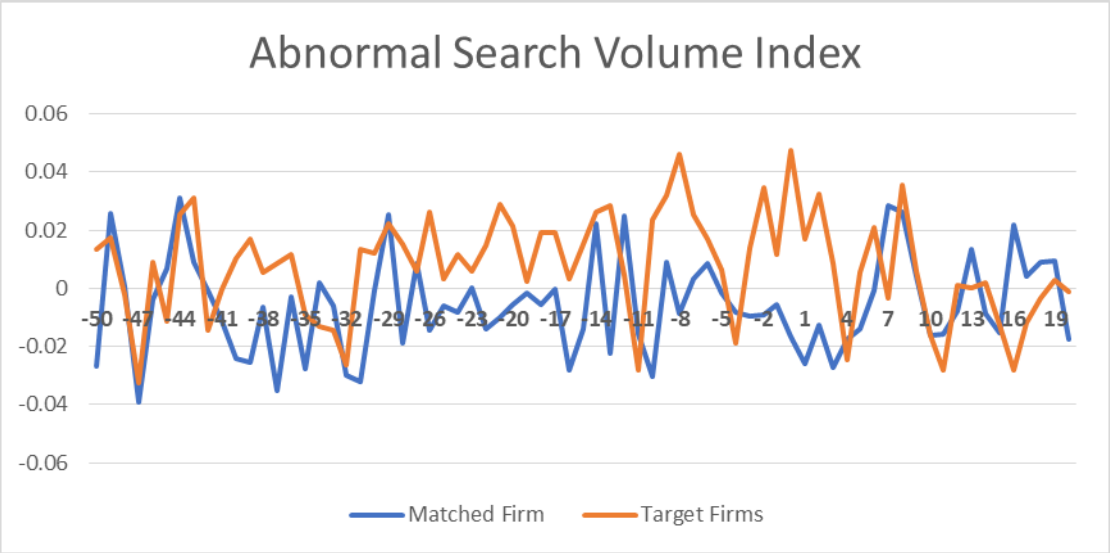

Figure 3.1 Trends of GASVI around annual general meetings

This figure plots the time-varying trends of Abnormal Search Volume (GASVI) for target and matched firms over the window [-50, +20] around annual general meetings

In the next step, this study sets up multivariate analyses to explore the differences in retail investors' attention between the target and control firms before the annual general meetings:

$$GASVI_{j,t} = \beta_0 + \beta_1(Pre[22] \times Target)_{j,t} + \beta_2(Pre[22])_{j,t} + \beta_3(Target)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t} \quad \textbf{Equation 14}$$

where $GASVI_{j,t}$ is the Abnormal Google Search Volume Index as calculated by Equation 1. $Pre[22]$ is a dummy variable representing the observation windows. $Pre[22]$ assumes the value one if the respective day is within 22 days prior to the annual general meetings, and zero otherwise. The variable of interest is the interaction term ($Pre[22] \times Target$) following *Hypothesis 1*, and β_1 is expected to have a positive sign, indicating higher retail investors' attention for the target firms relative to the control firms before the annual general meetings. A series of control variables ($X_{j,t}$) are included in the regression, including advertising expense, market capitalization, Tobin's Q, institutional ownership, tangibility ratio, three-year stock returns, and the number of employees, as defined in Section 3.3.2.5 and Table 3.2. δ_t and δ_{ind} are year and industry fixed effects.

Table 3.7 reports the estimated results of Equation 14. Column (1) shows that the coefficient of $Pre[22] \times Target$ is 0.015, implying that the target firms receive 1.5% higher attention from retail investors relative to the control firms 22 days preceding the annual general meetings. The coefficient of $Pre[22]$ shows retail investors' attention for the control firms. The insignificant relationship between $Pre[22]$ and $GASVI$ indicates that retail investors' attention does not increase significantly prior to the annual general meetings if the firms do not receive a shareholders' proposal[35].

Moreover, for the target firms ($Target_{j,t}$ taking the value of one), the coefficient of $Pre[22]$ becomes $(\beta_1 + \beta_2)$, with an estimate of 0.012, which is statistical significance at 5% level (*F-stat* = 5.82, *p-value* = 0.02). This implies that the target firms as a whole receive 1.2% higher attention from retail investors as measured by GASVI. To put into context in terms of significance, these results can be compared with the findings of Drake *et al.* (2012). Drake *et al.* (2012) report a surge in the abnormal search volume before corporate events, with the highest increase in the abnormal search volume of 1.3% six days before an earnings announcement and only a 0.3% increase before analyst forecast.

Column (2) reports the subsample results of the target firms that receive a high salience proposal along with their respective control firms. The estimate of the coefficient of $Pre[22] \times Target$ in this case is 0.019, with statistical significance at 5% level. In other words, the firms with high salience proposals receive 1.9% higher attention compared to the control firms. This finding is much stronger compared to the whole sample of the target firms.

In addition, Drake *et al.* (2012) find that abnormal Google search significantly increases before the earnings announcements. To control the effect of earnings announcements, this study further removes all the firms, both target and control, that have earnings

[35] Different event windows (19, 20, 21 and 23 days) are applied for robustness checks. This study has also tried other various fixed effects (year, industry, etc.) and clustering of standard errors on various dimensions (meeting, firm, industry). The results do not change significantly. More information is provided in Section 3.5.

announcements 45 days around the annual general meetings. The regression results of this subsample are reported in Column (3). The coefficient of $Pre[22] \times Target$ becomes 0.027, with statistical significance at 5% level, which is higher than the results in Column (1). Such findings suggest that the results based on all the target firms capture the lower boundary of attention while keeping statistical significance at a reasonable level.

Table 3.7 Retail investors' attention during shareholder activism

This table provides the incremental retail investors' attention before the annual general meetings compared to a set of control firms identified through the Propensity Score Matching. The dependent variable is Google Abnormal Search Volume (GASVI). The estimates are based on the following regression equation: $GASVI_{j,t} = \beta_0 + \beta_1(Pre[22] \times Target)_{j,t} + \beta_2(Pre[22])_{j,t} + \beta_3(Target)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$, where $Target_{j,t}$ takes the value of one if the firm receives a shareholder proposal in a certain year, and zero otherwise; $Pre[22]$ assumes the value of one if the respective day is within 22 days prior to the annual general meetings, and zero otherwise. $X_{j,t}$ represents a set of control variables, including market capitalization, advertising expenses, Tobin's Q, institutional ownership, tangibility ratio, three-year stock returns, and the number of employees. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)
	All firms	High salience firms	Firms with no earning announcements
Variables	**GASVI**	**GASVI**	**GASVI**
Pre[22]×Target	0.015**	0.019**	0.027**
	(0.007)	(0.009)	(0.012)
Pre[22]	-0.003	-0.001	-0.011
	(0.005)	(0.006)	(0.007)
Target	-0.008*	-0.008	-0.005
	(0.005)	(0.005)	(0.006)
Mcap	0.013***	0.014***	0.009***
	(0.003)	(0.003)	(0.003)
Advertising	-0.035	-0.116	-0.058
	(0.118)	(0.143)	(0.160)
TobinQ	-0.002**	-0.004***	-0.002*
	(0.001)	(0.001)	(0.001)
InstOwn^X	0.066***	0.071***	0.052***
	(0.014)	(0.018)	(0.016)
Tangibility	0.023	0.032**	0.007

	(0.015)	(0.016)	(0.017)
3yrReturns^{X}	-0.005	-0.018	0.012
	(0.013)	(0.018)	(0.014)
#Employees	-0.005	-0.009**	-0.001
	(0.003)	(0.004)	(0.004)
FirmAge	-0.001	0.005	0.003
	(0.003)	(0.003)	(0.004)
Constant	-0.132***	-0.153***	-0.087***
	(0.025)	(0.035)	(0.027)
Observations	405,747	212,145	188,640
R-squared	0.003	0.003	0.002
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Note: The variables with the superscript (^{X}) mean that the estimates of their coefficients are multiplied by 100. The note for the superscript is applicable throughout all the tables in this thesis.

3.4.4 Do proxy sentiments and transparency impact retail investors' attention?

After establishing the fact that the target firms generally receive greater attention from retail investors before the annual general meetings more than the matched firms, this study further restricts the sample to the target firms only (i.e. there are no matching firms in the sample) to examine whether firm-level and campaign-level factors would facilitate retail investors' attention[36]. To explore how much retail investors' attention is related to the sentiment revealed in the proxy statements (*Hypothesis 2a*), this study employs the following equation:

$$GASVI_{j,t} = \beta_0 + \beta_1(Pre[22])_{j,t} + \beta_2(LM-Tone)_{j,t} + \beta_3(Pre[22] \times LM-Tone)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t} \quad \textbf{Equation 15}$$

where the variable *LM-tone* captures the sentiment revealed in the proxy statements. A positive (negative) value of the *LM-tone* implies the dominance of positive (negative)

[36] Since *LM-tone* is the measure of sentiment expressed in the proxy statements, the control firms are excluded here, as the control firms do not receive shareholders' proposals.

words or sentiment over negative (positive) words or sentiment in the proxy statements. Based on *Hypothesis 2a*, β_2 is expected to be negatively significant, indicating that the negative sentiment grabs more retail investors' attention before the annual general meetings. β_1 is expected to be positive, as $Pre[22]$ has been found significantly positive following *Hypothesis 1*. The interaction term $(Pre[22] \times LM - Tone)$ captures the incremental effect of the sentiment in the proxy statements (LM-tone) on retail investors' attention prior to the annual general meetings. $X_{j,t}$ represents a comprehensive set of control variables indicating firms' information environment and financial situation. These control variables include advertising expense, market capitalization, Tobin's Q, institutional ownership, tangibility ratio, three-year stock returns, the number of employees, the number of news articles, the number of analyst following, bid-ask spread, abnormal turnover, and abnormal return, as defined in Section 3.3.2.5 and Table 3.2. δ_t and δ_{ind} are year and industry fixed effects.

To explore the impact of firm-level information transparency on retail investors' attention (*Hypothesis 2b*), this study further adds the variable *LMSW* in the multiplicative form with $Pre[22]$ in the regression, as shown in the following equation:

$$GASVI_{j,t} = \beta_0 + \beta_1(Pre[22] \times LMSW)_{j,t} + \beta_2(Pre[22])_{j,t} + \beta_3(LM - Tone)_{j,t} + \beta_4 LMSW_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t} \quad \textbf{Equation 16}$$

where the variable *LMSW* captures the firm-level transparency, and it takes the value of one if $\vartheta_y > 0$ (when the firm is less transparent) and zero otherwise. $X_{j,t}$ represents the same set of control variables as in Equation 15. δ_t and δ_{ind} are year and industry fixed effects. Based on *Hypothesis 2b*, β_1 is expected to be positively significant, capturing the incremental effect of retail investors' attention for the less transparent firms, given that the coefficient of $Pre[22]$ (i.e. β_2) is positive. The *LM-tone* variable is also kept in the regression, allowing it to be an additional control.

Table 3.8 reports results of *Hypotheses 2a and 2b*, based on Equations 15 and 16, respectively. Column (1) starts with the regression without the interaction term, and Column (2) adds the interaction term into the regression which captures the incremental effect. Column (1) shows that the estimate of the coefficient of *LM-tone* is -0.137, statistically significant at 5% level, implying that the positive sentiment expressed in the shareholder proposals lowers retail investors' attention. In other words, the negative sentiment increases the abnormal search by the retail investors, supporting *Hypothesis 2a*. This finding is consistent with prior studies that markets react more aggressively to bad news than good news (Glosten, Jagannathan, & Runkle, 1993), and the negative sentiment generally has a stronger pull on attention than the positive sentiment (Baumeister *et al.,* 2001). The coefficient of $Pre[22]$ is positively and significantly related to $GASVI$, with the value of 0.018, indicating that the increase in abnormal search (i.e. retail investors' attention) is significant before the annual general meetings. This is consistent with *Hypothesis 1* that firms experience an increase in retail investors' attention before the annual general meetings if they receive a shareholder proposal.

Similarly, Column (2) also shows a negative estimate of the coefficient of $Pre[22] \times LM - Tone$ with the value -0.265, statistically significant at 5% level. Firms whose proxy materials are dominated by the negative sentiment attract 26.5% higher retail investors' attention relative to firms whose proxy materials are dominated by the positive sentiment. These results provide further evidence on *Hypothesis 2a* that the negative sentiment increases retail investors' attention during shareholder activism. For other control variables, higher values of firms' Tobin's Q, institutional ownership, tangibility ratio, or abnormal turnover also increase retail investors' attention. On the contrary, the number of news, firms' stock returns during the past three years, and the number of employees are negatively related to the abnormal search.

Columns (3) and (4) show the impact of information transparency on retail investors' attention (*Hypothesis 2b*), based on the regressions with or without the interaction

terms respectively. Column (3) supports the *Hypotheses 1* and 2a that retail investors' attention increases significantly by 1.8% before the annual general meetings and the negative sentiment attracts more attention, as indicated by the positive coefficient of $Pre[22]$ and negative coefficient of *LM-tone*. However, the estimate of the coefficient of *LMSW* is insignificant, implying that in general firm-level information transparency does not significantly affect retail investors' search for information.

More importantly, the key variable of interest in Column (4) is the interaction term $Pre[22] \times LMSW$, which captures the incremental effect of information transparency on retail investors' attention. The estimate of the coefficient of $Pre[22] \times LMSW$ is positively significant at 5% level with a value of 0.026, indicating that retail investors' attention is 2.6% higher if the target firms are less transparent in their information dissemination relative to the target firms that are more transparent. The estimate of the coefficient of *LM-tone* is -0.134, statistically significant at 5% level, which is consistent with the results reported in Column (1). This supports *Hypothesis 2b* that the increase of retail investors' attention is more pronounced for firms with lower information transparency even after controlling for the sentiment expressed in the proposals. These results align with prior studies that information flow improves information acquisition (Goldstein & Yang, 2015). The improvement is more pronounced for firms with higher information asymmetry (Prevost *et al.*, 2016).

Table 3.8 Impact of proxy sentiments and transparency on attention

This table provides the results of *Hypotheses 2a* and *2b*. Column (1) reports the impact of proxy sentiment on retail investors' attention within 22 days before the annual general meetings. The analysis is developed on the following regression: $GASVI_{j,t} = \beta_0 + \beta_1(Pre[22])_{j,t} + \beta_2(LM - Tone)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$, where the variable *LM-tone* captures the sentiment revealed in the proxy statements. Column (2) adds the interaction term $Pre[22] \times LM - Tone$ into the regression which captures the incremental effect. Column (3) examines the impact of information transparency on retail investors' attention before the annual general meetings based on the regression: $GASVI_{j,t} = \beta_0 + \beta_2(Pre[22])_{j,t} + \beta_3(LM - Tone)_{j,t} + \beta_4 LMSW_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$, where the variable *LMSW* captures the firm-level transparency. Column (4) adds the interaction term $Pre[22] \times LMSW$ into the regression, which provides the incremental effect of information transparency on the changes in retail investors' attention. $X_{j,t}$ represents a set of control variables, including market capitalization, advertising expenses, Tobin's Q, institutional ownership, tangibility ratio, three-year stock returns, and the number of employees. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Full Sample	**Full Sample**	**Less transparency**	**Less transparency**
Variables	**GASVI**	**GASVI**	**GASVI**	**GASVI**
Pre[22]×LMSW				0.026**
				(0.012)
Pre[22]×LM-Tone		-0.265**		
		(0.125)		
Pre[22]	0.018***	-0.014	0.018***	0.004
	(0.006)	(0.015)	(0.006)	(0.008)
LM-Tone	-0.137**	-0.078	-0.135**	-0.134**
	(0.058)	(0.060)	(0.057)	(0.057)
LMSW			-0.004	-0.010*
			(0.005)	(0.006)
#News	-0.003*	-0.003*	-0.003*	-0.003*
	(0.001)	(0.001)	(0.001)	(0.001)
Mcap	-0.003	-0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)
Advertising	-0.035	-0.035	-0.034	-0.034
	(0.121)	(0.121)	(0.120)	(0.120)
TobinQ	0.015***	0.015***	0.015***	0.015***
	(0.003)	(0.003)	(0.003)	(0.003)
InstOwn[X]	0.044***	0.0447***	0.000***	0.044***
	(0.016)	(0.0169)	(0.000)	(0.016)
Tangibility	0.028*	0.028*	0.028*	0.028*
	(0.014)	(0.014)	(0.014)	(0.014)

3yrReturns^{X}	-0.037**	-0.0372**	-0.000**	-0.036**
	(0.015)	(0.0158)	(0.000)	(0.015)
#Employees	-0.007**	-0.007**	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)
FirmAge	-0.003	-0.003	-0.003	-0.003
	(0.004)	(0.004)	(0.004)	(0.004)
Analyst	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
AbsRet	0.046	0.047	0.043	0.043
	(0.190)	(0.190)	(0.190)	(0.190)
AbTV	0.023***	0.023***	0.023***	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)
Spread	0.020	0.018	0.020	0.021
	(0.130)	(0.130)	(0.130)	(0.130)
Constant	0.022	0.029	0.025	0.028
	(0.030)	(0.030)	(0.030)	(0.030)
Observations	209,432	209,432	209,432	209,432
R-squared	0.003	0.003	0.003	0.003
Industry Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

To ensure that the impact of the abnormal Google search volume prior to the earnings announcement does not contaminate the results, this study separate firms that have no earnings announcement 45 days around the annual general meetings following Drake *et al.* (2012). However, this results in an exclusion of 1,710 activism events.

The regression results are reported in Table 3.9. Column (1) shows that the estimate of the coefficient of *LM-tone* is -0.256, compared to -0.137 as reported in Table 3.8 (Column (1)). Column (2) also indicates that the increase in retail investors' attention is 5.3% higher if the firms have less transparency. In fact, the comparison between the Column (2) of Table 3.9 and Column (2) of Table 3.8 shows that the attention is higher for less transparent firms with no earnings announcements. These findings confirm that *Hypotheses 2a* and *2b* are strongly held, supporting the findings in Table 3.8.

Table 3.9 Impact of earnings announcements on retail investors' attention

This table provides the results of *Hypotheses 2a* and *2b* by excluding the firms with earnings announcements 45 days around annual general meetings. Column (1) reports the impact of proxy sentiments on retail investors' attention 22 days prior to annual general meetings, and Column (2) provides the incremental effect of information transparency (represented by *LMSW*) on the changes of retail investors' attention. The regression models are identical to the ones in Table 3.8. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)
	Full Sample	**Less Transparency**
Variables	**GASVI**	**GASVI**
Pre[22]×LMSW		0.053**
		(0.021)
Pre[22]	0.020*	-0.009
	(0.011)	(0.014)
LM-Tone	-0.256**	-0.248**
	(0.112)	(0.111)
LMSW		-0.024**
		(0.010)
#News	-0.002	-0.002
	(0.003)	(0.003)
Mcap	-0.003	-0.003
	(0.004)	(0.004)
Advertising	-0.071	-0.067
	(0.218)	(0.218)
TobinQ	0.016**	0.015**
	(0.006)	(0.006)
InstOwn^{X}	0.0099	0.011
	(0.029)	(0.029)
Tangibility^{X}	0.006	0.007
	(0.026)	(0.026)
3yrReturns^{X}	-0.037	-0.034
	(0.024)	(0.025)
#Employees^{X}	0.0047	-0.016
	(0.006)	(0.006)
FirmAge^{X}	-0.059	0.003
	(0.717)	(0.715)
Analyst	-0.010**	-0.010**
	(0.004)	(0.004)
AbsRet	-0.031	-0.037
	(0.329)	(0.328)

AbTV	0.029***	0.029***
	(0.010)	(0.010)
Spread	0.003	0.002
	(0.210)	(0.210)
Constant	0.023	0.037
	(0.054)	(0.054)
Observations	80,301	80,301
R-squared	0.004	0.004
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

3.4.5 Does retail investors' attention impact on participation?

To examine *Hypothesis 3a*, this study explores whether a pre-meeting increase in retail investors' attention increases participation (or reduces non-participation) during high salience activism. In doing so, the non-participation rate (NPR) is regressed on the Cumulative Abnormal Search Volume during the 22-day window before the annual general meetings ($CGASVI[22]$), along with *LM-tone* and other firm-specific control variables around the annual general meetings. The cross-sectional regression model is shown as follows:

$$NPR_{j,t} = \beta_0 + \beta_1(HighSal \times CGASVI[22])_{j,t} + \beta_2(CGASVI[22])_{j,t} + \beta_3(Highsal)_{jt} + \beta_4(HighSal \times LM - Tone)_{j,t} + \beta_5(LM - Tone)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$$

Equation 17

where $HighSal$ is the dummy variable indicating high salience proposals, which assumes the value of one for high salience activism and zero otherwise. The coefficient of $(\beta_1 + \beta_2)$ captures the effect of retail investors' attention on their participation in the voting process for high salience proposals (when $Highsal$ = 1), while the coefficient of the interaction term, $HighSal \times CGASVI[22]$, or β_1 captures the incremental effect of the attention for the high salience proposals on participation. To avoid potential endogeneity issues, $NPR_{j,t}$ is the standardized non-participation rate, following Aggarwal *et al.* (2018). β_1 is expected to have a negative sign, indicating an

incremental decrease (increase) in non-participation (participation) due to an increase in retail investors' attention for high salience proposals. The coefficient of $Highsal$, β_3 captures the non-participation rate for high salience proposals compared to other proposals. Furthermore, to examine the impact of firm-level transparency on retail investors' participation (*Hypothesis 3b*), this study uses a subsample that only includes firms with the positive ϑ_y, that is, the less transparent firms. Relevant results are reported in Table 3.10. Table 3.10 starts the regressions with a simple model without interaction terms, as reported in Column (1). The interactions term are then added into the regressions, as reported in Column (2). Column (3) reports the results of *Hypothesis 3b*.

Column (1) shows that firms receiving high salience proposals have 13.6% lower non-participation rate (higher participation rate) in annual general meetings, while the LM-tone has no direct impact on the non-participation rate. It means that the LM-tone significantly affects retail investors' attention (*Hypothesis 2a*), which indirectly affects retail investors' participation.

Column (2) shows the incremental effect of the pre-meeting increase in retail investors' attention on non-participation rate. The estimate of the coefficient of $Highsal$ (β_3) is -0.231, statistically significant at 1% level, implying that the non-participation rate of retail investors is significantly lower for firms with high salience proposals when compared to the non-participation rate of firms with other types of proposals. The coefficient of $(\beta_1 + \beta_2)$ is -0.134, which means retail investors' attention results in 13.4% lower non-participation (higher participation) in the voting process for the high salience proposals relative to non-salience proposals. More importantly, the incremental effect of the high salience proposals on retail investors' non-participation is reflected by the coefficient of $HighSal \times CGASVI[22]$, with the value of -0.283 and statistically significant at 5% level. This suggests that 28.3% reduction in retail investors' non-participation rate during high salience activism can be explained by the increase of retail investors' attention. These findings align with prior studies on voting that retail

shareholders' turnout is higher for closely contested proposals (Lee & Souther, 2020) or proxy contests related to advanced social responsibility (Cvijanović *et al.*, 2020). Since the coefficient of *LM-tone* is no longer significant, it seems that the negative sentiment expressed in the proxy statements does not directly influence retail investors' participation. Instead, it significantly increases retail investors' attention, as proved in *Hypothesis 2a*, and the high attention translates into high participation indirectly.

Column (3) and (4) report the results of the subsample of the less transparent firms, based on the regressions with or without interaction terms respectively. Column (3) shows that retail investors' attention during high salience activism also significantly reduces non-participation rate by 12.7% for less transparent firms. In Column (4), the interaction term $HighSal \times CGASVI[22]$ is negatively associated with firms' non-participation rate, statistically significant at 5% level, while the estimate of the coefficient has a larger absolute value compared to the estimates in Column (1). In other words, for firms that receive high salience proposals but are less informationally transparent, the decrease in non-participation rate (or increase in participation rate) is more pronounced. These results provide supportive evidence for *Hypotheses 3a* and *3b*, and these findings fill in the research gap on the relation between information transparency and voting preference of retail investors. It is also notable that the results are not driven by the participation of large account retail shareholders, as shown in Brav *et al.* (2019) that small account retail shareholders tend to support shareholder proposals more during shareholder activism than the large account shareholders.

For other control variables, institutional ownership, tangibility ratio, the number of employees, and firm age are also significantly related to the non-participation rate. Retail investors are more likely to participate if the firm has higher institutional holding or more employees. On the contrary, firms with a long history or higher tangibility ratio usually have lower retail investors' participation during high salience activism.

Table 3.10 Retail investors' attention and non-participation rate

This table provides the results of *Hypotheses 3a* and *3b*. Column (1) reports the effect of retail investors' attention on the non-participation rates during high salience activism using a simple model without interaction terms. Column (2) reports the incremental effect based on the following cross-sectional regression: $NPR_{j,t} = \beta_0 + \beta_1(HighSal \times CGASVI[22])_{j,t} + \beta_2(CGASVI[22])_{j,t} + \beta_3(Highsal)_{jt} + \beta_4(HighSal \times LM - Tone)_{j,t} + \beta_5(LM - Tone)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$, where $NPR_{j,t}$ is the standardized non-participation rate, following Aggarwal *et al.* (2018). $HighSal$ is the dummy variable indicating high salience activism, which takes the value of one for high salience activism and zero otherwise; $CGASVI[22]$ is the Cumulative Abnormal Google Search Volume for the window [-22, 0]; and $HighSal \times CGASVI[22]$ is the incremental effect of the attention for the high salience proposals on participation. *LM-tone* is the sentiment revealed in the proxy statements, and $X_{j,t}$ represents a set of control variables, including market capitalization, advertising expenses, Tobin's Q, institutional ownership, tangibility ratio, three-year stock returns, and the number of employees. The variable definitions are provided in Table 3.2. Column (3) provides the regression estimated for the sub-sample of less transparent firms using the simple model without interaction terms. Column (4) adds the interaction terms into the regression. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	NPR	NPR	NPR	NPR
Variables	**Full Sample**	**Full Sample**	**Less Transparency**	**Less Transparency**
HighSal×CGASVI[22]		-0.283**		-0.358**
		(0.113)		(0.164)
Highsal×Tone		-0.827		-0.734
		(0.587)		(0.909)
Highsal	-0.136***	-0.231***	-0.127***	-0.204*
	(0.025)	(0.075)	(0.032)	(0.108)
CGASVI[22]	0.000	0.149	0.058	0.247
	(0.060)	(0.102)	(0.090)	(0.151)
LM-Tone	-0.159	0.282	-0.060	0.328
	(0.332)	(0.590)	(0.505)	(0.888)
#News	0.013	0.013	0.014	0.014
	(0.008)	(0.008)	(0.012)	(0.012)
$Mcap^X$	-0.002	-0.034	-0.021	-1.941
	(0.014)	(1.376)	(0.019)	(1.902)
Advertising	0.312	0.284	-0.184	-0.159
	(0.687)	(0.672)	(1.140)	(1.102)
TobinQ	-0.014	-0.014	-0.031	-0.031
	(0.017)	(0.017)	(0.021)	(0.020)
InstOwn	-0.007***	-0.007***	-0.006***	-0.007***

	(0.001)	(0.001)	(0.002)	(0.002)
Tangibility	0.158*	0.157*	0.262**	0.254**
	(0.090)	(0.090)	(0.127)	(0.127)
3yrReturns	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
#Employees	-0.054***	-0.057***	-0.052**	-0.055**
	(0.017)	(0.016)	(0.023)	(0.023)
FirmAge	0.083***	0.085***	0.099***	0.099***
	(0.018)	(0.018)	(0.028)	(0.028)
Analyst	-0.020	-0.020	0.015	0.014
	(0.014)	(0.014)	(0.016)	(0.017)
Constant	1.426***	1.464***	1.537***	1.581***
	(0.176)	(0.186)	(0.248)	(0.262)
Observations	4,022	4,022	2,107	2,107
R-squared	0.153	0.157	0.166	0.171
Industry Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

3.4.6 Endogeneity issues

Results in Table 3.10 are subject to two types of endogeneity issues. Firstly, there is reverse causality between retail investors' attention and their participation. Secondly, high salience activism endogenously leads to higher retail investors' attention and subsequent participation. To check the robustness of our results in Table 3.10, this study addresses these two endogeneity issues.

To address the first type of endogeneity concern whether there is reverse causality between retail investors' attention and their participation, this study employs the instrumental variable (IV) approach to extract the exogenous component from retail investors' attention. The industry-year median of retail investors' attention is employed as an instrumental variable, which is strongly correlated with firm-level retail investors' attention but uncorrelated with firm-level non-participation rate. Using the two-stage least square (2SLS) panel regressions, this study first regresses $CGASVI[22]_{j,t}$ on the instrumental variable, i.e. the industry-year median of retail investors' attention, along with the same set of control variables. This study also

controls for industry and year fixed effects as in the baseline regressions (Equation 17). In the second stage, the fitted value of the Cumulative Abnormal Search Volume, namely $(CGASVI\_Fitted)_{j,t}$, is used as the explanatory variable. Formally, the 2SLS regressions are presented as follows:

First stage

$$CGASVI[22]_{j,t} = \beta_0 + \beta_1 Instrument\_Attention_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$$

Equation 18

Second stage

$$NPR_{j,t} = \beta_0 + \beta_1 (HighSal \times CGASVI\_Fitted)_{j,t} + \beta_2 (CGASVI\_Fitted)_{j,t} + \beta_3 (Highsal)_{jt} + \beta_4 (HighSal \times LM - Tone)_{j,t} + \beta_5 (LM - Tone)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$$

Equation 19

where $Instrument\_Attention_{j,t}$ is the industry-year median of retail investors' attention, and $(CGASVI\_Fitted)_{j,t}$ is the fitted value of $CGASVI[22]_{j,t}$ from the first-stage regression. The results of the 2SLS regressions are reported in Table 3.11.

Column (1) reports the results of the first-stage regression, where the dependent variable is firm-level retail investors' attention. Consistent with the rationale behind the instrument, $Instrument\_Attention_{j,t}$ (industry-year median of retail investors' attention) is positively correlated with the firm-level retail investors' attention with statistical significance at 1% level. This implies that the chosen instrument variable is valid. Moreover, the F-statistics is high for the first-stage regression (*F-statistics=14.04*), showing that the instrument is not weak. Columns (2) and (3) report the results of the second-stage regression, where the dependent variable is the non-participation rate. To correct the standard errors in the second-stage regression, bootstrapping is used and the standard errors reported in both columns are calculated using 200 repetitions. The key variable of interest is the interaction term *Highsal x CGASVI_Fitted*, the estimates of which are significant at 1% level in both Columns (2) and (3), showing a negative effect of retail investors' attention on the non-participation rate. This supports *Hypotheses 3a* and *3b*.

Table 3.11 Retail investors' attention and non-participation rate: IV estimator

This table presents estimates using the instrumental variable method based on two-stage least square (2SLS) panel regressions. Column (1) reports the results of the first-stage regression where the dependent variable is firm-level retail investors' attention. The instrument variable is the industry-year median of retail investors' attention. Columns (2) and (3) report the results of the second-stage regression, based on the full sample and the subsample of less transparent firms respectively, respectively. The dependent variable is the non-participation rate. The key variable of interest is the interaction term with the predicted values of retail investors' attention from the first-stage regression into high salience dummy. The same set of control variables, industry, and year fixed effects as Equation 17 are included. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)
	First stage	Second stage	
	CGASVI[22]	NPR	NPR
Variables	Full Sample	Full Sample	Less Transparency
Instrumental _Attention	0.812***		
	(0.057)		
HighsalxCGASVI_Fitted		-0.964***	-0.954*
		(0.345)	(0.519)
Highsal×Tone		-0.947***	-0.753
		(0.355)	(0.513)
Highsal		-0.222***	-0.186***
		(0.046)	(0.061)
CGASVI_Fitted		0.418	0.283
		(0.278)	(0.423)
LM-Tone	-0.128**	0.340	0.299
	(0.057)	(0.331)	(0.448)
#News	0.005***	0.014***	0.015**
	(0.002)	(0.005)	(0.007)
Mcap	-0.006*	-0.001	-0.021
	(0.003)	(0.009)	(0.013)
Advertising	-0.347***	0.240	-0.200
	(0.130)	(0.403)	(0.637)
TobinQ	0.012***	-0.014	-0.028**
	(0.004)	(0.011)	(0.013)
InstOwn	0.000***	-0.007***	-0.006***
	(0.000)	(0.001)	(0.001)
Tangibility	0.038**	0.160***	0.267***
	(0.016)	(0.048)	(0.080)
3yrReturns	-0.000	-0.001**	-0.001
	(0.000)	(0.001)	(0.001)

#Employees	-0.012***	-0.057***	-0.056***
	(0.004)	(0.011)	(0.015)
FirmAge	-0.001	0.084***	0.099***
	(0.004)	(0.011)	(0.018)
Analyst	0.009***	-0.020***	0.015
	(0.003)	(0.008)	(0.010)
Constant	0.104***	1.468***	1.591***
	(0.034)	(0.111)	(0.168)
Observations	4,022	4,022	2,107
F-Stats	14.05***		
Bootstrap reps		200	200
R-squared	0.115	0.157	0.169
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

To address the second type of endogeneity concerning whether high salience activism endogenously leads to higher retail investors' attention and subsequent participation, this study uses the endogenous treatment effect regression method (Wooldridge, 2010). The model is composed of an equation for the outcome y_j ($NPR_{j,t}$) and an equation for the endogenous treatment t_j ($HighSal_{j,t}$). The variables x_j (including $Highsal$, $CGASVI[22]$, $HighSal \times CGASVI[22]$, *LM-tone*, *#News*, *Mcap*, *Advertising*, *TobinQ*, *Tangibility*, *InstOwn*, *3yrReturns*, *#Employees*, *FirmAge*, *Analyst*) are used to model the outcome. When there are no interactions between t_j and x_j, the models are as follows:

$$y_j = x_j\beta + \delta t_j + \epsilon_j \qquad \textbf{Equation 20}$$

$$t_j = \begin{cases} 1, \ if \ w_j\gamma + u_j > 0 \\ 0, \ otherwise \end{cases} \qquad \textbf{Equation 21}$$

where w_j (*Mcap*, *Advertising*, *TobinQ*, *Tangibility*, *InstOwn*, *3yrReturns*, *#Employees*, *FirmAge*, *Analyst*) are the covariates for the treatment assignment. The error terms ϵ_j and u_j are bivariate normal with the mean value of zero. The variance and correlation parameters are identical across treatment and control groups. The covariates of x_j and w_j are unrelated to the error terms, implying that they are exogenous. One of

the outcome variable, $HighSal \times CGASVI[22]$, is the interaction between treatment variable ($HighSal$) and outcome covariate ($CGASVI[22]$). The maximum likelihood method proposed by Maddala (1983) and Greene (2000)[37] is used.

The regression results are presented in Table 3.12. Columns (1) and (2) report the results for the full sample and the subsample of the less transparent firms, respectively. The key variable of interest is the interaction term $HighSal \times CGASVI[22]$, the estimates of which take the value of -0.270 and -0.344 in Columns (1) and (2) respectively, both statistically significant and negative at 1% level. These results further support *Hypotheses 3a* and *3b*, suggesting that the main results are not driven by any endogeneity.

[37] The *etregress* command in STATA is used to estimate the results. The etregress command estimates an average treatment effect (ATE) and the other parameters of a linear regression model augmented with an endogenous binary-treatment variable. Estimation is a two-step consistent estimator by full maximum likelihood.

Table 3.12 High salience activism and participation: Endogenous treatment effect

This table presents the results of the endogenous treatment effect regressions on the full sample and the subsample of the less transparent firms (Columns (1) and (2), respectively). Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)
	NPR	NPR
Variables	**Full Sample**	**Less Transparency**
Highsal ×CGASVI[22]	-0.270***	-0.344***
	(0.079)	(0.110)
Highsal	-0.161***	-0.247***
	(0.033)	(0.070)
CGASVI[22]	0.142**	0.239**
	(0.068)	(0.096)
LM-Tone	-0.162	-0.063
	(0.181)	(0.265)
#News	0.013***	0.013**
	(0.004)	(0.006)
Mcap	0.002	-0.010
	(0.009)	(0.013)
Advertising	0.290	-0.193
	(0.432)	(0.600)
TobinQ	-0.017	-0.037***
	(0.011)	(0.014)
InstOwn	-0.007***	-0.006***
	(0.001)	(0.001)
Tangibility	0.162***	0.270***
	(0.050)	(0.072)
3yrReturns	-0.001**	-0.001
	(0.001)	(0.001)
#Employees	-0.056***	-0.058***
	(0.010)	(0.015)
FirmAge	0.083***	0.095***
	(0.011)	(0.017)
Analyst	-0.019**	0.015
	(0.008)	(0.010)
Constant	1.279***	1.425***
	(0.106)	(0.154)
Observations	4,022	2,107
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

3.4.7 Average treatment effects

This study provides further evidence on the effect of retail investors' attention on non-participation rate by examining the Average Treatment Effect (ATE) on non-participation rate between firms that receive specific types of high salience proposals and firms that receive all the remaining types of proposals[38]. The ATE provides information about the average difference of the non-participation rate between the target and control firms by comparing their *absolute* non-participation. It is important to mention here that all explanatory variables added in the ATE regressions are the same as in Table 3.10, but interactions among variables are avoided. The ATE is calculated as:

$$ATE = E(y_1 - y_0) = (1 - t)y_0 - ty_1 \qquad \textbf{Equation 22}$$

where t_i denotes the treatment received. With X presenting covariates of the outcome variables, y_0 and y_1 are calculated as:

$$y_0 = X\beta_0 + \epsilon_0 \qquad \textbf{Equation 23}$$

$$y_1 = X\beta_1 + \epsilon_1 \qquad \textbf{Equation 24}$$

Table 3.13 reports ATE's results and the percentage change of ATE between the target and control firms. As prior literature shows that the levels of institutional ownership make a significant difference in the relation between voting outcomes and firm-level transparency (Boone & White, 2015; Cvijanović *et al.*, 2020; Prevost *et al.*, 2016), as evident from Table 3.10, this study further divides the sample into above or below median institutional ownership.

[38] Here, the control firms are firms that receive proposals other than the type of high salience proposals under investigation. To be more specific, in Panel (a), proposals of interest are all high salience proposals (including social and environment proposals, contentious corporate governance proposals and corporate governance proposals for firms in financial distress). All other types of types are considered as remaining types of proposals. Similarly, in Panel (b), proposals of interest are social and environmental proposals. Remaining proposals include contentious corporate governance proposals, corporate governance proposals for firms in financial distress and all other types of proposals. In Panel (c) and (d), proposals of interest are contentious corporate governance proposals and corporate governance proposals for firms in financial distress, respectively.

In Panel (a), the average non-participation rate for the firms that receive high salience proposals is 25.122%, while the average non-participation rate for the firms that receive other types of proposals is 28.820%. This indicates a 3.698% higher participation rate for firms that receive high salience proposals. This represents a significant decrease in the non-participation rate (12.831% by percentage change) if firms receive high salience proposals. These numbers are marginally different from what is reported in Table 3.10 due to the specification of the ATE regressions that there are no interactions among explanatory variables in equations. The decrease in the non-participation rate is more pronounced for firms with above median institutional ownership. The target firms experience a significantly lower non-participation rate (5.939% lower or 22.099% by percentage change) if their institutional ownership is above the median, while the target firms with below median institutional ownership do not witness a statistically significant decrease in the non-participation rate.

Panels (b), (c), and (d) show the average treatment effect on the non-participation rates for the firms that receive specific types of high salience proposals. The non-participation rate is 3.342% (12.091% by percentage change) lower if the firms receive social and environmental proposals. Similarly, the non-participation rate is 1% (3.701% by percentage change) lower if the firms receive contentious corporate governance proposals. These results provide supportive evidence to *Hypothesis 3a,* as reported in Table 3.10. Firms that receive specific types of proposals attract retail investors' attention, and consequently, the non-participation rate decreases.

In Panel (d), the average non-participation rate of financially distressed firms is statistically indifferent from the non-participation rate of remaining firms. The apparent insignificance in the ATE for financially distressed firms is reflected in the fact that the non-participation rate of the target firms is 4.966% lower with above median institutional ownership and 7.076% higher with below median institutional ownership, both of which are statistically significant at 1% level. Hence, the net effect on the non-participation rate of the full sample of financially distressed firms becomes less

significant. The findings thus show a substantial role of institutional ownership in retail investors' participation during the voting process: the higher the institutional ownership, the higher is the participation of retail investors.

Table 3.13 Average Treatment Effects

This table provides results of the Average Treatment Effect (ATE) on the non-participation rate. In each panel, the target firms are the firms that receive a specific type of high salience proposals based on various levels of institutional ownership. The control firms are firms that receive proposals other than the type of high salience proposals under investigation. All regressions include industry and year fixed effects. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	Proposals of interest	All other proposals	ATE	Percentage ATE compared to other proposals
Panel (a) High Salience Proposals				
Full Sample	25.122	28.820	-3.698***	-12.831***
InstOwn> Median	20.935	26.874	-5.939***	-22.099***
InstOwn< Median	29.812	30.169	-0.357	-1.183
Panel (b) Proposals Social				
Full Sample	24.298	27.640	-3.342***	-12.091***
InstOwn> Median	20.505	25.036	-4.531***	-18.098***
InstOwn< Median	28.160	30.265	-2.105***	-6.955***
Panel (c) Proposals Close CG				
Full Sample	26.020	27.020	-1.000***	-3.701***
InstOwn> Median	20.624	24.962	-4.338***	-17.378***
InstOwn< Median	31.720	30.300	1.420**	4.686**
Panel (d) Proposals Fin dis CG				
Full Sample	27.381	28.224	0.843	-2.987
InstOwn> Median	20.130	25.096	-4.966***	-19.788***
InstOwn< Median	36.796	29.720	7.076***	23.809***

3.4.8 The impact of E-proxy on retail investors' participation

The last model explores the consequence of E-proxy on retail investors' participation during high salience activism (*Hypothesis 4*). A dummy variable, E-proxy, is introduced in the model, which takes the value of one for the years after 2009 when the E-proxy was fully implemented, and zero otherwise. The regression model is shown as follows:

$$NPR_{jt} = \beta_0 + \beta_1(HighSal \times CGASVI[22] \times Eproxy)_{j,t} + \beta_2(HighSal \times CGASVI[22])_{j,t} +$$

$\beta_3(HighSal)_{j,t} + \beta_4(Eproxy)_{j,t} + \beta_5(CGASVI[22])_{j,t} + \beta_6(LM - Tone)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$ **Equation 25**

The key variable of interest is the coefficient β_1, which reflects the impact of retail investors' attention after the E-proxy is introduced in 2009 on retail investors' participation during high salience activism. Following *Hypothesis 4*, β_1 is expected to be negative, implying an incremental increase (decrease) in retail investors' participation (non-participation) for high salience proposals after implementing E-proxy. Moreover, when $Eproxy$ = 1 (namely after the full implementation of E-proxy), $(\beta_1 + \beta_2)$ captures the total impact of retail investors' attention on the non-participation for high salience proposals. This study also runs the same regression using the subsample of firms with less information transparency to examine whether firm-level transparency would interact with the E-proxy during the voting process. Relevant results are reported in Table 3.14.

Column (1) shows that the coefficient of $Eproxy$ is positively significant with a value of 0.105 and statistical significance at 5% level. It means that the introduction of E-proxy has no direct impact in decreasing the non-participation of the retail investors. To better understand these results, it is notable that E-proxy does not change how institutional investors receive their proxy documents, most of whom use paid platforms, while the E-proxy experiment does facilitate retail investors' search for information. However, although there have been innovations in voting methods since the implementation of E-proxy, there are little changes on retail investors' participation. This aligns with the findings of Geoffroy (2018). However, the estimate of $HighSal$ is -0.088 with statistical significance at 1% level, implying that the participation associated with high salience proposals has increased by around 8.8%. More importantly, the coefficient of the interaction term $HighSal \times CGASVI[22] \times Eproxy$, is negative with a value of -0.210 and statistical significance at 1% level. It means that after the full implementation of E-proxy, retail investors' attention has resulted in a significant decrease (increase) in the non-participation (participation) rate

during high salience activism. More specifically, after the implementation of E-proxy (i.e. $Eproxy$ = 1), the estimates of coefficients $(\beta_1 + \beta_2)$ equal -0.163 (*F-stat* = 4.25 and p-value = 0.04). This implies a significant overall decrease (increase) in the non-participation (participation) rate of firms during high salience activism with an increase in retail investors' attention. In other words, the retail investors' participation would have been even lower overall without the implementation of E-proxy.

In Column (2), for firms with lower information transparency, the incremental effect of E-proxy on retail investors' participation is also significant with a negative value of -0.199 and statistical significance at 10% level. This indicates that the introduction of E-proxy is also relevant for less transparent firms. The incremental effect is less pronounced than the findings in Column (1), as both the (absolute) value of the coefficient and the significance level drop. However, this provides evidence that E-proxy, as a representative of information technology, improves firms' information flow, without which the participation would have been lower.

Table 3.14 E-proxy and non-participation rate

This table reports the results of *Hypothesis 4*, which examines the impact of E-proxy on the non-participation rate. Column (1) reports the regression based on the regression: $NPR_{jt} = \beta_0 + \beta_1(HighSal \times CGASVI[22] \times Eproxy)_{j,t} + \beta_2(HighSal \times CGASVI[22])_{j,t} + \beta_3(HighSal)_{j,t} + \beta_4(Eproxy)_{j,t} + \beta_5(CGASVI[22])_{j,t} + \beta_6(LM - Tone)_{j,t} + \sum_k \beta_k X_{j,t} + \delta_t + \delta_{ind} + e_{j,t}$, where *Eproxy* is the dummy variable that takes the value of one for years after 2009 when the E-proxy was fully implemented, and zero otherwise. The key variable of interest is $HighSal \times CGASVI[22] \times Eproxy$, which captures the incremental effect of E-proxy on retail investors' participation during high salience activism. *LM-tone* is the sentiment revealed in the proxy statements. $X_{j,t}$ represents a set of control variables, including market capitalization, advertising expenses, Tobin's Q, institutional ownership, tangibility ratio, three-year stock returns, and the number of employees. The variable definitions are provided in Table 3.2. Column (2) provides the regression for the subsample of the less transparent firms. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1) NRP	(2) NRP
	Full Sample	**Less Transparency**
HighSal×CGASVI[22]×Eproxy	-0.210***	-0.199*
	(0.078)	(0.110)
HighSal×CGASVI[22]	0.047	0.067
	(0.078)	(0.109)
Highsal	-0.088***	-0.100***
	(0.020)	(0.028)
Eproxy	0.105**	0.090
	(0.046)	(0.074)
CGASVI[22]	0.051	0.051
	(0.059)	(0.085)
LM-Tone	-0.355*	-0.227
	(0.212)	(0.357)
#News	0.001	-0.003
	(0.010)	(0.013)
Advertising	-0.376	-0.519
	(0.791)	(1.127)
Mcap	-0.027	-0.032
	(0.019)	(0.025)
TobinQ	-0.001	-0.003
	(0.015)	(0.022)
InstOwn	-0.007***	-0.006***
	(0.001)	(0.001)
Tangibility	0.094	0.118
	(0.121)	(0.147)

3yrReturns	-0.002***	-0.002**
	(0.001)	(0.001)
#Employees	-0.008	-0.009
	(0.020)	(0.027)
FirmAge	0.009	0.036
	(0.025)	(0.031)
Analyst^{X}	0.256	-0.036
	(1.319)	(1.752)
Constant	1.518***	1.498***
	(0.177)	(0.222)
Observations	4,022	2,107
R-squared	0.116	0.131
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

3.5 Robustness checks

Several robustness tests are conducted in this essay and incorporated alternative specifications. Firstly, instead of the Drake *et al.* (2012) measure of GASVI, this study uses an alternative proxy for retail investors' attention as proposed in Da *et al.* (2011). Following Da *et al.* (2011), GASVI is calculated as the difference between the logarithm of daily GSVI for firm "j" at time "t" and the logarithm of the median GSVI for firm "j" during the preceding eight weeks. This study re-examines all the hypotheses using Da *et al.*'s (2011) proxy for retail investors' attention. Relevant results are reported in Tables 3.15 -3.18.

Table 3.15 confirms the main findings that the target firms experience an increase in retail investors' attention relative to their matched control firms before the annual general meetings (*Hypothesis 1*). Table 3.16 provides evidence that the negative sentiment in shareholder proposals attracts more retail investors' attention (*Hypothesis 2a*), especially for less transparent firms (*Hypothesis 2b*). The increase in attention leads to higher retail investors' participation during high salience activism (*Hypothesis 3a*), and this effect is also more pronounced for less transparent firms (*Hypothesis 3b*), as shown in Table 3.17. Table 3.18 supports the impact of E-proxy on

the increase of retail investors' participation (decrease of non-participation) during high salience activism.

Table 3.15 Retail investors' attention during shareholder activism, Da *et al.* (2011) measure

This table provides results on the incremental retail investors' attention before the annual general meetings (*Hypothesis 1*), using the Da *et al*.'s (2011) measure of retail investors' attention. The dependent variable, Google Abnormal Search Volume (Da_GASVI), is calculated as the difference between the logarithm of daily GSVI for firm "j" at time "t" and the logarithm of the median GSVI for firm "j" during the preceding eight weeks. The explanatory and control variables are the same as the main tests reported in Table 3.7. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)
	All firms	**High salience firms**	**Firms with no earning announcements**
	Da_GASVI	**Da_GASVI**	**Da_GASVI**
Pre[22]×Target	0.009**	0.009*	0.005
	(0.004)	(0.005)	(0.006)
Pre[22]	0.003	0.006	-0.001
	(0.003)	(0.003)	(0.004)
Target	-0.007	-0.008	-0.003
	(0.004)	(0.005)	(0.006)
Mcap	-0.006***	-0.005**	-0.009***
	(0.002)	(0.003)	(0.003)
Advertising	0.134	0.102	0.039
	(0.090)	(0.120)	(0.158)
TobinQ	0.001	0.003*	0.001
	(0.001)	(0.002)	(0.001)
InstOwn	0.042***	0.055***	0.061***
	(0.013)	(0.017)	(0.016)
Tangibility	-0.003	-0.004	-0.012
	(0.013)	(0.014)	(0.015)
3yrReturns	-0.001	-0.004	-0.014
	(0.0087)	(0.012)	(0.012)
#Employees	-0.008**	-0.008**	-0.006
	(0.003)	(0.004)	(0.004)
FirmAge	-0.005	-0.005	-0.003
	(0.004)	(0.004)	(0.004)
Constant	0.072***	0.051**	0.071***
	(0.020)	(0.025)	(0.023)

Observations	338,202	185,473	135,021
R-squared	0.011	0.013	0.015
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.16 Impact of proxy sentiments and transparency on attention, Da *et al.* (2011) measure

This table shows the robustness results of *Hypotheses 2a* and *2b*, using Da *et al.*'s (2011) measure of retail investors' attention. Column (1) reports the impact of proxy sentiments on retail investors' attention. Column (2) provides the incremental effect of information transparency (represented by *LMSW*) on the changes of retail investors' attention. The explanatory and control variables are the same as the main tests reported in Table 3.8. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)
	Full Sample	**Less Transparency**
	Da_GASVI	**Da_GASVI**
Pre[22]×LMSW		0.015*
		(0.008)
Pre[22]	0.018***	0.010*
	(0.004)	(0.006)
LM-Tone	-0.082**	-0.083**
	(0.033)	(0.033)
LMSW		-0.002
		(0.003)
#News	-0.001	-0.001
	(0.001)	(0.001)
Mcap	-0.001	-0.001
	(0.002)	(0.002)
Advertising	-0.002	-0.002
	(0.063)	(0.063)
TobinQ	0.003*	0.003*
	(0.002)	(0.002)
$InstOwn^X$	0.020**	0.020**
	(0.008)	(0.008)
Tangibility	0.023***	0.023***
	(0.009)	(0.009)
$3yrReturns^X$	0.009	0.009
	(0.011)	(0.011)
#Employees	-0.000	-0.000
	(0.002)	(0.002)
FirmAge	0.003	0.003
	(0.002)	(0.002)
Analyst	-0.002	-0.002
	(0.001)	(0.001)
AbsRet	-0.077	-0.076
	(0.123)	(0.123)

AbTV	0.014***	0.014***
	(0.004)	(0.004)
Spread	0.061	0.062
	(0.094)	(0.094)
Constant	-0.037**	-0.036**
	(0.015)	(0.015)
Observations	233,871	233,871
R-squared	0.000	0.000
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.17 Retail investors' attention and non-participation, Da *et al.* (2011) measure

This table shows the robustness results of *Hypotheses 3a* and *3b*, using Da *et al*.'s (2011) measure of retail investors' attention. Column (1) provides the effect of retail investors' attention on non-participation rates during high salience activism. Column (2) provides the incremental effect of information transparency on the changes in the non-participation rate. The explanatory and control variables are the same as the main tests reported in Table 3.10. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)
	NPR	NPR
Variables	**Full Sample**	**Less Transparency**
HighSal×DA_CGASVI[22]	-0.031***	-0.021**
	(0.008)	(0.010)
Highsal×Tone	-0.836	-0.722
	(0.581)	(0.893)
Highsal	-0.237***	-0.211*
	(0.075)	(0.109)
DA_CGASVI[22]	0.012	0.005
	(0.008)	(0.010)
LM-Tone	0.230	0.272
	(0.586)	(0.879)
#News	0.012	0.014
	(0.008)	(0.012)
Mcap	-0.002	-0.020
	(0.014)	(0.019)
Advertising	0.365	-0.173
	(0.660)	(1.094)
TobinQ	-0.015	-0.030
	(0.017)	(0.021)
InstOwn	-0.007***	-0.006***
	(0.001)	(0.002)
Tangibility	0.149*	0.250**
	(0.089)	(0.127)
3yrReturns	-0.001	-0.001
	(0.001)	(0.001)
#Employees	-0.058***	-0.057**
	(0.016)	(0.023)
FirmAge	0.081***	0.096***
	(0.018)	(0.028)
Analyst	-0.020	0.016
	(0.014)	(0.017)

Constant	1.492***	1.607***
	(0.185)	(0.262)
Observations	4,022	2,107
R-squared	0.165	0.172
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.18 E-proxy and non-participation rate, Da et al. (2011) measure

This table shows the robustness results of *Hypothesis 4*, using Da *et al*.'s (2011) measure of retail investors' attention. Column (1) reports the impact of E-proxy on the non-participation rate during high salience activism. Column (2) provides the regression for the subsample of the less transparent firms. The explanatory and control variables are the same as the main tests reported in Table 3.14. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)
	NPR	NPR
Variables	**Full Sample**	**Less Transparency**
HighSal×DA_CGASVI[22]×Eproxy	-0.012**	-0.015*
	(0.005)	(0.008)
HighSal×DA_CGASVI[22]	-0.003	-0.000
	(0.005)	(0.008)
Highsal	-0.091***	-0.101***
	(0.020)	(0.028)
Eproxy	0.098**	0.082
	(0.047)	(0.075)
DA_CGASVI[22]	0.004	0.003
	(0.004)	(0.007)
LM-Tone	-0.379*	-0.232
	(0.212)	(0.353)
#News	0.001	-0.003
	(0.010)	(0.013)
Advertising	-0.306	-0.494
	(0.791)	(1.125)
Mcap	-0.029	-0.033
	(0.019)	(0.025)
TobinQ	0.000	-0.003
	(0.015)	(0.022)
InstOwn	-0.007***	-0.006***
	(0.001)	(0.001)
Tangibility	0.085	0.114
	(0.121)	(0.147)
3yrReturns	-0.002***	-0.002**
	(0.001)	(0.001)
#Employees	-0.008	-0.009
	(0.020)	(0.027)
FirmAge	0.011	0.035
	(0.025)	(0.031)
Analyst	0.002	-0.001

	(0.013)	(0.017)
Constant	1.520***	1.504***
	(0.177)	(0.223)
Observations	4,022	2,107
R-squared	0.124	0.133
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Secondly, instead of using the 22-day window preceding the annual general meetings, this study employs several other event windows, including 19-day, 20-day, 21-day, 23-day, and 24-day windows. This robustness check expects to ensure that the selection of event windows does not bias against the results. Results for all the hypotheses are reported in Tables 3.19-3.22. These robustness results confirm that the selection of event windows does not affect the results of the underlying hypotheses. Different event windows all provide consistent evidence on the increase in retail investors' attention preceding the annual general meetings, leading to higher participation during high salience activism.

Table 3.19 Retail investors' attention during shareholder activism, various event windows

This table provides results on the incremental retail investors' attention before the annual general meetings (*Hypothesis 1*), based on various event windows. The dependent variable is GASVI using the Drake *et al.*'s (2012) measure. The control variables are included in the regressions, as the main tests reported in Table 3.7. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	GASVI	GASVI	GASVI	GASVI	GASVI
Variables	**Pre[19]**	**Pre[20]**	**Pre[21]**	**Pre[23]**	**Pre[24]**
Time x Treatment	0.013*	0.014*	0.015**	0.014*	0.014*
	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
Time	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Target	-0.007	-0.007*	-0.008*	-0.008*	-0.008*
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Controls	Yes	Yes	Yes	Yes	Yes
Constant	-0.132***	-0.132***	-0.132***	-0.132***	-0.132***
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Observations	405,747	405,747	405,747	405,747	405,747
R-squared	0.003	0.003	0.003	0.003	0.003
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.20 Impact of proxy sentiments and transparency on attention, various event windows

This table shows the robustness results of *Hypotheses 2a* and *2b*, based on various event windows. Columns (1)-(5) report the results on the impact of proxy sentiments on retail investors' attention (*Hypotheses 2a*), and Columns (6)-(10) report the incremental effect of information transparency on the changes of retail investors' attention (*Hypotheses 2b*). The dependent variable is GASVI using the Drake *et al.*'s (2012) measure. The control variables are included in the regressions, as the main tests reported in Table 3.8. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	GASVI	GASVI	GASVI	GASVI	GASVI	GASVI	GASVI	GASVI	GASVI	GASVI
Variables	**Pre[19]**	**Pre[20]**	**Pre[21]**	**Pre[23]**	**Pre[24]**	**Pre[19]**	**Pre[20]**	**Pre[21]**	**Pre[23]**	**Pre[24]**
Time	0.019***	0.019***	0.018***	0.017***	0.017***	0.007	0.006	0.005	0.003	0.005
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
LM-Tone	-0.137**	-0.137**	-0.137**	-0.137**	-0.137**	-0.134**	-0.134**	-0.134**	-0.134**	-0.134**
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)
Time x LMSW						0.023*	0.024**	0.025**	0.026**	0.023**
						(0.012)	(0.012)	(0.012)	(0.012)	(0.011)
LMSW						-0.009	-0.009*	-0.010*	-0.010*	-0.010*
						(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.022	0.022	0.022	0.022	0.022	0.027	0.028	0.028	0.028	0.027
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Observations	209,432	209,432	209,432	209,432	209,432	209,432	209,432	209,432	209,432	209,432
R-squared	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.21 Retail investors' attention and non-participation rate, various event windows

This table shows the robustness results of *Hypothesis 3a* on the impact of retail investors' attention on their participation during high salience activism, based on various event windows. The dependent variable is the non-participation rate (*NPR*) during high salience activism. The control variables are included in the regressions, as the main tests reported in Table 3.10. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	NPR	NPR	NPR	NPR	NPR
Variables	**CGASVI[19]**	**CGASVI[20]**	**CGASVI[21]**	**CGASVI[23]**	**CGASVI[24]**
Time x Highsal	-0.262**	-0.267**	-0.264**	-0.257**	-0.272**
	(0.106)	(0.104)	(0.108)	(0.118)	(0.120)
Time	0.141	0.137	0.123	0.115	0.123
	(0.094)	(0.091)	(0.095)	(0.106)	(0.107)
Highsal×Tone	-0.841	-0.833	-0.829	-0.820	-0.824
	(0.586)	(0.586)	(0.587)	(0.589)	(0.589)
Highsal	-0.233***	-0.232***	-0.232***	-0.231***	-0.231***
	(0.075)	(0.076)	(0.076)	(0.075)	(0.075)
LM-Tone	0.295	0.287	0.281	0.278	0.280
	(0.589)	(0.589)	(0.590)	(0.593)	(0.592)
Controls	Yes	Yes	Yes	Yes	Yes
Constant	1.463***	1.465***	1.468***	1.467***	1.468***
	(0.187)	(0.187)	(0.187)	(0.186)	(0.186)
Observations	4,022	4,022	4,022	4,022	4,022
R-squared	0.157	0.157	0.156	0.156	0.156
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.22 E-proxy and non-participation rate, various event windows

This table shows the robustness results of *Hypothesis 4* on the incremental impact of E-proxy on retail investor' participation, based on various event windows. The dependent variable is the non-participation rate (*NPR*) during high salience activism. The control variables are included in the regressions, as the main tests reported in Table 3.15. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	NPR	NPR	NPR	NPR	NPR
Variables	**CGASVI[19]**	**CGASVI[20]**	**CGASVI[21]**	**CGASVI[23]**	**CGASVI[24]**
Time x Highsal x Eproxy	-0.171**	-0.165**	-0.171**	-0.245***	-0.230***
	(0.072)	(0.074)	(0.079)	(0.082)	(0.081)
Time x Highsal	0.039	0.016	0.012	0.088	0.070
	(0.076)	(0.075)	(0.077)	(0.085)	(0.083)
Time	0.037	0.047	0.047	0.034	0.040
	(0.057)	(0.057)	(0.057)	(0.061)	(0.063)
Highsal	-0.088***	-0.087***	-0.087***	-0.089***	-0.088***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Eproxy	0.104**	0.104**	0.103**	0.105**	0.106**
	(0.046)	(0.046)	(0.046)	(0.045)	(0.046)
LM-Tone	-0.356*	-0.356*	-0.357*	-0.357*	-0.355*
	(0.213)	(0.212)	(0.212)	(0.212)	(0.213)
Controls	Yes	Yes	Yes	Yes	Yes
Constant	1.519***	1.520***	1.520***	1.519***	1.520***
	(0.177)	(0.177)	(0.177)	(0.177)	(0.176)
Observations	4,022	4,022	4,022	4,022	4,022
R-squared	0.116	0.117	0.116	0.116	0.116
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Thirdly, as discussed in Subsection 3.3.2.1, there is an overlap for the first two days of the annual general meetings (i.e. day 0 and day 1). As a robustness check, this study calculates GASVI over the period [-14 week, -4 week] prior to the annual general meetings. This makes sure that there is no overlap in the "abnormal" estimation window and the "normal" performance period. Cumulative Abnormal Search Volume (CGASVI) is calculated as Equation 27.

$$Average\ GSVI\_2_{jt} = \frac{x\sum_{4}^{14} GSVI_{j(t-7x)}}{10}$$ **Equation 26**

$$\boldsymbol{GASVI\_2_{jt} = \frac{GSVI_{jt} - Average\ GSVI_{jt}}{Average\ GSVI_{jt}}}$$ **Equation 27**

Hence, as a robustness check, this study re-examines Equations 14 and 17 using the new GASVI and CGASVI proxies. Relevant results are reported in Table 3.23 and Table 3.24. The results are consistent with the main results and provide evidence to *Hypothesis 1*, *Hypothesis 3a* and *Hypothesis 3b*.

Table 3.23 Retail investors' attention during shareholder activism, new estimation windows for GASVI

This table provides the incremental retail investors' attention before the annual general meetings compared to a set of control firms (*Hypothesis 1*). The dependent variable is Google Abnormal Search Volume (GASVI) calculated over the period [-14 week, -4 week] prior to the annual general meetings. The variable definitions are provided in Table 3.2. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)
	All firms	High salience firms	Firms with no earning announcements
Variables	**GASVI_2**	**GASVI_2**	**GASVI_**
Pre[22]×Target	0.015**	0.019**	0.023*
	(0.007)	(0.009)	(0.012)
Pre[22]	-0.003	-0.001	-0.008
	(0.005)	(0.006)	(0.007)
Target	-0.008*	-0.008	0.001
	(0.005)	(0.005)	(0.006)
Mcap	0.013***	0.014***	0.008***
	(0.003)	(0.003)	(0.003)
Advertising	-0.035	-0.116	-0.001
	(0.118)	(0.143)	(0.177)
TobinQ	-0.002**	-0.004***	-0.001
	(0.001)	(0.001)	(0.001)
InstOwn^{X}	0.0662***	0.0718***	0.0512***
	(0.0145)	(0.0183)	(0.0170)
Tangibility	0.023	0.032**	0.006
	(0.015)	(0.016)	(0.018)
3yrReturns^{X}	-0.00519	-0.0185	0.0144

	(0.0132)	(0.0182)	(0.0147)
#Employees	-0.005	-0.009**	0.001
	(0.003)	(0.004)	(0.004)
FirmAge	-0.001	0.005	0.003
	(0.003)	(0.003)	(0.004)
Constant	-0.133***	-0.154***	-0.091***
	(0.025)	(0.035)	(0.028)
Observations	405,747	212,145	163,739
R-squared	0.003	0.004	0.002
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.24 Retail investors' attention and non-participation rate, new estimation windows for CGASVI

This table provides the robustness results of *Hypotheses 3a* and *3b*. $CGASVI[22]$ is the Cumulative Abnormal Google Search Volume based on the Google Abnormal Search Volume (GASVI), which is calculated over the period [-14 week, -4 week] prior to the annual general meetings. The variable definitions are provided in Table 3.2. Column (2) provides the regression estimated for the sub-sample of less transparent firms. Robust standard errors are provided below in the parentheses and are clustered at the firm level. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	**(2)**
	NPR	**NPR**
Variables	**Full Sample**	**Less Transparency**
HighSal×CGASVI_2[22]	-0.295**	-0.337**
	(0.124)	(0.170)
Highsal×Tone	-0.579	-0.034
	(0.573)	(0.892)
Highsal	-0.182**	-0.112
	(0.073)	(0.106)
CGASVI_[22]	0.190*	0.282*
	(0.109)	(0.146)
LM-Tone	0.056	-0.315
	(0.561)	(0.848)
#News	0.017**	0.017
	(0.009)	(0.013)
$Mcap^X$	0.003	-0.029
	(0.014)	(0.018)
Advertising	0.979*	1.201
	(0.529)	(0.782)

TobinQ	-0.018	-0.023
	(0.015)	(0.020)
InstOwn	-0.007***	-0.007***
	(0.001)	(0.001)
Tangibility	0.152*	0.208*
	(0.092)	(0.126)
3yrReturns^{X}	-0.099	-0.031
	(0.095)	(0.136)
#Employees	-0.050***	-0.048**
	(0.016)	(0.022)
FirmAge	0.078***	0.100***
	(0.019)	(0.028)
Analyst	-0.023	0.018
	(0.014)	(0.016)
Constant	1.375***	1.595***
	(0.196)	(0.259)
Observations	4,022	2,107
R-squared	0.150	0.182
Industry Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

In addition to the results reported above, there are several untabulated results including various fixed effects (year or industry) and clustering the standard errors on various dimensions (meeting, firm, or industry). These tests all show quantitatively similar and statistically significant results to the main findings[39]. With the above robustness results, I am now confident with the hypotheses of this study that information technology helps mitigate retail investors' apathy issues during shareholder activism.

3.6 Conclusions

This study explores the dynamics of retail investors' attention during shareholder activism and its impact on retail investors' participation in the wake of the digital age (when accessibility to the internet has extended enormously). Examining the U.S.

[39] Owing to the amount of tables and high consistence of the results, these results are not reported in the dissertation. Relevant results are available upon request.

sample of all shareholder activism events covering the period 2005-2016, this study finds that retail investors' attention of the target firms significantly increases before the annual general meetings during which a shareholder proposal is to be voted. This increase in attention is not driven by earnings announcements and is more pronounced for firms with less information transparency. This study also finds a positive impact of retail shareholders' attention on their participation during high salience activism, which resonates with their preferences and interests. Retail investors are also more likely to participate in the voting process if the target firms have a higher institutional ownership level. Finally, this study documents that the introduction of E-proxy has generated higher sentiment that has facilitated retail investors' participation in high salience activism.

This study has several important contributions and implications. It is the first study to examine the relationship between retail investors' attention and participation. It is also the first study to document retail investors' preferences during shareholder activism. The empirical results provide evidence on the role of information technology in mitigating investors' apathy problems, which might provide a new insight for attracting retail investors. Consistent with the suggestions of the SEC roundtable, this study provides practical implications that information technology should be well incorporated in proxy voting process, which helps retail investors make informed decisions.

Chapter Four: Essay Two: Hedge fund activism and firm risk-taking

This chapter presents the second essay of the thesis, which examines the link between hedge fund activism and firm risk-taking. This study also considers the impact of the information environment and managements' response to activism on activism outcomes. Section 4.1 presents a brief introduction to this study. Section 4.2 provides

an overview of relevant literature and develops the hypotheses. Section 4.3 describes the data sources, key variables, and models used in this study. Section 4.4 reports the core findings. Section 4.5 illustrates various robustness checks. Section 4.6 concludes the chapter. Relevant reference list of this chapter is provided at the end of this thesis.

Hedge fund activism and firm risk-taking

Abstract

Hedge funds have emerged as both the most promising and the most controversial type of activist. This essay examines how firm risk-taking is affected by the presence of hedge fund activism. Using a sample of hedge fund activism events in the U.S., this study provides evidence that firms targeted by activists experience a significant reduction in risk-taking over the five-year period following hedge fund interventions. This post-intervention risk reduction is more pronounced for firms with myopic management or lower information transparency. These results suggest that target firms become more risk-averse post interventions, which indicates hedge funds' potential engagement in short-termism. In addition, this study shows that management's hostile resistance to activism would offset the initial effect of hedge fund activism on target firms. Overall, this study highlights a negative consequence of activist hedge funds' investment in firms, which provides implications for policymakers and corporate management.

Keywords: Hedge fund activism, risk-taking, myopia, information asymmetry, hostile resistance

4.1 Introduction

Hedge funds as the latest activist investor entered the activism scene in late 1990s. Over the past two decades, hedge funds have overtaken all other institutional investors, such as pension funds and mutual funds, and become the most prevalent activist investor (Denes, Karpoff, & McWillians, 2017). According to a Reuters news article, in the activist sector hedge funds had $12 billion at their disposal in 2003, which had increased to $146 billion in 2018 (Herbst-Bayliss, 2019). Firms targeted by activist hedge funds have also increased in both number (Tang, 2020) and size (Moyer, 2017), exposing a large number of firms to further activism threats. The rising popularity of hedge fund activism and its increased influence on corporate governance have raised various concerns. The debate over hedge fund activism among academic circles, policymakers and corporate management has led to rigorous research in order to understand both short-run and long-term economic effects of hedge fund activism.

In absence of any universally accepted definition of hedge funds, a roundtable on hedge funds organized by SEC identified the following characteristics. Firstly, hedge funds are pooled, privately organized investment vehicles. Secondly, they are administered by professional investment managers, who have performance-based compensation and invest significantly in the fund. Thirdly, they are not widely available to the public. Fourthly, they are exempted from securities regulation and registration requirements (Brav, Jiang, Partnoy, & Thomas, 2008). These unique characteristics are supposed to influence the effectiveness of activist hedge funds in pursuing shareholder activism (Goranova & Ryan, 2014).

Hedge fund activism has been considered within agency theory and the shareholder primacy model. In contrast to other “rationally apathetic” shareholders, hedge funds have been considered as an active monitoring entity that reduces agency costs inherent in publicly held companies. Kahan and Rock (2007) suggest that activist hedge funds have better incentives to monitor and have fewer conflicts of interest than other institutional investors. There has been growing empirical literature that identifies a

significant improvement in shareholder wealth and corporate governance with the announcement of activism (Brav *et al.*, 2008; Clifford, 2008; Klein & Zur, 2009; Greenwood & Schor, 2009). This has been attributed to improved firm productivity or the increased possibility of takeovers (Greenwood & Schor, 2009; Brav, Jiang, & Kim, 2015; Boyson, Gantchev, & Shivdasani, 2017).

However, opponents of hedge fund activism argue that this emerging activist raises various concerns. There have been increasing discussions regarding the motives of such activism that can be labeled as "short-termism". Hedge funds seek short-term gains from interventions disregarding the long-term consequences, which induces firms to cut research and development (R&D), capital expenditure, operating expenses, and employees (Klein & Zur, 2009; DesJardine & Durand, 2020). Khurana, Li, and Wang (2018) find evidence that hedge fund activism is positively related to firms' earnings management, which is also an indicator of short-termism. Such issues raise concerns about whether hedge fund activism creates or destructs shareholder wealth in the long-term, especially when empirical evidence shows a negative long-term impact of hedge fund activism on firm value (e.g., Clifford, 2008; deHaan, Larcker, & McClure, 2019).

The situation might be further exacerbated because little is known about how hedge fund activism influences firm risk-taking behaviors. In theory, unlike other institutional investors that improve firm performance through reforms in corporate governance, activist hedge funds have a relatively short investment horizon, and are more likely to seek a more direct and immediate gain on share prices. Target firms are likely to become more risk-averse post activism by decreasing capital and R&D expenditures (Greenwood & Schor, 2009; Brav, Jiang, Ma, & Tian, 2018), resulting in high likelihood of underinvestment (Singh, Deb, & Singh, 2020). However, there is no direct empirical evidence on the changes of firm risk-taking post activism. The level of firm risk-taking is associated with the principle of value-maximization. Prior studies show that managers might avoid value-enhancing risk-taking due to the career concerns (Amihud

& Lev, 1981; Hirshleifer & Thakor, 1992; Holmstrom & Costa, 1986). The ownership structure and the separation of control and cash flow rights can also have impact on firm risk-taking (Rajan & Zingales, 2003; Morck, Wolfenzon, & Yeung, 2005; Stulz, 2005). John, Litov, and Yeung (2008) find that firms that rely on bank financing and firms with higher unionization tend to be less risk-taking in corporate investments.

This study explores how hedge fund activism affects firm risk-taking post activism in the U.S. Empirical results show that firms targeted by activist hedge funds experience a 1.07% reduction in risk-taking (as proxied by the industry-adjusted standard deviation of ROA) relative to their matched peers over the five years following hedge fund interventions. Interestingly, activist hedge funds significantly reduce firm-level risk-taking even though the activists have no publicly disclosed demands. These results indicate that firms targeted by activists invest more conservatively in the long-term, consistent with the argument of short-termism.

This study further examines whether firm-level characteristics such as myopic management and information environment make a difference in post-intervention reduction in risk-taking. Empirical results indicate that myopic firms experience a more pronounced reduction in firm risk-taking relative to their matched peers. A possible explanation is that the incentives of myopic managers and activist hedge funds align in terms of short-termism. The reduction in risk-taking is also more pronounced for opaque firms. This is consistent with Bourveau and Schoenfeld (2017) that activist hedge funds are more likely to target opaque firms, whose values are mispriced. Additional tests provide evidence that the effect on risk reduction is less pronounced if management mounts hostile resistance to activism. This is consistent with Boyson and Pichler (2019), implying that the resistance from the management would offset hedge fund activism's initial effect on target firms.

This study contributes to the existing literature in several ways. Firstly, to the best of the author's knowledge, this is the first study that explores the link between hedge fund activism and firm risk-taking. Notably, this study overcomes the shortcoming of

prior literature on hedge fund activism; i.e. the empirical tests of post-activism changes in firm performance fail to take into account the pre-activism performance trends between target and control groups (Penman, 1991; deHaan *et al.*, 2019). This study adequately matches pre-activism trends and traces the same peers over time. Empirical findings provide direct evidence on a significant reduction in firm risk-taking up to five years following hedge fund activism, indicating that target firms become more risk-averse post interventions. More importantly, this provides evidence that activist hedge funds potentially engage in short-termism. This is consistent with Boo and Kim (2020) that institutional investors with short-term investment horizons tend to maximize firms' near-term returns and reduce long-term investments.

Secondly, this study adds to the literature on myopic management, and this is the first paper to document how myopic actions of management interact with activists' short-termism. Empirical evidence indicates that management's myopia and activists' short-termism combined exaggerate the negative impact on firms' strategic and risk-taking behaviors. Moreover, this study relates to work on corporate disclosure and information flow (Lorek, Stone, & Willinger, 1999; Bourveau & Schoenfeld, 2017). Consistent with the short-termism nature of hedge fund activism, activist hedge funds are likely to withhold information with intentions to seek more profits from the mispriced opaque target firms.

Thirdly, this study is amongst the few studies that examine the impact of target firms' response on activism outcomes, and it documents whether management's resistance would affect firms' risk-taking behaviors. This study provides new evidence that management's hostile resistance to activism would offset hedge fund activism's initial impact, leading to a less pronounced reduction in firm risk-taking.

Overall, this study provides implications for policymakers and corporate management by highlighting short-termism nature of activist hedge funds. This serves as a potential negative consequence of activists' investment in firms, providing counterbalance to the numerous positive consequences documented in prior literature on hedge fund

activism. More importantly, this study provides imperative implications for policymakers and corporate management that activist hedge funds might fail to serve as a useful monitoring tool for corporate governance.

The rest of this chapter is organized as follows. Section 4.2 reviews relevant literature and develops the hypotheses. Section 4.3 describes the data, key variables, and methodology. Section 4.4 reports the core results, and Section 4.5 provides robustness results. Section 4.6 concludes.

4.2 Literature review and hypothesis development

4.2.1 Hedge funds and hedge fund activism

Following the classical question "who will monitor the monitor" by Alchian and Demsetz (1972), the shirking problem, which is now popularly known as the agency problem, has become a core focus in corporate governance research. Agency conflict, arising from conflicting interests and incentives between management and shareholders (Jensen & Meckling, 1976), is particularly acute in large-scale corporations. The risk-taking behavior is also influenced by agency conflict in that managers might pursue different objectives from shareholders. Specifically, shareholders are considered to be risk neutral in an individual firm, as they are able to diversify their shareholdings across multiple firms. On the contrary, managers tend to be risk averse in decisions in order to lower their personal risk in wealth. Proper corporate governance is helpful in aligning the risk orientation between shareholders and managers (Wiseman & Gomez-Mejia, 1998). In recent years, shareholder activism arising from the agency problem has become a dynamic force in reshaping corporate governance.

Since the 1980s, institutional investors, labor unions, individuals, public pension funds, mutual funds, and other groups have engaged in shareholder activism. This coincides with the rapid increase of institutional investor holdings, from around one-quarter of

U.S. shares outstanding in 1980 to two-third in 2019 (ProxyPulse, 2019). However, earlier studies show as activists, the traditional institutional investors, particularly mutual funds and pension funds, failed to achieve significant changes to firms' corporate governance structures or create measurable values (Karpoff, 2001; Gillan & Starks, 2007), since the monitoring from institutional investors is generally plagued by regulatory and structural barriers (Brav *et al.*, 2008). In addition, there is evidence that traditional institutional investors may face potential conflicts of interest in their monitoring role, especially when activists in business relations with corporations (Gillan & Starks, 2007).

The latest actor, hedge funds, entered the activism stage in the late 1990s, which has rapidly emerged as the most promising and the most controversial form of the activism in the market (Greenwood & Schor, 2009; Goranova & Ryan, 2014). Similar to previous forms of activism, activist hedge funds also influence firm performance, management, governance, or strategy. In addition, rather being passive, hedge funds are promised to be "active shareholders" (Kahan & Rock, 2007). This is a result of rapid expansions of the hedge fund industry over the years. The value of assets managed by hedge funds worldwide has grown from $118 billion in 1997 to $3.1 trillion in 2019 (Rudden, 2020), and this sizeable pool of investment has set the stage for more hedge fund activism. The rise in hedge fund activism is also facilitated by the exemption[40] from the Investment Company Act of 1940. The expansion and strength of such unique type of activism has resulted in both positive and negative effects.

On the positive side, hedge fund activism offers to be more effective compared to other institutional investors[41] (Gillan & Starks, 2007; Goranova & Ryan, 2014) due to several reasons. Hedge funds are largely unregulated, which allows them to enjoy significant economies of scale, use leverage, and invest in derivatives. This enables

[40] Hedge funds are allowed to use short selling and invest in derivatives. These exemptions enable hedge funds to use complex trading strategies.

[41] During the past decades, activist hedge funds have been successful in launching proxy fights, filing and winning lawsuits, pressuring firms' boards through the media, overcoming anti-takeover defenses, and replacing board members (Briggs, 2006)

them to take positions that are much larger than those of other traditional institutional investors. Hence, activist hedge funds can influence corporate boards and managements by employing sophisticated tactics. Moreover, hedge fund managers have strong financial incentives, as they not only collect management fees on the assets they manage, but also receive 10%-20% or more of the profits that the fund makes (Brav *et al.*, 2008; Bebchuk, Brav, & Jiang, 2015; Heaton, 2019). It is generally believed that these powerful financial incentives would lead activist hedge funds to focus on generating positive and absolute returns. This is also supported by prior studies that document a significant increase in short-term value of the firm post hedge fund activism (Brav *et al.*, 2008; Klein & Zur, 2009, 2011).

On the dark side, there are four major concerns regarding hedge fund activism, namely, short-termism, aggressiveness, control seeking, and equity decoupling (Katelouzou, 2013). Activist hedge funds are usually criticized to pursue aggressive actions and seek changes in the control of target firms. According to Cheffins and Armour (2011), activist hedge funds are generally not protecting pre-existing stakes. Instead, they are "offensive shareholders" that aim to make changes to target firms by building up a sizeable stake "offensively." This sometimes leads to the use of voting power to force management to address activists' demands, in contrast to "defensive" activism of other institutional investors (Kahan & Rock, 2007; Cheffins & Armour, 2011). Specifically, even though activist hedge funds hold a relatively small stake in target firms[42], other investors can follow when hedge funds announce a 5% or 10% position in a company, forming a "wolf pack" (Kulpa & Long, 2005). Such "wolf pack" sometimes gain enough voting power to force management to address activists' demands, generally without even a public disclosure (Hu & Black, 2007). This is in contrast with other institutional investors as "defensive" activism (Kahan & Rock, 2007; Cheffins & Armour, 2011).

In addition, there are raising questions about whether hedge fund activism creates,

[42] On average, activist hedge funds hold about 6% shares, as reported in Brav, Jiang, and Kim (2009).

captures, or destroys corporate value. Activist hedge funds are generally considered to pursue a "profit-making strategy" (Kahan & Rock, 2007), and the ultimate goal of hedge fund activism is to provide absolute or real returns for their shareholders. Staying in target firms for only a short period, it is likely that activist hedge funds would seek to squeeze immediate value from target firms. In other words, activist hedge funds are criticized to engage in short-termism. This is also documented in prior empirical studies that fail to find the improvement in firms' long-term performance post hedge fund activism (Clifford, 2008; Cremers, Giambona, Sepe & Wang, 2015; deHaan *et al.*, 2019; Bebchuk, Brav, Jiang, &, Keusch, 2020). Boyson *et al.* (2017) argue that the improvement in firms' long-term performance is actually driven by mergers and acquisitions, while Agrawal and Lim (2018) argue that hedge funds create value through transferring wealth from stakeholders to shareholders.

To conclude, as the latest breed of activists, activist hedge funds have enjoyed extraordinary success compared to all other activist investors. Prior literature documents more than 60% settlement rate of hedge fund activism (Brav *et al.*, 2008; Boyson & Mooradian, 2015; Bebchuk *et al.*, 2020), compared to a 31% success rate for pension funds (Wahal, 1996). Such extraordinary success rate raises the question on the pivotal role of hedge fund activism in value creation in the long-run, while the objective of their activism is rooted in short-termism.

4.2.2 Hedge fund activism, corporate governance, and firm risk-taking

In the backdrop of the ever-present dilemma, hedge fund activism is especially controversial in pursuing the short-term strategy. As documented in DesJardine and Durand (2020), "*[Hedge] fund managers almost exclusively prefer shorter-term gains, which are more certain and controllable than longer-term returns*." This investment strategy of activist hedge funds would also affect firm risk-taking behaviors.

Building on existing literature, this study tries to establish the association between hedge fund activism and firm risk-taking in the long-term. Although very limited

empirical studies address the association between hedge fund activism and firm risk-taking, anecdotal evidence indicates that activists have noticed the importance of firm risk-taking during hedge fund campaigns.

For instance, in a 2007 campaign between the activist hedge fund Thesis Capital Management LLC and the target company Orange 21, a beneficial shareholder claimed that the former management team focused on "*low-return, high-risk growth projects*." In a 2015 campaign, in which the activist Voce Capital Management LLC targeted Air Methods Corporation, Voce outlined that the firm strategy "*increased the volatile nature of Air Methods' earnings while obscuring visibility into its performance, with its quarterly results becoming wildly unpredictable*." Similarly, in another 2010 campaign between the activist Ramius LLC and the target company Cypress Bioscience, the Cypress Boards were criticized to *"destroy shareholder value by making increasingly risky investments with shareholder money."* All the anecdotal evidence suggests that activist hedge funds identify risk-taking as an essential factor during activism.

Theoretically, this study builds the hypotheses on agency theory, hedge fund takeover, and portfolio diversification. Firstly, from the agency perspective, managers tend to avoid risk-taking due to their career concerns, as they are not able to diversify their unemployment risk (Amihud & Lev, 1981; Hirsheifer & Thakor, 1992). Prior literature also supports that insiders tend to avoid some value-enhancing but risky projects to preserve their private benefits (John, Litov, & Yeung, 2008). This issue is critical as insufficient risk-taking is likely to lower firm value (Low, 2009). There is also evidence that firm risk-taking is associated with long-term economic growth (Barro, 1991; De Long & Summers, 1991).

As basic tenets, shareholders (principals) need to monitor and provide incentives to managers (agents), so that they can maximize shareholder value (Alchian & Demsetz, 1972; Jensen & Meckling, 1976). However, unlike other forms of activist institutional investors who seek to improve firm performance through reshaping corporate governance structures, activist hedge funds are more likely to seek more direct and

immediate increase in share prices (Bratton, 2008; Cheffins & Armour, 2011). In this sense, hedge funds are more likely to pursue short-term actions that create immediate gains at the expense of corporate policies that are beneficial and sustainable in the long-term (Lipton & Savitt, 2007; Clifford, 2008; Katelouzou, 2013). The phenomenon of short-termism is more evident if a firm has a higher portion of transient institutional investors in its ownership structure (Boo & Kim, 2020), in which activist action is a typical example (David, Hitt, & Gimeno, 2001). This is also supported by several empirical studies that capital expenditures or R&D expenditures of target firms drop significantly post hedge fund activism (Greenwood & Schor, 2009; Brav *et al.*, 2015; Coffee & Palia, 2015; Brav *et al.*, 2018). In this context, this study argues that target firms would reduce risk-taking post activism.

Secondly, there is also evidence that hedge fund activism creates shareholder value primarily by influencing takeover outcomes for target firms. Firms targeted by hedge fund activism are more likely to face subsequent takeovers (Becht, Franks, & Grant, 2015; Boyson *et al.*, 2017). Additionally, activism mergers with third-party bidders create higher values relative to non-activism mergers (Boyson *et al.*, 2017), and evidence shows that acquiring a less risky firm is associated with higher post-acquisition accounting returns (Schneider & Spalt, 2017). In this sense, conservative firms serve as a more attractive target for activist hedge funds. Combined with short-termism argument, this study expects target firms to be more conservative post activism.

Thirdly, the degree of portfolio diversification across large shareholders has a significant impact on firm risk-taking. According to Faccio, Marchica, and Mura (2011), firms controlled by non-diversified large shareholders tend to invest more conservatively than firms controlled by well-diversified shareholders. They provide evidence that the risk-taking behaviors decline significantly following shocks to large shareholders' portfolios (i.e. becoming less diversified). In similar context, hedge funds are generally less diversified compared to other forms of institutional investors

(Agarwal, Jiang, Tang, & Yang, 2013), it is expected that hedge fund activism would lead to risk-averse behavior in target firms post activism.

Consequently, hedge fund activism is expected to have a significant influence on firm risk-taking behaviors. With the ultimate goal of seeking value creation, activist hedge funds are expected to take direct but sometimes short-term actions on target firms. In this context, this study hypothesizes that:

Hypothesis 1: *Firms targeted by activist hedge funds become more risk-averse post activism.*

4.2.3 Hedge fund activism, myopic management, and risk-taking

Corporate managers would face various alternative strategies, which generate different cash flow streams. Effective management is expected to maintain a long-term focus on strategies that maximize the sum of expected discounted future profits. However, the agency conflict arise when managers focus on short-term goals that overemphasize immediate payoffs at the expense of superior but more distant payoffs (Mizik, 2010). In other words, they engage in myopic management.

Myopic management exists via two mechanisms, namely hidden actions and hidden information (Grant, King, & Polak, 1996). Under imperfect market conditions, managers can take steps when shareholders cannot observe perfectly (Narayanan, 1985; Stein, 1989). Additionally, managers are usually better informed than shareholders, and their incentives might also deviate from shareholders' objectives. Given that achieving the earning and stock price target is of high priority for management, myopic managers might have incentives to take advantage and manipulate performance and accounting-based earnings management (Healy & Wahlen, 1999). Furthermore, managers can manipulate financial reporting, for example, accelerating recognition of revenues, or capitalizing rather than expensing some costs. More importantly, myopic management also has the incentives to shift

future income to the present at certain costs (Laverty, 1996, 2004), typically via the underinvestment in R&D, advertising, and employee training for the purpose of inflating current-period earnings. In other words, management might have the ability and incentives to manipulate real activities and discretionary accruals activities.

Such myopic practices, although do not affect the foundations of a firm's performance, would tamper with market perceptions when uncovered (Brandenburger & Polak, 1996; DuCharme, Malatesta, & Sefcik, 2004). A McKinsey report indicates that firms with short-term targets exhibit a less strong financial performance and market capitalization over time (McKinsey & Company, 2017). Prior empirical studies also report that firms cannot be properly valued as a consequence of myopia (Mizik, 2010). Garel (2017) further argues that market myopia encourages managerial myopia, especially when managers cater to market pricing.

Putting into the context of hedge fund activism, this study expects that management myopia interacts with the impact of hedge fund activism on firm risk-taking. This study posits that management myopia would further reduce firms' post-activism risk-taking behaviors from the perspectives of both activists and targets. On one hand, anecdotal and empirical evidence shows that U.S. firms have been experiencing an increasing level of management myopia over the past decades (McKinsey & Company, 2017). Managers and scholars voice their concerns that the U.S. equity market seems to force corporate managers to behave myopically. Two characteristics of the U.S. market might be responsible for such myopic practices, namely the prevalence of an active market for corporate control and the concentration of shares in the hands of institutional investors with short-term investment horizons (Wahal & McConnell, 2000). Activist hedge funds fulfil both characteristics. Unlike other institutional investors that are more passive, activist hedge funds tend to take up managerial roles (McCahery, Sautner, & Starks, 2016). In this sense, it is expected that hedge fund activism would further contribute to management myopia. This is also supported by the evidence that target firms are more likely to engage in real earnings management following hedge

fund interventions by temporarily boosting sales, overproducing inventory to reduce the cost of goods sold, or cutting discretionary expenses (Khurana *et al.*, 2018).

On the other hand, target firms would also choose their investment strategy based on their investment horizons (Brocket, Loumioti, & Serafeim, 2015). As discussed, myopic managed firms might find it optimal to undertake short-term investment that boosts short-term performance or secures external financing. This coincides with the hedge fund's short-termism. In this context, it is expected that activist hedge funds might find it easier to pursue short-term strategies in myopic target firms. This is consistent with the evidence that institutional investors with short investment horizons, including hedge funds, tend to shift their portfolios to short-term holding strategies, which is more likely to maximize near-term returns and reduce long-term investment (Bushee, 1998; Boo & Kim, 2020). In other words, myopic target firms are likely to become more conservative in investment post activism.

Consequently, this study argues that myopic managed firms are more like to experience a more significant reduction in risk-taking following hedge fund interventions. In this context, this study hypothesizes that:

Hypothesis 2: *Target firms with myopic management experience a more pronounced reduction in risk-taking post hedge fund activism.*

4.2.4 Hedge fund activism, information environment, and risk-taking

The flow of information in an efficient capital market is essential to make informed decisions. The information asymmetry between management and shareholders is a primary cause of agency problems (Jensen & Meckling, 1976). The access to information is a necessary condition for corporate transparency, and more corporate disclosure improves transparency (Healy & Palepu, 2001).

Information transparency plays a fundamental role in corporate governance, whereas the level of transparency varies across firms. Transparent firms tend to disclose reliable

information voluntarily, leading to less adverse selection and reduced demand for monitoring (Ma, Shang, & Wang, 2017). Firms with higher institutional ownership and greater management disclosure also experience lower information asymmetry (Boone & White, 2015). On the contrary, firms with a lower level of transparency have a limited supply of firm-specific information (Hutton, Marcus, & Tehranian, 2009). The informational mismatch between managers and outsiders restricts the ability of external stakeholders in firm valuation.

Corporate disclosure plays a vital role in the setting of hedge fund activism. Prior studies find that shareholder activism drives significant changes in firms' existing management, resulting in lower CEO compensation, higher CEO turnover, or less managerial control over the firm (Brav *et al.*, 2008; Ertimur, Ferri, & Muslu, 2011). Accordingly, managers might have a strong incentive to pre-empt activism at their firms. Specifically, in more transparent firms, disclosure serves as a complement of private information, while this eliminates arbitrage opportunities by converging stock price to its fair value (Kim & Verrecchia, 1994). This makes transparent firms less attractive to activist hedge funds, who usually target mispriced firms and make a quick profit. In other words, activist hedge funds are more likely to target relatively opaque firms (Bourveau & Schoenfeld, 2017).

Building on existing literature, this study argues that firm-level transparency plays a significant role in the relation between hedge fund activism and the reduction in risk-taking. Unlike other types of activist institutional investors that improve information flow and make additional information available to externals (Prevost, Wongchoti, & Marshall, 2016), activist hedge funds have a negative impact on firms' disclosure. Target firms cease providing information subsequent to hedge fund activism (Chen & Jung, 2016). Specifically, prior studies show that short-horizon institutional investors tend to provide managers with implicit and explicit short-term incentives, making managers take myopic disclosure strategies, such as withholding more bad news from market participants (Stein, 1989; Bourveau & Schoenfeld, 2017). This makes it a more

favorable target during activism mergers. In addition, managers tend to inflate earnings (at least temporarily) via earnings management strategies that produce and convey positive information regarding firms' financial conditions (Stein, 1989; Khurana *et al.*, 2018). In this sense, this study expects that it is easier for activist hedge funds to manipulate information flow in opaque firms (Lorek *et al.*, 1999).

Consequently, this study expects firms with a lower level of information transparency are more likely to experience a more pronounced reduction in risk-taking post hedge fund activism. In this context, this study hypothesizes that:

Hypothesis 3: *The post-intervention reduction in firm risk-taking is associated with firm-level transparency, and the effect is more pronounced for less transparent firms.*

4.2.5 Hedge fund activism, hostile resistance, and risk-taking

During hedge fund activism, activist hedge funds tend to seek changes in corporate control, management, board composition, or governance. When facing activists, management of target firms has options to ignore, negotiate with, or resist the activists. George and Lorsch (2014) report that corporate managers spend significant funds and other resources in resisting activism. Corporate managers have strong private incentives to resist activism, owing to the concerns about job security, reputational damages, changes of board seats, or probability of a takeover. This is consistent with the "managerial welfare hypothesis" (Amihud & Lev, 1981). Managers might also resist the activists because they believe activism might harm firm value, which is consistent with the "shareholder welfare hypothesis" (Walking & Long, 1984). In response to this resistance, activists usually counter-resist by initiating a proxy contest, filing a lawsuit, or making a tender offer (Boyson & Pichler, 2019).

There is limited empirical evidence of management's resistance during hedge fund activism. This study is trying to establish how management's response affects firms' risk-taking behaviors post hedge fund interventions. Prior empirical studies have well

established that the market reacts positively around the announcement of activist campaigns (e.g., Clifford, 2008; Klein & Zur, 2009; Brav *et al.*, 2009). However, the market would react negatively subsequent to hostile resistance, which even reduces the initial positive market reaction to the announcement of activism (Boyson & Pichler, 2019). Target firms with hostile resistance, unless hedge funds counter-resist, would experience faster activist exit or fewer mergers. Brav *et al.* (2015) also argue that post-intervention changes of target firms might not agree with planned strategies during hostile activism, which is usually proof of management's resistance. This is consistent with management's concerns about activism. In addition, in a recent working paper, Singh *et al.* (2020) provides evidence that hostile resistance tends to decrease overinvestment in target firms. In other words, management's resistance would offset the initial effect of hedge fund activism on target firms.

Putting into the context of firm risk-taking, this study argues that the change in firm risk-taking would be less (more) pronounced if management has (does not have) hostile resistance to hedge fund activism. In this context, this study hypothesizes that:

Hypothesis 4: *Target firms' response plays an essential role in the consequence of hedge fund activism, and firms with no hostile resistance would experience a more pronounced reduction in post-intervention risk-taking.*

4.3 Data, variable descriptions, and model designs

4.3.1 Data and sample descriptions

The sample consists of hedge fund activism events in the U.S., covering the period of 2000-2016. The information of the sample activism events is collected from the FactSet SharkRepellent database. Table 4.1 provides an overview of the hedge fund activism sample.

Table 4.1 Overview of hedge fund activism

The table provides details about hedge fund activism events in the sample, covering 2000-2016. The information of the sample activism events is collected from the FactSet SharkRepellent database. Panel A provides information about the sample size. Panel B provides the temporal distribution of hedge fund activism. Panel C provides information about the types of demands from activist shareholders, and Panel D reports the industrial distribution of the targeted firms following the Fama-French 17 industry classifications

Panel A Sample size	
Sample description	**Number of events**
Total hedge fund activism events (2000-2016)	3,374
M&A, bankruptcy, and business reorganization events	366
Financial firm and utilities	736
Missing CRSP or COMPUSTAT data	705
Final hedge fund activism events	**1,567**
Panel B Temporal distribution of hedge fund activism	
Years	**Number of events**
2000	12
2001	33
2002	28
2003	44
2004	37
2005	98
2006	152
2007	184
2008	142
2009	64
2010	96
2011	84
2012	99
2013	118
2014	134
2015	135
2016	107
Total	**1,567**
Panel C Types of activist demands	
Types of demands	**Number of events**
Board representation	516
Maximize shareholder value	472
No publicly disclosed activism	244
Board control	127
Vote for a stockholder proposal	46
Enhance corporate governance	45

Vote against a management proposal	33
Support dissident group in a proxy fight	23
Public short position/bear raid	22
Remove director(s), no dissident nominee to fill a vacancy	16
Vote for a management proposal/support management	12
Remove officer(s)	11
Total	**1,567**

Panel D Industrial distribution	
	Number of events
Industry	
Automobiles	32
Chemicals	36
Construction and construction materials	37
Consumer durables	54
Drugs, soap, perfumes, tobacco	62
Fabricated products	9
Food	23
Machinery and business equipment	222
Mining and minerals	25
Oil and petroleum products	64
Other	752
Retail stores	167
Steelworks etc.	7
Textiles, apparel & footwear	29
Transportation	48
Total	**1,567**

Panel A of Table 4.1 reports the information on sample description. There are a total of 3,374 activism events during the sample period, of which 366 events are related to M&A, bankruptcy, or reorganization of a business, and 736 events are related to financial firms or utilities. These activism events are excluded from the sample due to their direct impacts on risk-taking or the difference in regulatory and reporting requirements. This study requires firms' coverage in COMPUSTAT and CRSP datasets, which leads to an exclusion of another 705 activism events. The final sample constitutes 1,567, firm-year activism events. Panel B reports the number of activism events for each year during 2000-2016. The number of events increased from 2000-2007, peaking in 2007. The number dropped significantly in 2009, which gradually increased afterward. The number of activism events has some pro-cyclical

characteristics. Panel C reports the types of demands the activist hedge funds made. Among the events, board representation (516 events or 32.93%), maximization of shareholder values (472 events or 30.12%), and board control (127 events or 8.10%) are the top three activist demands[43]. Panel D shows the industrial distribution of target firms, following the Fama-French 17 industry classifications. In general, machinery and business equipment and retail industries receive the most activist campaigns.

4.3.2 Variables descriptions

4.3.2.1 Firm risk-taking

This study examines both the book-based and market-based risk-taking measures, which capture the post-activism risk-taking. Different proxies for risk-taking, together with other control variables, are reported in Table 4.2.

Table 4.2 Variables descriptions

This table lists the variables used in this study, together with their definitions. This study uses four book-based proxies and five market-based proxies for firms' risk-taking. The book-based measures include standard deviation or range of ROA and industry-adjusted standard deviation or range of ROA. The standard deviation or range of ROA is calculated over 3-year or 5-year rolling windows, respectively. The market-based measures include total risk, idiosyncratic risk, market-adjusted total risk, industry-adjusted total risk, and industry-adjusted idiosyncratic risk. A set of control variables are also included.

Variables	Description
Mcap	Market capitalization, which is calculated as the natural logarithm of market capitalization; data extracted from COMPUSTAT.
ROA	Earnings before interest, taxes, depreciation, and amortization scaled by lagged total assets; data extracted from COMPUSTAT.
SD_ROA[-3, -1]	Standard deviation of ROA, which is calculated from three years prior to hedge fund activism; data extracted from COMPUSTAT.
Leverage	Short-term debt plus long-term debt scaled by total assets; data extracted from COMPUSTAT.
TobinQ	Tobin's Q, Calculated as (Total Assets + Market Capitalization - Ordinary Equity)/Total Asset; data extracted from COMPUSTAT.
Tangibility	The ratio of tangible assets to total assets; data extracted from COMPUSTAT.

[43] Sometimes the 13D filers do not disclose the specific demands of the hedge fund activism. This accounts for 244 events or 15.57% of the sample activism events.

FirmAge	Age of the firm at the time of activism, which is calculated as the difference between the time of the activism and when CRSP first started reporting the firm's stock prices.
Dividends	Total dividend payments scaled by total assets; data extracted from COMPUSTAT.
Slack	Sum of cash and short term investment scaled by total assets; data extracted from COMPUSTAT.
Target	A dummy variable that takes the value of one if the firm is targeted by hedge funds, and zero otherwise.
Post	A dummy variable that takes the value of one if the target firm (matched control firm) is within [t + 1, t + 5] years post the activism event year, and zero otherwise.
3-year risk-taking	
BR_1	BR_1 is defined as industry-adjusted (following Fama-French 17 industry classifications) standard deviation of ROA over [t + 1, t + 3] years post hedge fund activism
BR_2	BR_2 is defined as industry-adjusted (following Fama-French 17 industry classifications) range of ROA over [t + 1, t + 3] years post hedge fund activism
BR_3	BR_3 is defined as the standard deviation of ROA over [t + 1, t + 3] years post hedge fund activism
BR_4	BR_4 is defined as the range of ROA over [t + 1, t + 3] years post hedge fund activism
MR_1	MR_1 is defined as standard deviation of stock return over [t + 1, t + 3] years post hedge fund activism
MR_2	MR_2 is defined as the standard deviation of residuals from Carhart four-factor model over [t + 1, t + 3] years post hedge fund activism
MR_3	MR_3 is defined as the market-adjusted standard deviation of stock return over [t + 1, t + 3] years post hedge fund activism
MR_4	MR_4 is defined as industry-adjusted (following the Fama-French 17 industry classifications) standard deviation of stock return over [t + 1, t + 3] years post hedge fund activism
MR_5	MR_5 is defined as industry-adjusted (following the Fama-French 17 industry classifications) standard deviation of residuals from Carhart four-factor model over [t + 1, t + 3] years post hedge fund activism
5-year risk taking	
BR_5	BR_5 is defined as industry-adjusted (following the Fama-French 17 industry classifications) standard deviation of ROA over [t + 1, t + 5] years post hedge fund activism
BR_6	BR_6 is defined as industry-adjusted (following the Fama-French 17 industry classifications) range of ROA over [t + 1, t + 5] years post hedge fund activism
BR_7	BR_7 is defined as the standard deviation of ROA over [t + 1, t + 5] years post hedge fund activism

BR_8	BR_8 is defined as the range of ROA over [t + 1, t + 5] years post hedge fund activism

This study uses four book-based measures following Boubakri, Cosset, and Saffar (2013), Faccio *et al*. (2011) and John *et al*. (2008). The four book-based measures are industry-adjusted standard deviation (BR_1), industry-adjusted range of ROA (BR_2), the standard deviation of ROA, (BR_3), and range of ROA (BR_4). For the main tests, this study uses the industry-adjusted standard deviation or range of ROA (i.e. BR_1 and BR_2) over a 3-year rolling window, as it takes into account industrial average in the measure. Alternatively, standard deviation or range of ROA (i.e. BR_3 and BR_4) over a 3-year rolling window are used as robustness measures. Notably, with the 3-year rolling window used for calculation, this paper examines the long-term effect of hedge fund activism on firm risk-taking, extending to the year 2019 at the latest. Moreover, this study also calculates the (industry-adjusted) standard deviation or range of ROA over a 5-year rolling window[44] for a robustness check (referred to as BR_5, BR_6, BR_7, and BR_8).

Additionally, five proxies for market-based measures are used[45], including total risk (MR_1), idiosyncratic risk (MR_2), market-adjusted total risk (MR_3), industry-adjusted total risk (MR_4), and industry-adjusted idiosyncratic risk (MR_5). Mathematically, total risk (as well as industry-adjusted total risk and market-adjusted total risk) is calculated as the standard deviation of firms' stock returns over 3-year windows post hedge fund activism events. Idiosyncratic risk is calculated as the residuals from the Fama-French 4-factor model.

4.3.2.2 Myopic management measure

This study identifies potentially myopic firms following Mizik (2010). According to

[44] When the 5-year rolling windows are used for calculation, the number of observations and hedge fund activism events drop. However, this study still examines the impact on firm risk-taking till the latest available data.

[45] Following relevant literature, the market-based measures are used for robustness checks, as the market-based measures might be noisier (Kodor, Pafka, & Nagy, 2007).

Mizik (2010), myopic managed firms tend to decrease their marketing and R&D expenditures intended to inflate reported earnings. In order to measure myopia, following Mizik (2010) what is first needed is to determine the "normal" or expected level of profitability, marketing, and R&D intensity for each firm-year. For this, fixed-effects autoregressive panel data forecast regressions are used to estimate normal levels of firms' earnings, marketing, and R&D intensity for the next period with two period lags.

$$ROA_{i,t} = \alpha_{roa,i} + \emptyset_{roa} \times ROA_{i,t-1} + \beta_{roa} ROA_{i,t-2} + \sum_{t=1}^{T} \delta_{roa,t} \times Year_t + \sum \lambda_{roa,sic} \times SIC_{sic} + \varepsilon_{roa,it} \quad \textbf{Equation 28}$$

$$MKT_{i,t} = \alpha_{mkt,i} + \emptyset_{mkt} \times MKT_{i,t-1} + \beta_{mkt} MKT_{i,t-2} + \sum_{t=1}^{T} \delta_{mkt,t} \times Year_t + \sum \lambda_{mkt,sic} \times SIC_{sic} + \varepsilon_{mkt,it} \quad \textbf{Equation 29}$$

$$R\&D_{i,t} = \alpha_{r\&d,i} + \emptyset_{r\&d} \times R\&D_{i,t-1} + \beta_{r\&d} R\&D_{i,t-2} + \sum_{t=1}^{T} \delta_{r\&d,t} \times Year_t + \sum \lambda_{r\&d,sic} \times SIC_{sic} + \varepsilon_{r\&d,it} \quad \textbf{Equation 30}$$

where $ROA_{i,t}$, $MKT_{i,t}$, and $R\&D_{i,t}$ represent the actual levels of ROA, marketing, and R&D intensity, respectively, for each firm i in the current period t. $ROA_{i,t-1}$, $MKT_{i,t-1}$, and $R\&D_{i,t-1}$ are their one-period lagged values, and $ROA_{i,t-2}$, $MKT_{i,t-2}$, and $R\&D_{i,t-2}$ are their two-period lagged values, respectively. $Year_t$ is a set of year dummy variables. $\alpha_{roa,i}$, $\alpha_{mkt,i}$, and $\alpha_{r\&d,i}$ are the firm-specific intercepts. $\emptyset_{roa}$, $\emptyset_{mkt}$, and $\emptyset_{r\&d}$ are the respective estimates of persistence. This study further controls for each dependent value using their lags in two periods. $\varepsilon_{i,t}$ is the error term. To reduce the bias of omitted variables, time fixed effect (δ_t) and industry fixed effects (λ_{sic}) are controlled.

The generalized system model of moments (GMM) estimation approach is employed for Equations 28-30. According to Arellano & Bond (1991), Arellano & Bover (1995), and Blundell & Bond (1998), dynamic panel data estimators are efficient, especially in the following situations. Firstly, there are fewer periods than cross-sections. Secondly, the dependent variable dynamic, and it depends on its previous values. Lastly, the functional relationship is linear. Following these studies, the GMM approach is

advantageous in the calculation of myopia, because the calculation involves regressing the left-hand side variable on its lags, while there are also more cross-sections than time periods.

The forecast errors in the models provide the estimates of the deviation of the series from the "normal" level in each period. In other words, $\varepsilon_{roa,it} = \left(ROA_{i,t} - \widehat{ROA_{it|it-1}}\right)$, $\varepsilon_{mkt,it} = \left(MKT_{i,t} - \widehat{MKT_{it|it-1}}\right)$, and $\varepsilon_{r\&d,it} = \left(R\&D_{i,t} - \widehat{R\&D_{it|it-1}}\right)$. These values are used to identify firms as myopic and non-myopic. Based on Mizik's (2010) classification, firm i is identified as myopic in year t if $\varepsilon_{roa,it} > 0$, $\varepsilon_{mkt,it} < 0$, and $\varepsilon_{r\&d,it} < 0$

4.3.2.3 Firm-level transparency

Three proxies for firm-level transparency are used, namely transparency measure proposed in Llorente, Michaely, Saar, and Wang's (2002) model (LMSW hereafter), the earnings management measure, and 8K-based disclosure measures. These three measures cover the market-based, book-based, and regulatory perspectives of firm-level opacity.

Firstly, following Llorente *et al.*'s (2002) model, this study uses stock return autocorrelation conditional on trading volume as a proxy for firm-level transparency. Specifically, this measure is constructed from the following regression estimated for each firm-year:

$$\boldsymbol{r_{j,t} = \alpha_j + \gamma_j r_{j,t-1} + \vartheta_y r_{j,t-1} V_{j,t-1} + e_{j,t}} \qquad \textbf{Equation 31}$$

where $r_{j,t}$ and $r_{j,t-1}$ are the contemporaneous and lagged weekly stock returns, respectively. $V_{j,t-1}$ is the lagged log turnover detrended by subtracting the moving average of the log turnover over the prior 26 weeks. The key estimate is the coefficient of the interaction term ϑ_y, which reflects the amount of information-based trading. According to Llorente *et al.* (2002), firms with less transparency should have a positive value of ϑ_y due to partial adjustments to the prices, whereas firms with higher transparency should have a negative ϑ_y due to return reversal. This study creates

subsamples based on the positive or negative values of ϑ_y for the sample firms.

Secondly, following Jones (1991) and Dechow, Sloan, and Sweeney (1995), this study uses a cross-sectional model of discretionary accruals to measure accrual-based earnings management. The model is estimated for each two-digit SIC-year grouping as follows:

$$\frac{TACC_{it}}{Assets_{i,t-1}} = k_{1t}\frac{1}{Assets_{i,t-1}} + k_2\frac{\Delta REV_{it}}{Assets_{i,t-1}} + k_3\frac{PPE_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \qquad \textbf{Equation 32}$$

where $Assets_{i,t-1}$ is the total assets for firm i at the beginning of year t. $TACC_{it}$ is total accruals for firm i during the year t, which is calculated as income before extraordinary items minus cash flow from operating activities adjusted for extraordinary items and discontinued operations. ΔREV_{it} is the change in revenues for firm i during the year t. PPE_{it} is the gross value of property, plant, and equipment for firm i at the end of year t.

The coefficient estimates from Equation 32 are used to estimate the firm-specific normal accruals (NA_{it}) for the sample firms, based on the following equation:

$$NA_{it} = \hat{k}_{it}\frac{1}{Assets_{i,t-1}} + \hat{k}_2\frac{(\Delta REV_{it} - \Delta AR_{it})}{Assets_{i,t-1}} + \hat{k}_3\frac{PPE_{it}}{Assets_{i,t-1}} \qquad \textbf{Equation 33}$$

where ΔAR_{it} is the change in accounts receivable for firm i during the year t. $\hat{k}_{it}$, $\hat{k}_2$, and $\hat{k}_3$ are the estimated coefficients from Equation 32. Following Cohen, Dey, and Lys (2008), this study calculates discretionary accruals as the difference between total accruals and the fitted normal accruals. It is notable that accruals reverse over time. Hence, the second proxy for firm-level transparency, namely accrual-based earnings management, is measured by the absolute value of discretionary accruals, as defined in the following equation:

$$EM_{it} = ABS\left[\left(TA_{it}/Assets_{i,t-1}\right) - NA_{it}\right] \qquad \textbf{Equation 34}$$

Thirdly, in order to provide a level playing field for all investors, the SEC has implemented the rule Regulation Fair Disclosure (Reg FD) since 2000. According to Reg FD, the SEC requires listed firms to make public any material events [46] that shareholders should know. Some information reported in 8K filings is clearly required by SEC, such as material events that happen to a firm or events that it participates in (namely *mandatory disclosure*), while sometimes firms provide additional information in 8Ks beyond the mandatory requirements (Carter & Soo, 1999; Lerman & Livnat, 2010). With more 8K filings disclosed, it is expected that the firms are more informationally transparent.

Various measures based on 8K filings are widely used as an indicator of firm-level disclosure (e.g., Guay, Samuels, & Taylor, 2016; Bourveau, Lou, & Wang, 2018). This study uses the total number of 8Ks firm files (All_8K) as the third proxy for firm-level transparency. The 8K filings are downloaded from the SEC EDGAR website.

4.3.2.4 Other control variables

A comprehensive set of control variables known in prior literature is included in this study[47]. *Mcap* is expressed as the natural logarithm of a firm's market capitalization. *ROA* is defined as the ratio of earnings before interest, taxes, depreciation, and amortization to total assets. *SD_ROA[-3, -1]* is the standard deviation of ROA calculated over a 3-year window prior to hedge fund activism events. *Leverage* is defined as the ratio of debt (short-term and long-term) to total assets. *TobinsQ* is calculated as (Total Assets + Market Capitalization - Ordinary Equity)/Total Asset. *Tangibility* is the ratio of tangible assets to total assets. *FirmAge* is the age of a firm at the time of activism, which is calculated as the difference between the time of hedge fund activism and when COMPUSTAT first reported the firm's annual data. *Dividends* are defined as total dividend payments scaled by the firm's total assets. *Slack* is defined as the sum of cash and short-term investment scaled by the firm's total assets. *Target* is a dummy variable

[46] The SEC defines a "material" event as one that is expected to influence investors' investment decision-making.

[47] Also refer to Table 4.2 for more information.

that takes the value of one if the firm is targeted by hedge funds, and zero otherwise. *Post* is a dummy variable that takes the value of one for the years after the activism event year, and zero otherwise.

Stock returns and turnover data are collected from CRSP. The data for all the remaining control variables are gathered from COMPUSTAT. The information of hedge fund activism, including the relevant types and hedge fund filings, is provided by the FactSet SharkRepellent database. The 8K filings are downloaded from the SEC EDGAR website.

4.3.2.5 Descriptive statistics

Table 4.3 presents descriptive statistics for the variables used in the empirical investigations. All continuous variables are winsorized at 1st and 99th percent. The average firm risk-taking is 0.0197 and 0.0625 when it is proxied by the industry-adjusted standard deviation of ROA (BR_1) or industry-adjusted range of ROA (BR_2) respectively. The distribution of firm risk-taking proxied by BR_3 and BR_4 is also identical, although BR_3 and BR_4 are higher in values compared to the industry-adjusted risk-taking measures. For the firm transparency measurement, *LMSW* has a positive mean (median) value of 0.0230 (0.0259). The positive values indicate that most of the firms are less informationally transparent. This is consistent with Bourveau and Schoenfeld (2017) that activist hedge funds are more likely to target less transparent firms.

Table 4.4 reports the Pearson correlation matrix[48]. The correlations among variables are normally low, except for a few cases. The standard deviation of ROA prior to hedge fund activism (*SD_ROA[-3, -1]*) is a relatively high correlation with the risk-taking proxies post the activism.

[48] The reported risk-taking measures are all book-based measures calculated over the 3-year windows. The correlations using other risk-taking measures are also within reasonable range, and the correlation matrix is available upon request.

Table 4.3 Descriptive statistics

This table provides descriptive statistics of the variables. The sample covers all the hedge fund activism events during the period 2000-2016. All variables are winsorized at 1st and 99th percent. The variable definitions are provided in Table 4.2.

Variables	(1) N	(2) Mean	(3) Std.dev.	(4) p25	(5) p50	(6) p75
3-year book-based risk-taking						
BR_1	13,848	0.0197	0.0966	-0.0249	-0.0076	0.0242
BR_2	13,848	0.0625	0.0979	0.0150	0.0309	0.0661
BR_3	13,848	0.0367	0.1808	-0.0478	-0.0145	0.0458
BR_4	13,848	0.1188	0.1851	0.0285	0.0594	0.1256
Firm transparency						
LMSW	11,115	0.0230	0.1941	-0.0822	0.0259	0.1325
EM	13,677	0.6356	1.1634	0.0712	0.2500	0.6859
Log(All_8K)	11,849	2.3878	0.6223	2.0794	2.3979	2.7726
Control variables						
Mcap	13,848	5.8038	2.3126	4.2022	5.7767	7.3202
ROA	13,848	0.0703	0.2049	0.0290	0.1032	0.1686
Tobin's Q	13,848	1.6191	3.0712	0.8193	1.1468	1.7272
SD_ROA[-3, -1]	13,848	0.0729	0.1165	0.0175	0.0357	0.0761
Leverage	13,848	0.2336	0.3335	0.0058	0.1700	0.3437
Tangibility	13,848	0.2497	0.2381	0.0642	0.1630	0.3779
FirmAge	13,848	2.9133	0.5946	2.4849	2.8904	3.3322
Slack	13,848	0.2081	0.2255	0.0399	0.1212	0.3027
5-year book-based risk-taking						
BR_5	10,824	0.0230	0.1127	-0.0275	-0.0077	0.0271
BR_6	10,824	0.0757	0.1135	0.0215	0.0407	0.0784
BR_7	10,824	0.0561	0.2722	-0.0666	-0.0186	0.0668
BR_8	10,824	0.1848	0.2741	0.0523	0.0997	0.1924
3-year market-based risk-taking						
MR_1	10,343	0.5050	0.2464	0.3330	0.4475	0.6108
MR_2	10,343	0.4637	0.2546	0.2914	0.4022	0.5603
MR_3	10,343	0.4682	0.2513	0.2950	0.4094	0.5693
MR_4	10,343	0.5049	0.2463	0.3330	0.4475	0.6107
MR_5	10,343	0.4600	0.2545	0.2872	0.3977	0.5566

Table 4.4 Correlation matrix

This table provides correlations for all firm-specific variables. The sample covers all the hedge fund activism events during the period 2000-2016. All variables are winsorized at 1st and 99th percent. The variable definitions are provided in Table 4.2.

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	BR_1	1														
(2)	BR_2	1.00	1													
(3)	BR_3	0.99	0.98	1												
(4)	BR_4	0.99	0.99	1.00	1											
(5)	LMSW	0.01	0.01	0.01	0.01	1										
(6)	EM	0.09	0.09	0.07	0.07	-0.01	1									
(7)	Log(All_8K)	-0.06	-0.06	-0.06	-0.06	-0.05	-0.06	1								
(8)	Mcap	-0.31	-0.31	-0.31	-0.31	-0.10	-0.11	0.33	1							
(9)	ROA	-0.49	-0.50	-0.51	-0.51	-0.02	-0.03	0.03	0.38	1						
(10)	Tobin's Q	0.32	0.32	0.32	0.32	-0.02	0.09	-0.03	0.01	-0.20	1					
(11)	SD_ROA[-3, -1]	0.44	0.45	0.46	0.46	-0.02	0.05	-0.06	-0.26	-0.42	0.24	1				
(12)	Leverage	0.11	0.11	0.11	0.11	-0.03	0.10	0.05	-0.02	-0.08	0.25	0.07	1			
(13)	Tangibility	-0.11	-0.11	-0.11	-0.11	-0.03	0.16	0.07	0.13	0.20	-0.07	-0.14	0.21	1		
(14)	FirmAge	-0.11	-0.11	-0.12	-0.12	0.01	-0.03	0.07	0.23	0.12	-0.05	-0.19	-0.01	0.06	1	
(15)	Slack	0.31	0.31	0.33	0.33	0.02	-0.08	-0.05	-0.18	-0.39	0.19	0.32	-0.26	-0.41	-0.16	1

4.3.3 Propensity Score Matching

This study first identifies matched control firms that are not targeted by hedge funds using the Propensity Score Matching. The control sample is formed by matching each event firm to a non-event firm from the same year and the same industry with the closest propensity score. Following Brav *et al.* (2018), the Propensity Score Matching is estimated based on the firm-level characteristics including market capitalization, Tobin's Q, ROA and past risk-taking through standard deviation of ROA measured for the years [t-3, t-1]. All the variables are lagged for one period. Mathematically, the following regression equation is used:

$$Target_{j,t} = \beta_0 + \beta_1 Mcap_{j,t-1} + \beta_2 TobinQ_{j,t-1} + \beta_3 ROA_{j,t-1} + \beta_4 SD\_ROA[-3,-1]_{j,t-1} + \delta_t + \delta_{ind} + e_{j,t} \quad \textbf{Equation 35}$$

where $Target_{i,t}$ takes the value of one if hedge funds target the firm in a particular year, and zero otherwise. δ_t and δ_{ind} are year and industry fixed effects. Table 4.5 reports the balance test of the Propensity Score Matching. Panel A reports the comparison for the matching criteria used in the Propensity Score Matching model. All these firm-level characteristics are identical between the target and matched control firms, with statistically indifferent p-values. Moreover, the target and matched firms are also indistinguishable for most of the firm-level characteristics, with the only exceptions of firm age and the total number of 8Ks a firm files, as reported in Panel B of Table 4.5. This indicates that the target firms and matched firms are similar in both risk-taking inputs and outputs in the year of hedge fund activism, despite the fact that some of the characteristics are not part of the matching criteria.

Table 4.5 Balance test of Propensity Score Matching

This table provides the balance test of Propensity Score Matching. The control sample is formed by matching each event firm to the non-event control firm from the same year and the same industry (following the Fama-French 17 industry classifications) with the closest propensity score. The propensity score is estimated based on firms' market capitalization, Tobin's Q, ROA, and past risk-taking through the standard deviation of ROA measured between years [t-3] and [t-1]. The variable definitions are provided in Table 4.2.

Variables	Target	Matched	Diff.	P-value	Obs. Matched	Obs. Target
Panel A: Propensity Score Matching						
Mcap	5.6148	5.5240	-0.0908	0.3166	1,304	1,304
ROA	0.0575	0.0650	0.0075	0.3824	1,304	1,304
SD_ROA[-3, -1]	0.0756	0.0727	-0.0029	0.5453	1,304	1,304
TobinQ	1.5949	1.5690	-0.0259	0.8937	1,304	1,304
Panel B : Remaining variables						
Firm-level variables						
Leverage	0.2457	0.2573	0.0116	0.4276	1,304	1,304
Tangibility	0.2358	0.2509	0.0151	0.1109	1,304	1,304
FirmAge	2.9235	2.8337	-0.0898	***0.0001******	1,304	1,304
Slack	0.2113	0.2008	-0.0105	0.2630	1,304	1,304
3-year book-based risk-taking						
BR_1	0.0239	0.0184	-0.0054	0.2679	1,037	879
BR_2	0.0671	0.0610	-0.0061	0.2162	1,037	879
BR_3	0.0444	0.0340	-0.0105	0.2523	1,037	879
BR_4	0.1278	0.1160	-0.0117	0.2088	1,037	879
Transparency and disclosure						
LMSW	0.0289	0.0264	-0.0025	0.7547	1,220	1,213
EM	0.6179	0.6432	0.0253	0.6128	1,117	1,122
Log(All_8K)	2.5864	2.3076	-0.2789	***0.0000******	1,022	1,264
5-year book-based risk-taking						
BR_5	0.0262	0.0269	0.0007	0.9214	722	573
BR_6	0.0778	0.0787	0.0010	0.8861	722	573
BR_7	0.0638	0.0647	0.0009	0.9560	722	573
BR_8	0.1896	0.1911	0.0016	0.9255	722	573
3-year market-based risk-taking						
MR_1	0.5386	0.5214	-0.0171	0.2375	764	727
MR_2	0.4974	0.4781	-0.0193	0.1976	764	727
MR_3	0.5024	0.4818	-0.0206	0.1624	764	727
MR_4	0.5385	0.5213	-0.0171	0.2373	764	727
MR_5	0.4941	0.4747	-0.0195	0.1933	764	727

4.3.4 Model specification

In order to explore the impact of hedge fund activism on firm's risk-taking behaviors, the difference-in-difference model is used, as shown in the following equation:

$$Risk_{i,t} = \beta_0 + \beta_1(Target \times Post)_{i,t} + \beta_2 Post_{i,t} + \beta_3 Target_{i,t} + \sum_k \beta_k X_{i,t} + \delta_t + \delta_{FE} + \varepsilon_{i,t}$$

Equation 36

where $Risk_{i,t}$ is the book-based proxies (or market-based proxies in the robustness checks) for firms' risk-taking. $Target_{i,t}$ is a dummy variable that takes the value of one if the firm is targeted by hedge fund activism in a certain year, and zero otherwise. $Post_{i,t}$ is the dummy variable that takes the value of one within [t+1, t+5] years after the activism event year[49]. The variable of interest is the interaction term $Target \times Post$, which indicates the incremental effect on the risk-taking of the target firms post activism. Based on *Hypothesis 1*, β_1 is expected to be negative, implying that the target firms have a more significant reduction in risk-taking post activism compared to the control firms. A series of control variables ($X_{i,t}$) are included in the regression equation, as explained in Table 4.2. δ_t is year fixed effects. This study also controls for firm fixed years (δ_{FE}) in most of the main tests[50].

A key identifying assumption in a difference-in-differences model is the parallel trend, which requires the target and control firms to exhibit the same trend in outcomes (i.e. risk-taking in this paper) prior to the treatment (Roberts & Whited, 2012). To confirm the accuracy of the results, this study conducts a parallel trend test by running a regression on the $Target$ dummy variable interacted with three-time dummies (pre-target, target year, and post-target). This regression model allows me to check the difference between target and control samples over the periods examined (Boubaker,

[49] This study follows Brav *et al.* (2018) to restrict observations to five years prior to the event year through five years afterwards. The results are robust if the three-year window following interventions is used. Relevant results are available upon request.

[50] The results with industry fixed effects are reported as the robustness checks.

Saffar, & Sassi, 2018). The results on the parallel trends are reported in Table 4.6.

Table 4.6 Parallel trend test of difference-in-difference model

This table report the parallel trends of the control and matched sample firms. Columns (1)-(4) use different dependent variables, which are the four book-based risk measures as defined in Table 4.2.

	(1)	(2)	(3)	(4)
Variables	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$	$\boldsymbol{BR_3}$	$\boldsymbol{BR_4}$
Target_Pre	-0.0009	-0.0003	-0.0016	-0.0005
	(0.0025)	(0.0024)	(0.0046)	(0.0046)
Target_year	-0.0050	-0.0043	-0.0092	-0.0078
	(0.0032)	(0.0032)	(0.0060)	(0.0061)
Target_Post	-0.0074**	-0.0073**	-0.0137**	-0.0138**
	(0.0032)	(0.0032)	(0.0060)	(0.0061)
Mcap	-0.0081***	-0.0080***	-0.0151***	-0.0152***
	(0.0020)	(0.0020)	(0.0038)	(0.0038)
ROA	-0.0496***	-0.0493***	-0.0906***	-0.0910***
	(0.0152)	(0.0152)	(0.0283)	(0.0287)
TobinQ	0.0028***	0.0028***	0.0050***	0.0051***
	(0.0009)	(0.0009)	(0.0016)	(0.0016)
SD_ROA[-3, -1]	-0.0850***	-0.0858***	-0.1560***	-0.1605***
	(0.0261)	(0.0261)	(0.0484)	(0.0493)
Leverage	0.0080	0.0084	0.0160	0.0169
	(0.0087)	(0.0086)	(0.0159)	(0.0161)
Tangibility	0.0251	0.0250	0.0448	0.0454
	(0.0243)	(0.0246)	(0.0447)	(0.0460)
FirmAge	0.0007	0.0010	0.0012	0.0018
	(0.0013)	(0.0013)	(0.0024)	(0.0024)
Slack	0.0199	0.0201	0.0375	0.0383
	(0.0160)	(0.0160)	(0.0295)	(0.0301)
Constant	0.0295	0.0739***	0.0570	0.1427***
	(0.0242)	(0.0244)	(0.0441)	(0.0448)
Observations	13,813	13,813	13,813	13,813
R-squared	0.6974	0.7034	0.6990	0.7046
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

As reported, it is obvious that the coefficients on the interaction term, ($Target\_Pre$) is not statistically significant before the hedge fund activism events, suggesting that the target and control firms behave similarly before the activism. The difference in firm

risk-taking is observed starting from the year of hedge fund activism, although it is not very significant in the target year ($Target\_year$). The difference becomes significantly negative post the activism ($Target\_Post$). Overall, these results suggest that there are no pre-trends present for firm risk-taking.

4.4 Core results

4.4.1 Does hedge fund activism reduce the risk-taking of target firms?

The empirical analyses begin with an examination of the relation between hedge fund activism events and firm risk-taking. Figure 4.1 and Figure 4.2 first plot the trends of the two book-based risk-measures, BR_1 (industry-adjusted standard deviation of ROA) and BR_2 (industry-adjusted range of ROA), for target and matched firms over the [-5, +5] window around hedge fund interventions. Both figures show that target firms experience a greater reduction in risk-taking compared to matched firms post the intervention of hedge fund activism.

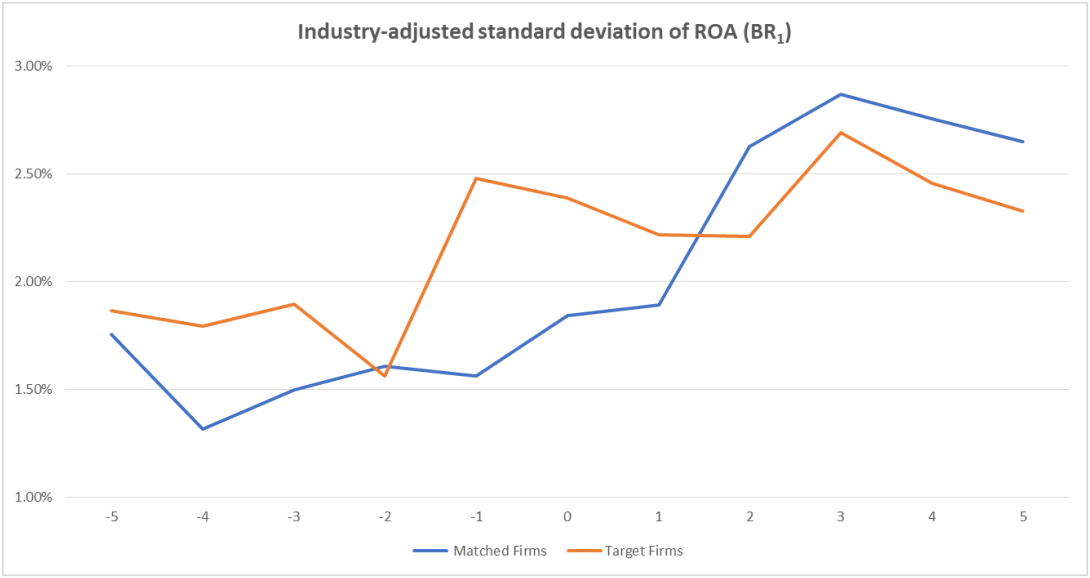

Figure 4.1 Trends of BR_1 around hedge fund interventions

This figure plots the trends of BR_1, industry-adjusted standard deviation of ROA, for target and matched firms over the [-5, +5] window around hedge fund interventions.

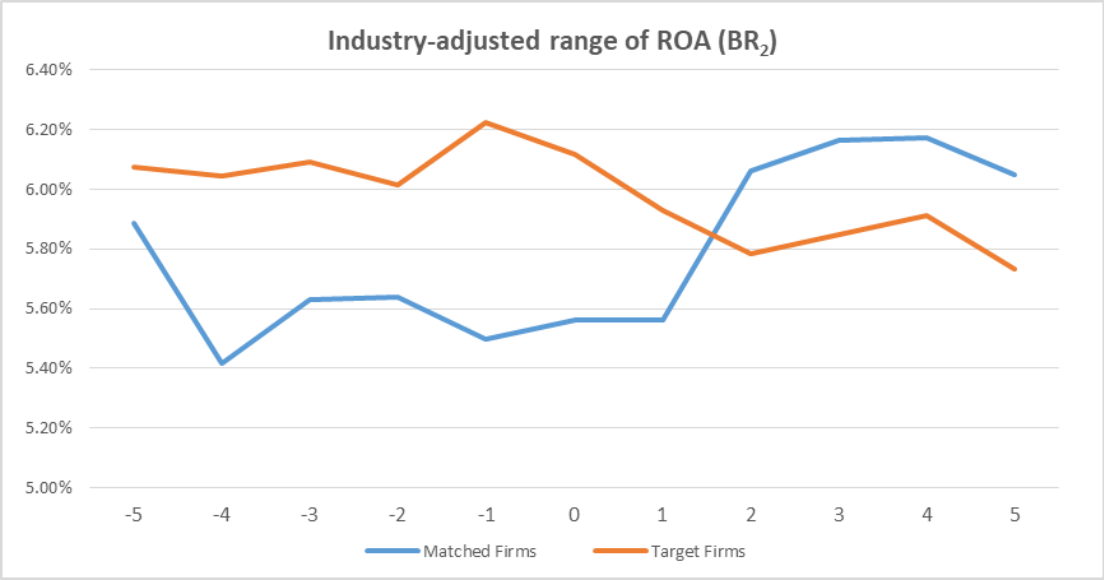

Figure 4.2 Trends of BR_2 around hedge fund interventions

This figure plots the trends of BR_2, industry-adjusted range of ROA, for target and matched firms over the [-5, +5] window around hedge fund interventions.

This study further uses the difference-in-differences model as defined in Equation 36. Table 4.7 reports the results of *Hypothesis 1*. The dependent variables are industry-adjusted standard deviation or range of ROA over the three-year window (BR_1 and BR_2 respectively). Columns (1) and (2) report the results based on firm fixed effects, and Columns (3) and (4) report the results based on industry fixed effects.

The key estimate is the coefficient of the interaction term $Target \times Post$, which reflects the incremental change in risk-taking post the hedge fund activism events. Evidently, although the risk-taking has increased for all firms post activism, as indicated by the positively significant estimates of the variable $Post$, the risk-taking of the target firms has decreased significantly relative to their matched control peers three years post activism, irrespectively of whether firm fixed effects or industry fixed effects are used. Taking the result in Column (1) as an example, the coefficient of $Target \times Post$ is negatively and statistically significant at 1%, with the value of -0.0107. This indicates that the risk-taking of the target firms (when it is proxied by the industry-adjusted standard deviation of ROA) reduces significantly by 1.07% post activism relative to the changes incurred by the control firms. These results are consistent using various book-based proxies for risk-taking and across different fixed effects. In general, the

association between hedge fund activism and firms' risk-taking is more significant when controlling for firm fixed effects, as shown in Columns (1) and (2). These results provide evidence for *Hypothesis 1* that the target firms become more risk-averse and reduce their risk-taking post hedge fund activism.

Table 4.7 Hedge fund activism and firm risk-taking

The table provides regression results of the risk-taking behaviors of the target firms post hedge fund activism. The dependent variables of different columns are industry-adjusted standard deviation or range of ROA (i.e. BR_1 and BR_2) over the 3-year rolling window, as defined in Table 2. Columns (1) and (2) report the results based on firm fixed effects, and Columns (3) and (4) report the results based on industry fixed effects. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Variables	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$
$Target \times Post$	-0.0107***	-0.0200***	-0.0055*	-0.0104*
	(0.0041)	(0.0077)	(0.0033)	(0.0062)
post	0.0067**	0.0128**	0.0060***	0.0113***
	(0.0031)	(0.0059)	(0.0023)	(0.0043)
target	-0.0001	-0.0001	0.0042**	0.0078**
	(0.0026)	(0.0049)	(0.0019)	(0.0036)
Mcap	-0.0080***	-0.0149***	-0.0055***	-0.0104***
	(0.0020)	(0.0038)	(0.0006)	(0.0011)
ROA	-0.0488***	-0.0890***	-0.0910***	-0.1732***
	(0.0151)	(0.0282)	(0.0083)	(0.0157)
TobinQ	0.0028***	0.0050***	0.0033***	0.0062***
	(0.0009)	(0.0016)	(0.0008)	(0.0016)
SD_ROA[-3, -1]	-0.0866***	-0.1590***	0.1542***	0.2925***
	(0.0263)	(0.0488)	(0.0139)	(0.0266)
Leverage	0.0081	0.0162	0.0078**	0.0141*
	(0.0086)	(0.0159)	(0.0040)	(0.0075)
Tangibility	0.0248	0.0442	0.0005	0.0009
	(0.0244)	(0.0448)	(0.0051)	(0.0097)
FirmAge	-0.0142	-0.0274	-0.0006	-0.0012
	(0.0129)	(0.0240)	(0.0017)	(0.0032)
Slack	0.0184	0.0347	0.0466***	0.0892***
	(0.0162)	(0.0298)	(0.0067)	(0.0128)
Constant	0.0740**	0.1405**	0.0122*	0.0236*
	(0.0364)	(0.0676)	(0.0069)	(0.0131)
Observations	13,813	13,813	13,813	13,813

R-squared	0.6977	0.6993	0.3722	0.3729
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	No	No
Industry Fixed Effect	No	No	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

For control variables, firms' market capitalization (*Mcap*) and ROA have significantly negative impacts on firms' post-intervention risk-taking. Tobin's Q (*TobinQ*) is positively related to firms' future risk-taking. The standard deviation of ROA over the past three years (*SD_ROA[-3, -1]*) is negatively associated with post-intervention risk-taking, indicating that firms with higher risk-taking in the past three years would have a more significant reduction in future risk-taking. An implication is that activist hedge funds tend to target a riskier firm.

In addition, Greenwood and Schor (2009) argue that different types of demands by activists conveys material information about the course of actions that firm should take. Brav *et al.* (2008) and Boyson and Pichler (2019) also consider that activists' demands have significant implications for target firms. This study also explores the consequences of different types of hedge fund demands (as provided by the FactSet SharkRepellent database). Hence, this study examines whether different types of hedge fund demands make a difference in firm risk-taking behaviors post interventions. The hedge fund activism events are distinguished into three subsamples, namely activism with corporate governance related demands, activism with value enhancement related demands, and activism without explicit demands. The types of hedge fund demands are provided by the FactSet SharkRepellent database.

Relevant results are reported in Table 4.8. Industry-adjusted standard deviation of ROA (BR_1) and industry-adjusted range of ROA (BR_2) are used as the book-based proxies for firm risk-taking. Columns (1) and (2) report the results based on corporate governance-related demands. Columns (3) and (4) report the results based on value enhancement related demands. Columns (5) and (6) report the results based on hedge

fund activism without explicit demands. This test controls for firm fixed effects and year fixed effects.

Table 4.8 Impact of types of hedge fund demands on firm risk-taking

The table provides regression results of firm risk-taking post hedge fund activism, based on different types of hedge fund demands. The dependent variables of different columns are BR_1 and BR_2 as defined in Table 4.2. Columns (1) and (2) report the results using the subsample that hedge funds target corporate governance-related issues, and Columns (3) and (4) report the results using the subsample that hedge funds target value enhancement issues. Columns (5) and (6) report the results that hedge funds do not have explicit demands. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	CG Related		**Value Enhancement Related**		**No Explicit Demands**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Variables	BR_1	BR_2	BR_1	BR_2	BR_1	BR_2
$Target \times Post$	-0.0099*	-0.0184*	-0.0122*	-0.0233*	-0.0143**	-0.0266**
	(0.0060)	(0.0111)	(0.0066)	(0.0123)	(0.0062)	(0.0117)
post	0.0036	0.0071	0.0055	0.0106	0.0119***	0.0225***
	(0.0052)	(0.0097)	(0.0052)	(0.0097)	(0.0045)	(0.0083)
target	-0.0016	-0.0031	0.0024	0.0047	0.0019	0.0039
	(0.0046)	(0.0085)	(0.0067)	(0.0125)	(0.0044)	(0.0086)
Mcap	-0.0099***	-0.0185***	-0.0067**	-0.0124**	-0.0075***	-0.0144***
	(0.0029)	(0.0054)	(0.0029)	(0.0053)	(0.0028)	(0.0053)
ROA	-0.0301*	-0.0548*	-0.0414*	-0.0763*	-0.0598**	-0.1078**
	(0.0166)	(0.0313)	(0.0213)	(0.0399)	(0.0271)	(0.0509)
TobinQ	0.0050**	0.0091**	0.0023**	0.0041*	0.0022**	0.0039**
	(0.0024)	(0.0045)	(0.0011)	(0.0021)	(0.0011)	(0.0020)
SD_ROA[-3, -1]	-0.0922***	-0.1697***	-0.1119***	-0.2067***	-0.0725*	-0.1318*
	(0.0280)	(0.0519)	(0.0411)	(0.0759)	(0.0405)	(0.0761)
Leverage	-0.0012	0.0013	-0.0018	-0.0030	0.0164	0.0313

	(0.0126)	(0.0229)	(0.0162)	(0.0294)	(0.0112)	(0.0208)
Tangibility	0.0146	0.0272	0.0288	0.0522	-0.0137	-0.0301
	(0.0342)	(0.0625)	(0.0367)	(0.0679)	(0.0324)	(0.0612)
FirmAge	-0.0064	-0.0121	-0.0220	-0.0430	-0.0094	-0.0181
	(0.0195)	(0.0358)	(0.0223)	(0.0411)	(0.0193)	(0.0363)
Slack	0.0051	0.0106	0.0101	0.0200	0.0299	0.0556
	(0.0236)	(0.0432)	(0.0219)	(0.0404)	(0.0254)	(0.0476)
Constant	0.0661	0.1206	0.1433	0.2725	0.0704	0.1361
	(0.0523)	(0.0960)	(0.0928)	(0.1703)	(0.0501)	(0.0942)
Observations	7,508	7,508	5,410	5,410	4,337	4,337
R-squared	0.6983	0.7009	0.6818	0.6825	0.7469	0.7468
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4.8 provides supportive evidence that the target firms experience a significant reduction in risk-taking post hedge fund activism no matter the types of hedge fund demands, as indicated by the negative estimates of the coefficient of $Target \times Post$ across all columns. Specifically, the post-intervention risk-taking of the target firms proxied by industry-adjusted standard deviation of ROA (BR_1) is 0.99% lower relative to their matched control firms during the three-year window when hedge funds target corporate governance related issues (Column (1)). The risk-taking of the target firms is 1.22% lower relative to their matched control firms post the activism if hedge funds target value enhancement related issues (Column (3)). The statistical significance of the coefficient of $Target \times Post$ in both columns is 10%. Alternatively, the risk-taking of the target firms is 1.43% lower than the control firms if hedge fund activism does not have explicit demands, which is statistically significant at 5% level.

An implication from these results is that firms targeted by activist hedge funds experience a reduction in risk-taking in the long-term, even if hedge funds do not have explicit demands. In other words, the target firms tend to become more conservative in the long-term.

4.4.2 Hedge fund activism and risk-taking: Myopic management

To examine the *Hypothesis 2*, this study creates subsamples based on the myopic management measure described in Subsection 4.3.2.2, and classifies firms into myopic and non-myopic firms. Following this, it re-estimates Equation 36 based on different subsamples. Industry-adjusted standard deviation and range of ROA (BR_1 and BR_2 respectively) are used as the proxies for firm risk-taking. This study also controls for firm fixed effects and year fixed effects. According to *Hypothesis 2*, it is expected that the myopic subsample would have a negative value of β_1. Relevant results are reported in Table 4.9. Columns (1) and (2) provide results based on the myopic subsample, and Columns (3) and (4) provide results based on the non-myopic subsample.

Table 4.9 Hedge fund activism and risk-taking: Myopic management

The table provides regression results of firm risk-taking post hedge fund activism, based on subsamples of myopic and non-myopic firms. The dependent variables of different columns are BR_1 and BR_2 as defined in Table 4.2. Columns (1) and (2) report the results using the subsample of the myopic firms, and Columns (3) and (4) report the results using the subsample of the non-myopic firms. Following Mizik (2010), myopia is measured by comparing a firm's current levels of earnings, marketing, and R&D expenditures and its "normal" or expected levels. Firms with increasing ROA and decreasing marketing and R&D expenditures are classified as myopic firms. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	Myopic Firms		**Non-Myopic Firms**	
	(1)	**(2)**	**(3)**	**(4)**
Variables	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$
$Target \times Post$	-0.0125***	-0.0240***	-0.0096	-0.0179
	(0.0039)	(0.0073)	(0.0077)	(0.0145)
post	0.0069**	0.0133**	0.0065	0.0122
	(0.0031)	(0.0057)	(0.0059)	(0.0111)
target	0.0062***	0.0118***	-0.0035	-0.0061
	(0.0023)	(0.0043)	(0.0043)	(0.0080)
Mcap	-0.0084***	-0.0155***	-0.0101***	-0.0189***
	(0.0028)	(0.0052)	(0.0032)	(0.0059)
ROA	-0.0047	-0.0077	-0.0633***	-0.1150***
	(0.0255)	(0.0478)	(0.0219)	(0.0411)
TobinQ	0.0154***	0.0287***	0.0027***	0.0048***
	(0.0036)	(0.0068)	(0.0008)	(0.0015)
SD_ROA[-3, -1]	-0.0687**	-0.1242**	-0.0995***	-0.1817***
	(0.0272)	(0.0507)	(0.0365)	(0.0674)
Leverage	-0.0234*	-0.0415	0.0127	0.0244
	(0.0137)	(0.0264)	(0.0092)	(0.0163)
Tangibility	0.0294	0.0541	0.0297	0.0520
	(0.0270)	(0.0499)	(0.0361)	(0.0670)
FirmAge	-0.0029	-0.0059	-0.0007	-0.0033
	(0.0103)	(0.0191)	(0.0239)	(0.0447)
Slack	0.0187	0.0328	0.0163	0.0320
	(0.0192)	(0.0358)	(0.0223)	(0.0410)
Constant	0.0168	0.0290	0.0629	0.1235
	(0.0328)	(0.0611)	(0.0641)	(0.1194)
Observations	7,301	7,301	6,512	6,512
R-squared	0.6795	0.6817	0.7371	0.7380
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

It is notable that myopic and non-myopic target firms display different risk-taking behaviors post activism. Columns (1) and (2) report negative and significant estimates of the coefficient of the interaction term $Target \times Post$, with the values of -0.0125 and -0.0240, respectively. This indicates that myopic target firms experience 1.25% (or 2.40% if measured by BR_2) lower in risk-taking post hedge fund activism relative to their control peers. Alternatively, as shown in Columns (3) and (4), non-myopic managed target firms also tend to reduce risk-taking post intervention relative to their control peers, while the reduction is insignificant, as shown by the negative (but insignificant) coefficient of the interaction term $Target \times Post$ in Columns (3) and (4), with the values of -0.0096 and -0.0179 respectively.

Overall, these results provide supportive evidence for *Hypothesis 2* that myopic firms tend to have a more pronounced reduction in risk-taking post hedge fund interventions. This is associated with the argument of short-termism that myopic managed firms and activist hedge funds both tend to prioritize short-term high returns to investors rather than long-term investment in capabilities, for instance, by decreasing marketing or R&D expenditures (Mizik, 2010). This finding provides a potential explanation for the negative long-term impact of hedge fund activism on firm value (Clifford, 2008).

4.4.3 Hedge fund activism and risk-taking: Information transparency

To examine the *Hypothesis 3*, this study further creates subsamples based on the information transparency of the target firms, as discussed in Subsection 3.2.3. This helps isolate the impact of the information quality on the change of firm risk-taking post hedge fund activism. BR_1 and BR_2 serves as the proxies for firm risk-taking. Following this, it re-estimates Equation 36 based on different subsamples. *Hypothesis 3* implies a negative value of β_1 for the subsample of firms with lower information transparency. Table 4.10 reports results based on firm-level information transparency. Columns (1)-(4) show results based on the LMSW proxy, and Columns (5)-(8) show results based on the 8K filings proxy. A negative LMSW indicates higher information

transparency, and the subsample that discloses more 8K filings is also considered as more informationally transparent. Hence, Columns (1), (2), (5) and (6) are results based on firms with lower information transparency, and Columns (3), (4), (7), and (8) are results based on firms with higher information transparency.

Both the LMSW and 8K proxies indicate that only the target firms with less information transparency significantly lower their risk-taking relative to their matched control firms post activism. This is indicated by the significantly negative coefficient of the interaction term $Target \times Post$ in Columns (1), (2), (5) and (6), with the negative values of -0.0114, -0.0213, -0.0153, and -0.0283 respectively, which are statistically significant at 5% level. Alternatively, if the firms have higher information transparency, the target firms also tend to reduce their risk-taking relative to the control firms, while the difference in post-intervention risk-taking is insignificant. This is indicated by the negative (but insignificant) values of the coefficient of the interaction term $Target \times Post$ in Columns (3), (4), (7), and (8). This confirms *Hypothesis 3* that hedge fund activism has a more pronounced impact on risk-taking for less transparent firms. These results provide new evidence to Lorek *et al.* (1999) that it is easier to manipulate the information flow in opaque firms.

Table 4.10 Hedge fund activism and risk-taking: Information transparency

The table provides the results on the effect of information transparency on the risk reduction post hedge fund activism. The dependent variables of different columns are BR_1 and BR_2 as defined in Table 4.2. Information transparency is measured by either Llorente *et al.*'s (2002) model (*LMSW* proxy) or a total number of 8K filings. A negative *LMSW* indicates higher information transparency, and firms that disclose more 8K filings are also more transparent. This study creates subsamples depending on the firm-level information transparency. Columns (1)-(4) show results based on the LMSW proxy, and Columns (5)-(8) show results based on the 8K filings proxy. Columns (1), (2), (5), and (6) are results of firms with less transparency, and Columns (3), (4), (7), and (8) are results of firms with higher transparency. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	LMSW (Above Zero)		**LMSW (Below Zero)**		**All_8K (Below Median)**		**All_8K (Above Median)**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Variables	BR_1	BR_2	BR_1	BR_2	BR_1	BR_2	BR_1	BR_2
$Target \times Post$	-0.0114**	-0.0213**	-0.0071	-0.0138	-0.0153**	-0.0283**	-0.0069	-0.0125
	(0.0056)	(0.0106)	(0.0056)	(0.0105)	(0.0064)	(0.0119)	(0.0055)	(0.0102)
post	0.0085*	0.0160**	0.0018	0.0040	0.0074	0.0140	0.0028	0.0052
	(0.0043)	(0.0081)	(0.0039)	(0.0073)	(0.0058)	(0.0108)	(0.0044)	(0.0081)
target	-0.0002	-0.0003	0.0008	0.0016	0.0025	0.0048	-0.0015	-0.0025
	(0.0032)	(0.0060)	(0.0036)	(0.0068)	(0.0039)	(0.0072)	(0.0035)	(0.0065)
Mcap	-0.0077***	-0.0144***	-0.0139***	-0.0265***	-0.0088**	-0.0165**	-0.0118***	-0.0219***
	(0.0024)	(0.0044)	(0.0049)	(0.0090)	(0.0036)	(0.0066)	(0.0037)	(0.0069)
ROA	-0.0649***	-0.1202***	-0.0035	0.0003	-0.0731***	-0.1366***	-0.0120	-0.0186
	(0.0200)	(0.0373)	(0.0244)	(0.0453)	(0.0243)	(0.0448)	(0.0232)	(0.0431)
TobinQ	0.0022***	0.0040***	0.0117***	0.0221***	0.0016***	0.0029**	0.0175***	0.0316***
	(0.0008)	(0.0014)	(0.0040)	(0.0075)	(0.0006)	(0.0011)	(0.0035)	(0.0064)
SD_ROA[-3, -1]	-0.0693**	-0.1262**	-0.1261***	-0.2341***	-0.1037**	-0.1911**	-0.0974**	-0.1840**
	(0.0302)	(0.0560)	(0.0482)	(0.0905)	(0.0419)	(0.0774)	(0.0438)	(0.0811)

Leverage	0.0164	0.0317	-0.0289**	-0.0515**	0.0059	0.0112	-0.0049	-0.0054
	(0.0105)	(0.0197)	(0.0134)	(0.0247)	(0.0115)	(0.0213)	(0.0172)	(0.0288)
Tangibility	0.0176	0.0313	0.0349	0.0607	0.0278	0.0508	0.0192	0.0327
	(0.0316)	(0.0581)	(0.0340)	(0.0633)	(0.0485)	(0.0888)	(0.0339)	(0.0622)
FirmAge	-0.0183	-0.0342	0.0025	0.0037	-0.0177	-0.0374	0.0078	0.0162
	(0.0189)	(0.0349)	(0.0149)	(0.0282)	(0.0199)	(0.0372)	(0.0170)	(0.0316)
Slack	0.0120	0.0226	0.0139	0.0283	0.0724***	0.1331***	-0.0062	-0.0047
	(0.0199)	(0.0366)	(0.0289)	(0.0533)	(0.0252)	(0.0462)	(0.0255)	(0.0474)
Constant	0.0771	0.1438	0.0803	0.1533	0.0806	0.1627	0.0175	0.0285
	(0.0519)	(0.0960)	(0.0508)	(0.0949)	(0.0585)	(0.1089)	(0.0560)	(0.1040)
Observations	9,042	9,042	4,771	4,771	5,098	5,098	5,130	5,130
R-squared	0.7253	0.7269	0.7022	0.7048	0.7670	0.7691	0.7806	0.7807
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Following Lang, Lins and Maffet (2012), this study divides the sample based on the degree of the firms' earnings management, as an additional test of *Hypothesis 3*[51]. Relevant results are reported in Table 4.11. Columns (1) and (2) report the results of firms with above median earnings management, which are firms with a lower level of information transparency. Columns (3) and (4) report the results of firms with below median earnings management, which are firms with a higher level of information transparency.

Consistent with the findings in Table 4.10, Table 4.11 also reports a more pronounced reduction in risk-taking for the subsample with less information transparency. This is indicated by the significantly negative coefficient of the interaction term $Target \times Post$ in Columns (1) and (2), with the negative values of -0.0084 and -0.0162, respectively, statistically significant at 10% level. Alternatively, if the firms have a higher level of transparency, i.e. below median earnings management, the post-intervention reduction in risk-taking is statistically indifferent between the target and control firms. This is indicated by the negative (but insignificant) values of the coefficient of $Target \times Post$ in Columns (3) and (4). This additional test confirms *Hypothesis 3* that less transparent firms would experience a more pronounced reduction in risk-taking post hedge fund activism.

[51] This study does not use the estimates of accrual-based earnings management directly. Instead, this study indirectly use this proxy for information transparency, and divides the full sample into subsamples based on whether the target firm's level of earnings management is above or below median. Hence, the results using the proxy of earnings management is reported as an additional test in Table 4.11. This follows the study by Lang *et al.* (2012).

Table 4.11 Hedge fund activism and risk-taking: Earnings management

The table provides the results on the effect of information transparency on the risk reduction post hedge fund activism. The dependent variables of different columns are BR_1 and BR_2 as defined in Table 4.2. Information transparency is measured by accrual-based earnings management following Jones (1991) and Dechow *et al.* (1995). Columns (1) and (2) report the results of firms with above median earnings management, which are firms with a lower level of information transparency. Columns (3) and (4) report the results of firms with below median earnings management, which are firms with a higher level of information transparency. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	High EM Firms		Low EM Firms	
	(1)	(2)	(3)	(4)
Variables	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$
$Target \times Post$	-0.0084*	-0.0162*	-0.0089	-0.0166
	(0.0046)	(0.0086)	(0.0058)	(0.0110)
post	0.0053	0.0102*	0.0068	0.0130
	(0.0033)	(0.0062)	(0.0043)	(0.0081)
target	0.0016	0.0030	0.0005	0.0011
	(0.0030)	(0.0056)	(0.0033)	(0.0061)
Mcap	-0.0104***	-0.0192***	-0.0121***	-0.0228***
	(0.0029)	(0.0055)	(0.0032)	(0.0061)
ROA	-0.0501**	-0.0896**	-0.0499**	-0.0945**
	(0.0212)	(0.0394)	(0.0220)	(0.0420)
TobinQ	0.0026***	0.0046***	0.0137***	0.0251***
	(0.0009)	(0.0017)	(0.0029)	(0.0055)
SD_ROA[-3, -1]	-0.0636*	-0.1141*	-0.1140***	-0.2108***
	(0.0348)	(0.0645)	(0.0307)	(0.0576)
Leverage	-0.0044	-0.0071	0.0061	0.0125
	(0.0114)	(0.0213)	(0.0101)	(0.0179)
Tangibility	0.0439	0.0839	-0.0057	-0.0193
	(0.0386)	(0.0714)	(0.0324)	(0.0605)
FirmAge	-0.0130	-0.0269	-0.0159	-0.0277
	(0.0157)	(0.0294)	(0.0186)	(0.0346)
Slack	0.0378*	0.0705*	-0.0130	-0.0234
	(0.0206)	(0.0379)	(0.0221)	(0.0412)
Constant	0.0697	0.1342*	0.1025*	0.1892*
	(0.0427)	(0.0797)	(0.0546)	(0.1018)
Observations	6,715	6,715	7,098	7,098
R-squared	0.7782	0.7784	0.6984	0.6997
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.4.4 Hedge fund activism and risk-taking: Hostile resistance

To explore the *Hypothesis 4*, this study identifies the response of the target firms to hedge fund activism by going through 36,000 campaign filings of activist hedge funds and target firms provided by the FactSet SharkRepellent database. The activism events are classified as hostile resistance when the target firms disagree publicly to hedge fund demands. More specifically, following Boyson and Pichler (2019), this study identifies the following reactions of the target firms as hostile resistance: supermajority provisions for charter amendments or mergers, limits to shareholder bylaw amendments, classified boards, poison pills, and golden parachutes. Otherwise, activism events are classified as no resistance. This study re-estimates Equation 36 based on the two subsamples of hostile resistance or no resistance, with results reported in Table 4.12. Columns (1) and (2) report the results that the target firms have hostile resistance to hedge fund demands, and Columns (3) and (4) report the results that the target firms have no public resistance to the activism. BR_1 and BR_2 serve as the proxies for firm risk-taking.

It is notable that if the target firms resist to hedge fund activism, the post-intervention risk-taking is statistically indifferent between the target and control firms, as indicated by the insignificant values of the coefficient of $Target \times Post$ in Columns (1) and (2). In contrast, if the target firms do not have hostile resistance, the target firms experience significantly lower risk-taking post activism compared to their control peers, as indicated by the negative values of -0.0128 and -0.0236 in Columns (3) and (4) respectively, with statistically significant at 5% level. This represents a 1.28% (2.36% if measured by BR_2 in Column (4)) lower risk-taking for the target firms post hedge fund activism. These finding provides evidence for *Hypothesis 4* that target firms without hostile resistance to hedge fund activism would experience a more pronounced reduction in risk-taking in the long-term. The results of *Hypothesis 4* add to Boyson and Pichler's (2019) findings that document that management's hostile resistance to hedge fund activism helps offsets the consequences of activism.

Table 4.12 Target firms' response to hedge fund activism

The table provides the results how the target firms' response to hedge fund activism affects post-intervention risk-taking. The dependent variables of different columns are BR_1 and BR_2 as defined in Table 4.2. The full sample is divided into subsamples depending on whether target firms have hostile resistance to hedge fund activism. Columns (1) and (2) show results based on firms with hostile resistance to activism, and Columns (3) and (4) show results based on firms without resistance. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	Hostile Resistance		**No Resistance**	
	(1)	**(2)**	**(3)**	**(4)**
Variables	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$	$\boldsymbol{BR_1}$	$\boldsymbol{BR_2}$
$Target \times Post$	-0.0080	-0.0154	-0.0128**	-0.0236**
	(0.0051)	(0.0097)	(0.0052)	(0.0098)
Post	0.0018	0.0034	0.0103***	0.0193***
	(0.0040)	(0.0076)	(0.0040)	(0.0074)
Target	0.0018	0.0028	-0.0023	-0.0046
	(0.0045)	(0.0084)	(0.0041)	(0.0077)
Mcap	-0.0081***	-0.0157***	-0.0090***	-0.0166***
	(0.0023)	(0.0042)	(0.0026)	(0.0049)
ROA	-0.0134	-0.0264	-0.0517**	-0.0935**
	(0.0127)	(0.0241)	(0.0227)	(0.0422)
TobinQ	0.0097***	0.0180***	0.0020***	0.0034***
	(0.0015)	(0.0028)	(0.0007)	(0.0012)
SD_ROA[-3, -1]	-0.0668***	-0.1249***	-0.0856*	-0.1585*
	(0.0182)	(0.0351)	(0.0455)	(0.0841)
Leverage	0.0000	-0.0014	0.0109	0.0223
	(0.0079)	(0.0147)	(0.0097)	(0.0181)
Tangibility	0.0233	0.0422	0.0260	0.0474
	(0.0297)	(0.0547)	(0.0305)	(0.0567)
FirmAge	-0.0167	-0.0323	-0.0102	-0.0199
	(0.0143)	(0.0269)	(0.0167)	(0.0311)
Slack	-0.0032	-0.0059	0.0291	0.0552
	(0.0179)	(0.0336)	(0.0197)	(0.0363)
Constant	0.0632	0.1243*	0.0736	0.1384
	(0.0405)	(0.0755)	(0.0471)	(0.0876)
Observations	6,480	6,480	7,333	7,333
R-squared	0.6959	0.6964	0.7139	0.7152
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.4.5 Hedge fund activism and risk-taking: Additional tests

This study has several additional tests based on different subsamples, exploring whether specific subsamples react differently to hedge fund activism. Firstly, this study distinguishes whether hedge fund activism is successful or not. Target firms might take actions/settlement regarding the hedge fund demands, and relevant information on the actions is provided by the FactSet SharkRepellent database. The hedge fund activism is considered as "successful" if more than 50% demands are met. Two subsamples are classified, based on "successful" or "unsuccessful" hedge fund activism. Relevant results are reported in Table 4.13, with Columns (1) and (2) reported results of "successful" hedge fund activism, and Columns (3) and (4) reported results of "unsuccessful" hedge fund activism.

As indicated in Columns (1) and (2), the reduction in the risk-taking of the target firms relative to the control firms is only statistically significant when hedge fund activism is successful and most of the hedge fund demands are met. More specifically, the post-intervention risk-taking of the target firms is 1.40% (or 2.52% if measured by BR_2) lower than that of control firms, statistically significant at the 10% level. Alternatively, if hedge fund activism is unsuccessful and less than 50% of the hedge fund demands are met, the change in the risk-taking between the target and control firms is statistically indifferent post activism.

Table 4.13 Impact of the success of hedge fund activism

The table provides the results whether the success of hedge fund activism affects post-intervention risk-taking. The dependent variables of different columns are BR_1 and BR_2 as defined in Table 4.2. The full sample is divided into subsamples depending on whether the hedge fund activism is "successful" (i.e. more than 50% of demands are met) or not. Columns (1) and (2) show results of "successful" hedge fund activism, and Columns (3) and (4) show results of "unsuccessful" hedge fund activism. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	Successful hedge fund activism		**Unsuccessful hedge fund activism**	
	(1)	**(2)**	**(3)**	**(4)**
Variables	BR_1	BR_2	BR_1	BR_2
$Target \times Post$	-0.0140*	-0.0252*	-0.0048	-0.0100
	(0.0083)	(0.0188)	(0.0078)	(0.0146)
Post	0.0067	0.0129	0.0019	0.0039
	(0.0089)	(0.0166)	(0.0060)	(0.0112)
Target	0.0024	0.0041	0.0054	0.0106
	(0.0074)	(0.0140)	(0.0097)	(0.0179)
Mcap	-0.0078*	-0.0145*	-0.0068**	-0.0124**
	(0.0040)	(0.0074)	(0.0030)	(0.0056)
ROA	-0.0439	-0.0794	-0.0306	-0.0561
	(0.0302)	(0.0567)	(0.0210)	(0.0389)
TobinQ	0.0040	0.0069	0.0018**	0.0032*
	(0.0031)	(0.0057)	(0.0009)	(0.0017)
SD_ROA[-3, -1]	-0.1218**	-0.2245**	-0.1297***	-0.2394***
	(0.0553)	(0.1029)	(0.0333)	(0.0618)
Leverage	-0.0065	-0.0059	0.0044	0.0077
	(0.0164)	(0.0302)	(0.0151)	(0.0269)
Tangibility	0.0007	0.0003	0.0633	0.1174
	(0.0311)	(0.0593)	(0.0405)	(0.0736)
FirmAge	-0.0158	-0.0283	-0.0358	-0.0690
	(0.0252)	(0.0471)	(0.0247)	(0.0454)
Slack	-0.0011	0.0002	0.0175	0.0319
	(0.0307)	(0.0562)	(0.0270)	(0.0495)
Constant	0.1089	0.1983	0.1035	0.1943
	(0.0751)	(0.1398)	(0.0665)	(0.1220)
Observations	3,867	3,867	4,564	4,564
R-squared	0.6781	0.6787	0.7242	0.7266
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Secondly, this study also classifies the subsamples by the number of demands in each of the hedge fund activism events. In this way, it explores the scope of hedge fund demands during activism. Two subsamples are identified, namely activism with more than two demands and activism with two demands or less. Hedge fund activism with no explicit demands is excluded from this subsample. Relevant results are reported in Table 4.14. Columns (1) and (2) are results based on the subsample with more than two hedge fund demands. Columns (3) and (4) are results based on the subsample with less than two hedge fund demands.

As indicated, when activist hedge funds target on more than two demands, the target firms have a more pronounced reduction in risk-taking relative to the control firms, by 2.34% (or 4.52% if measured by BR_2) more decrease in firm risk-taking post hedge fund activism. On the contrary, if activist hedge funds target on less than two demands, the reduction in firm risk-taking is statistically indifferent between the target and control firms post activism.

Table 4.14 Hedge fund activism and risk-taking: By the number of demands

The table provides additional results based on the number of hedge fund demands. The dependent variables of different columns are BR_1 and BR_2 as defined in Table 4.2. The sample is divided into subsamples depending on whether activist hedge funds have more or less than two demands. Columns (1) and (2) show results that activist hedge funds have more than two demands, and Columns (3) and (4) show results that activist hedge funds have two demands or less. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	More than two demands		Two demands or less	
	(1)	(2)	(3)	(4)
Variables	BR_1	BR_2	BR_1	BR_2
$Target \times Post$	-0.0234**	-0.0452**	-0.0025	-0.0052
	(0.0099)	(0.0187)	(0.0065)	(0.0123)
Post	0.0139*	0.0262*	-0.0026	-0.0046
	(0.0083)	(0.0158)	(0.0047)	(0.0087)
Target	-0.0016	-0.0025	-0.0064	-0.0118
	(0.0113)	(0.0210)	(0.0058)	(0.0109)
Mcap	-0.0170***	-0.0320***	-0.0192***	-0.0361***
	(0.0047)	(0.0088)	(0.0042)	(0.0079)
ROA	-0.0374*	-0.0710	-0.0221	-0.0402
	(0.0227)	(0.0440)	(0.0198)	(0.0370)
TobinQ	0.0220***	0.0413***	0.0224***	0.0412***
	(0.0047)	(0.0089)	(0.0032)	(0.0060)
SD_ROA[-3, -1]	-0.1166***	-0.2109***	-0.0954**	-0.1806**
	(0.0395)	(0.0740)	(0.0392)	(0.0735)
Leverage	-0.0248	-0.0452	0.0072	0.0138
	(0.0257)	(0.0476)	(0.0158)	(0.0295)
Tangibility	0.0344	0.0636	0.0011	0.0045
	(0.0558)	(0.1035)	(0.0268)	(0.0499)
FirmAge	0.0079	0.0138	0.0069*	0.0129*
	(0.0100)	(0.0178)	(0.0040)	(0.0075)
Slack	-0.0203	-0.0367	0.0037	0.0085
	(0.0344)	(0.0644)	(0.0179)	(0.0335)
Constant	0.0087	0.0291	0.0650	0.1265
	(0.1339)	(0.2397)	(0.0615)	(0.1156)
Observations	3,166	3,166	5,921	5,921
R-squared	0.6960	0.6953	0.7456	0.7465
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.5 Robustness checks

This study conducts several robustness tests and incorporates alternative specifications. Firstly, instead of the industry-adjusted proxies for risk-taking, this study measures firm risk-taking based on the firm-level standard deviation or range of ROA over a 3-year rolling window (namely BR_3 and BR_4), as defined in Table 4.2. All the hypotheses are re-estimated based on BR_3 and BR_4. Relevant results are presented in Tables 4.15-4.18.

In these tables, the signs and significance of the estimate of the coefficient of $Target \times Post$ are highly consistent with the main results as reported in Tables 4.7-4.12. These results support the hypotheses. Specifically, the target firms experience a significant reduction in risk-taking post hedge fund activism by 1.09% (or 2.06% if measured by BR_4) relative to the control firms, as reported in Table 4.15 (*Hypothesis 1*). This effect on the reduction in risk-taking is more pronounced for myopic managed firms (*Hypothesis 2*) or opaque firms (*Hypothesis 3*), as reported in Tables 4.16 and 4.17, respectively. Table 4.18 confirms *Hypothesis 4* that the target firms with hostile resistance to hedge fund activism would experience a less significant reduction in risk-taking post interventions.

Table 4.15 Hedge fund activism and firm risk-taking, BR_3 and BR_4

The table provides regression results of the risk-taking behaviors of the target firms post hedge fund activism. The dependent variables of different columns are standard deviation or range of ROA (i.e. BR_3 and BR_4) over a 3-year rolling window as defined in Table 4.2. Columns (1) and (2) report the results based on firm fixed effects, and Columns (3) and (4) report the results based on industry fixed effects. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Variables	$\boldsymbol{BR_3}$	$\boldsymbol{BR_4}$	$\boldsymbol{BR_3}$	$\boldsymbol{BR_4}$
$Target \times Post$	-0.0109***	-0.0206***	-0.0061*	-0.0114*
	(0.0041)	(0.0078)	(0.0034)	(0.0063)
Post	0.0063**	0.0119**	0.0062***	0.0116***
	(0.0031)	(0.0059)	(0.0023)	(0.0044)
Target	0.0004	0.0008	0.0046**	0.0086**
	(0.0026)	(0.0049)	(0.0019)	(0.0037)
Mcap	-0.0079***	-0.0151***	-0.0055***	-0.0105***
	(0.0020)	(0.0038)	(0.0006)	(0.0011)
ROA	-0.0485***	-0.0895***	-0.0938***	-0.1777***
	(0.0151)	(0.0286)	(0.0084)	(0.0160)
TobinQ	0.0028***	0.0051***	0.0034***	0.0065***
	(0.0009)	(0.0016)	(0.0009)	(0.0016)
SD_ROA[-3, -1]	-0.0875***	-0.1637***	0.1557***	0.2947***
	(0.0264)	(0.0497)	(0.0141)	(0.0267)
Leverage	0.0085	0.0171	0.0087**	0.0156**
	(0.0086)	(0.0160)	(0.0041)	(0.0077)
Tangibility	0.0247	0.0448	0.0009	0.0016
	(0.0247)	(0.0461)	(0.0052)	(0.0099)
FirmAge	-0.0145	-0.0279	-0.0005	-0.0010
	(0.0129)	(0.0242)	(0.0018)	(0.0033)
Slack	0.0186	0.0355	0.0479***	0.0916***
	(0.0162)	(0.0303)	(0.0068)	(0.0129)
Constant	0.1230***	0.2348***	0.0605***	0.1157***
	(0.0365)	(0.0684)	(0.0070)	(0.0133)
Observations	13,813	13,813	13,813	13,813
R-squared	0.7036	0.7049	0.3959	0.3961
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes		
Industry Fixed Effect			Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4.16 Hedge fund activism and risk-taking: Myopic management, BR_3 and BR_4

The table provides regression results of firm risk-taking post hedge fund activism, based on myopic firms and non-myopic firms. The dependent variables of different columns are BR_3 and BR_4 as defined in Table 4.2. Columns (1) and (2) report the results using the subsample of myopic firms, and Columns (3) and (4) report the results using the subsample of non-myopic firms. Following Mizik (2010), firms with increasing ROA and decreasing marketing and R&D expenditures are classified as myopic firms. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	Myopic Firms		**Non-Myopic Firms**	
	(1)	**(2)**	**(3)**	**(4)**
Variables	$\boldsymbol{BR_3}$	$\boldsymbol{BR_4}$	$\boldsymbol{BR_3}$	$\boldsymbol{BR_4}$
$Target \times Post$	-0.0120***	-0.0231***	-0.0107	-0.0203
	(0.0039)	(0.0073)	(0.0077)	(0.0146)
post	0.0064**	0.0122**	0.0065	0.0121
	(0.0031)	(0.0057)	(0.0059)	(0.0112)
target	0.0060***	0.0116***	-0.0024	-0.0042
	(0.0023)	(0.0043)	(0.0043)	(0.0080)
Mcap	-0.0083***	-0.0155***	-0.0102***	-0.0194***
	(0.0028)	(0.0053)	(0.0032)	(0.0060)
ROA	-0.0051	-0.0071	-0.0634***	-0.1175***
	(0.0252)	(0.0478)	(0.0218)	(0.0415)
TobinQ	0.0157***	0.0293***	0.0027***	0.0050***
	(0.0036)	(0.0069)	(0.0008)	(0.0016)
SD_ROA[-3, -1]	-0.0737***	-0.1355***	-0.0988***	-0.1844***
	(0.0274)	(0.0518)	(0.0364)	(0.0686)
Leverage	-0.0215	-0.0380	0.0129	0.0249
	(0.0133)	(0.0256)	(0.0092)	(0.0167)
Tangibility	0.0262	0.0490	0.0300	0.0538
	(0.0274)	(0.0510)	(0.0369)	(0.0698)
FirmAge	-0.0022	-0.0042	-0.0015	-0.0049
	(0.0104)	(0.0192)	(0.0238)	(0.0452)
Slack	0.0179	0.0323	0.0167	0.0331
	(0.0191)	(0.0360)	(0.0224)	(0.0419)
Constant	0.0664**	0.1225**	0.1110*	0.2168*
	(0.0329)	(0.0616)	(0.0640)	(0.1210)
Observations	7,301	7,301	6,512	6,512
R-squared	0.6884	0.6899	0.7438	0.7442
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4.17 Hedge fund activism and risk-taking: Information transparency, BR_3 and BR_4

The table provides the results on the effect of information transparency on the risk reduction post hedge fund activism. The dependent variables of different columns are BR_3 and BR_4, as defined in Table 4.2. Information transparency is measured by either Llorente *et al.'s* (2002) model (*LMSW* proxy) or a total number of 8K filings. A negative *LMSW* indicates higher information transparency, and firms that disclose more 8K filings are also more transparent. The full sample is divided into subsamples depending on the firm-level information transparency. Columns (1)-(4) show results based on the LMSW proxy, and Columns (5)-(8) show results based on the 8K filings proxy. Columns (1), (2), (5), and (6) are results of the firms with less transparency, and Columns (3), (4), (7), and (8) are results of the firms with higher transparency. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	LMSW (Above Zero)		LMSW (Below Zero)		All_8K (Below Median)		All_8K (Above Median)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	BR_3	BR_4	BR_3	BR_4	BR_3	BR_4	BR_3	BR_4
$Target \times Post$	-0.0118**	-0.0224**	-0.0071	-0.0138	-0.0153**	-0.0286**	-0.0072	-0.0131
	(0.0056)	(0.0106)	(0.0056)	(0.0107)	(0.0064)	(0.0121)	(0.0054)	(0.0102)
post	0.0081*	0.0152*	0.0014	0.0032	0.0072	0.0136	0.0022	0.0038
	(0.0043)	(0.0082)	(0.0039)	(0.0074)	(0.0058)	(0.0110)	(0.0042)	(0.0079)
target	0.0002	0.0004	0.0012	0.0025	0.0031	0.0060	-0.0009	-0.0017
	(0.0032)	(0.0061)	(0.0036)	(0.0068)	(0.0039)	(0.0073)	(0.0035)	(0.0065)
Mcap	-0.0077***	-0.0147***	-0.0135***	-0.0260***	-0.0088**	-0.0168**	-0.0118***	-0.0223***
	(0.0024)	(0.0045)	(0.0049)	(0.0091)	(0.0036)	(0.0067)	(0.0036)	(0.0069)
ROA	-0.0630***	-0.1183***	-0.0079	-0.0074	-0.0734***	-0.1389***	-0.0108	-0.0160
	(0.0199)	(0.0376)	(0.0246)	(0.0463)	(0.0243)	(0.0455)	(0.0229)	(0.0431)
TobinQ	0.0022***	0.0040***	0.0117***	0.0222***	0.0017***	0.0030**	0.0171***	0.0315***
	(0.0008)	(0.0014)	(0.0040)	(0.0075)	(0.0006)	(0.0012)	(0.0034)	(0.0063)
SD_ROA[-3, -1]	-0.0700**	-0.1302**	-0.1288***	-0.2428***	-0.1033**	-0.1940**	-0.1002**	-0.1931**
	(0.0302)	(0.0570)	(0.0486)	(0.0921)	(0.0419)	(0.0792)	(0.0439)	(0.0826)

Leverage	0.0168	0.0331*	-0.0281**	-0.0518**	0.0060	0.0119	-0.0042	-0.0050
	(0.0104)	(0.0199)	(0.0133)	(0.0248)	(0.0115)	(0.0216)	(0.0171)	(0.0301)
Tangibility	0.0182	0.0333	0.0324	0.0568	0.0236	0.0453	0.0171	0.0282
	(0.0320)	(0.0597)	(0.0349)	(0.0651)	(0.0486)	(0.0903)	(0.0342)	(0.0631)
FirmAge	-0.0195	-0.0366	0.0042	0.0072	-0.0176	-0.0359	0.0076	0.0143
	(0.0188)	(0.0353)	(0.0151)	(0.0288)	(0.0202)	(0.0381)	(0.0170)	(0.0318)
Slack	0.0123	0.0235	0.0154	0.0315	0.0718***	0.1347***	-0.0063	-0.0067
	(0.0199)	(0.0373)	(0.0289)	(0.0540)	(0.0252)	(0.0473)	(0.0254)	(0.0478)
Constant	0.1279**	0.2416**	0.1226**	0.2364**	0.1306**	0.2545**	0.0608	0.1178
	(0.0519)	(0.0973)	(0.0508)	(0.0958)	(0.0589)	(0.1109)	(0.0566)	(0.1054)
Observations	9,042	9,042	4,771	4,771	5,098	5,098	5,130	5,130
R-squared	0.7301	0.7315	0.7126	0.7140	0.7684	0.7702	0.7888	0.7890
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4.18 Target firms' response to hedge fund activism, BR_3 and BR_4

The table provides the results how the target firms' response to hedge fund activism affects post-intervention risk-taking. The dependent variables of different columns are BR_3 and BR_4 as defined in Table 4.2. The full sample is divided into subsamples depending on whether the target firms have hostile resistance to hedge fund activism. Columns (1) and (2) show results based on the firms with hostile resistance to activism, and Columns (3) and (4) show results based on the firms without resistance. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	Hostile Resistance		No Resistance	
	(1)	(2)	(3)	(4)
Variables	$\boldsymbol{BR_3}$	$\boldsymbol{BR_4}$	$\boldsymbol{BR_3}$	$\boldsymbol{BR_4}$
$Target \times Post$	-0.0081	-0.0156	-0.0134**	-0.0248**
	(0.0052)	(0.0098)	(0.0052)	(0.0099)
post	0.0013	0.0027	0.0098**	0.0183**
	(0.0041)	(0.0077)	(0.0040)	(0.0075)
target	0.0021	0.0034	-0.0010	-0.0021
	(0.0046)	(0.0086)	(0.0041)	(0.0078)
Mcap	-0.0083***	-0.0159***	-0.0089***	-0.0167***
	(0.0023)	(0.0043)	(0.0026)	(0.0049)
ROA	-0.0150	-0.0277	-0.0526**	-0.0959**
	(0.0130)	(0.0245)	(0.0228)	(0.0429)
TobinQ	0.0100***	0.0184***	0.0019***	0.0035***
	(0.0015)	(0.0028)	(0.0007)	(0.0012)
SD_ROA[-3, -1]	-0.0681***	-0.1267***	-0.0878*	-0.1654*
	(0.0188)	(0.0360)	(0.0456)	(0.0860)
Leverage	-0.0000	-0.0019	0.0115	0.0237
	(0.0082)	(0.0152)	(0.0097)	(0.0183)
Tangibility	0.0245	0.0457	0.0236	0.0439
	(0.0296)	(0.0546)	(0.0316)	(0.0598)
FirmAge	-0.0148	-0.0288	-0.0122	-0.0231
	(0.0146)	(0.0273)	(0.0169)	(0.0318)
Slack	-0.0024	-0.0044	0.0274	0.0521
	(0.0184)	(0.0344)	(0.0198)	(0.0372)
Constant	0.1090***	0.2111***	0.1259***	0.2376***
	(0.0412)	(0.0767)	(0.0476)	(0.0895)
Observations	6,480	6,480	7,333	7,333
R-squared	0.7043	0.7047	0.7198	0.7208
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Secondly, instead of using the 3-year rolling window, this study uses a 5-year rolling window for the calculation of book-based risk-taking, namely industry-adjusted standard deviation of ROA (BR_5), industry-adjusted range of ROA (BR_6), the standard deviation of ROA (BR_7), and range of ROA (BR_8) all estimated over the 5-year window as defined in Table 4.2. This study re-examines *Hypothesis 1* on the impact of hedge fund activism on firms' risk-taking using the 5-year window. Relevant results are presented in Table 4.19.

Table 4.19 shows significant and negative estimates of the coefficient of $Target \times Post$ across all the four proxies, and with either firm fixed effects or industry fixed effects. The sign and significance of other variables also remain consistent with the main results. These results provide supportive evidence of *Hypothesis 1* that firms targeted by activist hedge funds tend to reduce risk-taking post interventions. Results of the remaining hypotheses also remain robust when using the risk-taking proxies measured by the 5-year rolling window. Relevant results are available upon request.

Table 4.19 Hedge fund activism and firm risk-taking, 5-year rolling windows

The table provides regression results of the risk-taking behaviors of the target firms post hedge fund activism. The dependent variables of different columns are the four book-based proxies for risk-taking calculated over a five-year rolling window, namely BR_5, BR_6, BR_7, and BR_8 as defined in Table 4.2. Columns (1)-(4) report the results based on firm fixed effects, and Columns (5)-(8) report the results based on industry fixed effects. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	$\boldsymbol{BR_5}$	$\boldsymbol{BR_6}$	$\boldsymbol{BR_7}$	$\boldsymbol{BR_8}$	$\boldsymbol{BR_5}$	$\boldsymbol{BR_6}$	$\boldsymbol{BR_7}$	$\boldsymbol{BR_8}$
$Target \times Post$	-0.0107*	-0.0107*	-0.0289**	-0.0287**	-0.0212*	-0.0217*	-0.0518*	-0.0529*
	(0.0059)	(0.0058)	(0.0143)	(0.0142)	(0.0127)	(0.0127)	(0.0296)	(0.0296)
post	0.0081**	0.0076**	0.0211**	0.0201**	0.0074	0.0075	0.0198	0.0201
	(0.0039)	(0.0039)	(0.0095)	(0.0094)	(0.0099)	(0.0099)	(0.0231)	(0.0231)
target	-0.0025	-0.0021	-0.0035	-0.0027	0.0051	0.0053	0.0132	0.0139
	(0.0036)	(0.0036)	(0.0084)	(0.0084)	(0.0091)	(0.0091)	(0.0213)	(0.0213)
Mcap	-0.0100***	-0.0100***	-0.0241***	-0.0241***	-0.0146***	-0.0146***	-0.0348***	-0.0348***
	(0.0026)	(0.0026)	(0.0063)	(0.0063)	(0.0021)	(0.0021)	(0.0049)	(0.0049)
ROA	-0.0336*	-0.0326*	-0.0716	-0.0693	-0.3838***	-0.3840***	-0.9139***	-0.9140***
	(0.0186)	(0.0182)	(0.0453)	(0.0444)	(0.0650)	(0.0650)	(0.1513)	(0.1512)
TobinQ	0.0020**	0.0020**	0.0046**	0.0045**	0.0306***	0.0305***	0.0709***	0.0708***
	(0.0009)	(0.0009)	(0.0022)	(0.0022)	(0.0065)	(0.0065)	(0.0155)	(0.0155)
SD_ROA[-3, -1]	-0.1068***	-0.1023***	-0.2470***	-0.2353***	0.2321***	0.2341***	0.5712***	0.5758***
	(0.0269)	(0.0267)	(0.0656)	(0.0651)	(0.0647)	(0.0648)	(0.1518)	(0.1520)
Leverage	0.0099	0.0099	0.0196	0.0195	0.0058	0.0061	0.0221	0.0232
	(0.0124)	(0.0123)	(0.0295)	(0.0293)	(0.0267)	(0.0269)	(0.0631)	(0.0634)
Tangibility	0.0121	0.0140	0.0283	0.0327	0.0155	0.0164	0.0371	0.0391

	(0.0321)	(0.0323)	(0.0744)	(0.0751)	(0.0173)	(0.0174)	(0.0407)	(0.0408)
FirmAge	-0.0062	-0.0064	-0.0119	-0.0117	0.0153**	0.0153**	0.0352**	0.0351**
	(0.0165)	(0.0163)	(0.0396)	(0.0393)	(0.0076)	(0.0076)	(0.0179)	(0.0179)
Slack	0.0263	0.0252	0.0634	0.0612	0.0210	0.0214	0.0602	0.0613
	(0.0251)	(0.0249)	(0.0593)	(0.0589)	(0.0283)	(0.0283)	(0.0667)	(0.0667)
Constant	0.0766*	0.1395***	0.1770*	0.3281***	0.0080	0.0714***	0.0187	0.1726***
	(0.0444)	(0.0439)	(0.1059)	(0.1050)	(0.0269)	(0.0269)	(0.0634)	(0.0635)
Observations	10,801	10,801	10,801	10,801	10,801	10,801	10,801	10,801
R-squared	0.8042	0.8081	0.8041	0.8076	0.3043	0.3094	0.3102	0.3158
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes				
Industry Fixed Effect					Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Thirdly, instead of the book-based proxies for risk-taking, this study re-examines the risk-taking of the target firms based on the five market-based proxies for risk-taking, namely total risk (MR_1), idiosyncratic risk (MR_2), market-adjusted total risk (MR_3), industry-adjusted total risk (MR_4), and industry-adjusted idiosyncratic risk (MR_5) as defined in Table 4.2. Relevant results are shown in Table 4.20. Columns (1)-(5) report the results based on firm fixed effects, and Columns (6)-(10) report the results based on industry fixed effects.

As shown in Columns (6)-(10), the interaction term $Target \times Post$ is negative and at least statistically significant at 10% level when controlling for industry fixed effects, consistent with the main results that use book-based measures. However, the incremental effect of target firms' risk-taking is insignificant when controlling for firm fixed effects.

Overall, with all the results, it is confident to conclude that the target firms become more risk-averse post hedge fund activism. This impact is more pronounced for the firms that are myopic managed or informationally opaque.

Table 4.20 Hedge fund activism and firm risk-taking, market-based risk measures

The table provides regression results of the risk-taking behaviors of the target firms post hedge fund activism. The dependent variables of different columns are the five market-based proxies for risk-taking, namely total risk (MR_1), idiosyncratic risk (MR_2), market-adjusted total risk (MR_3), industry-adjusted total risk (MR_4), and industry-adjusted idiosyncratic risk (MR_5) as defined in Table 4.2. Columns (1)-(5) report the results based on firm fixed effects, and Columns (6)-(10) report the results based on industry fixed effects. Robust standard errors are provided below in the parentheses. The variable definitions are provided in Table 4.2. All variables are winsorized at 1st and 99th percent. ***, **, and * represent statistical significance at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variables	$\boldsymbol{MR_1}$	$\boldsymbol{MR_2}$	$\boldsymbol{MR_3}$	$\boldsymbol{MR_4}$	$\boldsymbol{MR_5}$	$\boldsymbol{MR_1}$	$\boldsymbol{MR_2}$	$\boldsymbol{MR_3}$	$\boldsymbol{MR_4}$	$\boldsymbol{MR_5}$
$Target \times Post$	*-0.0015*	*-0.0007*	*-0.0015*	*-0.0016*	*-0.0010*	-0.0222**	-0.0221*	-0.0224**	-0.0222**	-0.0224*
	(0.0104)	*(0.0104)*	*(0.0104)*	*(0.0104)*	*(0.0105)*	(0.0112)	(0.0114)	(0.0110)	(0.0112)	(0.0114)
Post	0.0009	-0.0034	-0.0013	0.0010	-0.0031	0.0078	0.0071	0.0070	0.0078	0.0071
	(0.0079)	(0.0080)	(0.0078)	(0.0079)	(0.0080)	(0.0079)	(0.0085)	(0.0079)	(0.0079)	(0.0085)
Target	0.0014	0.0037	0.0027	0.0014	0.0037	-0.0079	-0.0077	-0.0064	-0.0079	-0.0075
	(0.0072)	(0.0071)	(0.0071)	(0.0072)	(0.0071)	(0.0080)	(0.0081)	(0.0080)	(0.0080)	(0.0082)
Mcap	-0.0328***	-0.0385***	-0.0362***	-0.0328***	-0.0380***	-0.0518***	-0.0609***	-0.0618***	-0.0518***	-0.0613***
	(0.0073)	(0.0076)	(0.0074)	(0.0073)	(0.0075)	(0.0027)	(0.0028)	(0.0027)	(0.0027)	(0.0028)
ROA	-0.1560***	-0.1491***	-0.1546***	-0.1560***	-0.1503***	-0.3440***	-0.3436***	-0.3358***	-0.3439***	-0.3440***
	(0.0308)	(0.0312)	(0.0311)	(0.0308)	(0.0312)	(0.0270)	(0.0283)	(0.0272)	(0.0270)	(0.0284)
TobinQ	0.0035	0.0033	0.0025	0.0035	0.0032	0.0088***	0.0092***	0.0090***	0.0088***	0.0092***
	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0028)	(0.0029)	(0.0028)	(0.0028)	(0.0029)
SD_ROA[-3,-1]	-0.0384	-0.0365	-0.0454	-0.0384	-0.0355	0.2369***	0.2460***	0.2378***	0.2369***	0.2487***
	(0.0371)	(0.0360)	(0.0364)	(0.0371)	(0.0361)	(0.0375)	(0.0375)	(0.0368)	(0.0375)	(0.0376)
Leverage	0.0746***	0.0711**	0.0728**	0.0745***	0.0732***	0.1108***	0.0991***	0.0999***	0.1108***	0.0998***
	(0.0287)	(0.0281)	(0.0283)	(0.0287)	(0.0283)	(0.0231)	(0.0238)	(0.0230)	(0.0231)	(0.0238)
Tangibility	0.0887	0.0891	0.0933	0.0888	0.0884	0.0434	0.0326	0.0366	0.0434	0.0323

	(0.0744)	(0.0766)	(0.0760)	(0.0744)	(0.0763)	(0.0301)	(0.0308)	(0.0297)	(0.0301)	(0.0309)
FirmAge	-0.0949**	-0.1121***	-0.0984**	-0.0948**	-0.1150***	-0.0322***	-0.0338***	-0.0298***	-0.0322***	-0.0341***
	(0.0415)	(0.0415)	(0.0410)	(0.0415)	(0.0416)	(0.0074)	(0.0075)	(0.0073)	(0.0074)	(0.0075)
Slack	-0.0929***	-0.0959***	-0.0886***	-0.0930***	-0.0963***	-0.0275	-0.0296	-0.0235	-0.0275	-0.0296
	(0.0325)	(0.0321)	(0.0327)	(0.0325)	(0.0321)	(0.0252)	(0.0253)	(0.0248)	(0.0252)	(0.0254)
Constant	0.9588***	1.0095***	0.9678***	0.9587***	1.0123***	0.9140***	0.9531***	0.9521***	0.9139***	0.9542***
	(0.1075)	(0.1083)	(0.1064)	(0.1075)	(0.1086)	(0.0308)	(0.0313)	(0.0304)	(0.0308)	(0.0313)
Observations	10,313	10,310	10,313	10,313	10,310	10,313	10,310	10,313	10,313	10,310
R-squared	0.7976	0.8072	0.8047	0.7976	0.8059	0.4874	0.4993	0.5074	0.4874	0.4959
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes					
Industry FE						Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.6 Conclusions

This study documents the impact of hedge fund activism on post-intervention risk-taking. Based on the sample of hedge fund activism events in the U.S. during the period 2000-2016, this study finds that the target firms experience a significant reduction in risk-taking post hedge fund activism. This effect on risk reduction is more pronounced when the target firms have myopic management or lower information transparency. These findings suggest that activist hedge funds reduce firm risk-taking or strategic behaviors, which indicates hedge funds' potential engagement in short-termism. In addition, empirical tests also provide evidence that target firms experience a less pronounced risk reduction when the firms have hostile resistance to hedge fund activism. This is consistent with Boyson and Pichler (2019) that management's hostile resistance to activism would offset the initial effect of hedge fund activism on target firms.

This study contributes to the literature on hedge fund activism. It is the first study to examine how activist hedge funds affect the risk-taking of target firms. By applying various subsamples based on firm-specific characteristics, this study provides consistent evidence that target firms become more risk-averse post interventions. Overall, these empirical findings provide new insights to academics and regulators by adding to the debate on the costs and benefits of activism for the economy. The short-termism nature of activist hedge funds provides important policy implications that activist hedge funds fail to act the monitoring role effectively.

Chapter Five: Conclusion

The final chapter concludes the dissertation. It has three sections. Section 5.1 presents a brief summary of the main findings from the two essays and discusses the implications of these findings. Section 5.2 provides some limitations of this research, and further discusses potential areas for future research that are related to the thesis topics.

5.1 A review of hypotheses, major findings, and implications

The hypotheses and major findings in connection with the essays are summarized in Table 5.1, with relevant discussions in Subsections 5.1.1 and 5.1.2.

Table 5.1 Hypotheses and conclusions for two essays

This table presents a summary of research objectives and hypotheses for the two essays. All the hypotheses are supported by empirical studies.

Research objective 1: To investigate the impact of information technology on retail investors' attention and participation during shareholder activism	
Hypothesis 1: Retail investors' attention increases for firms that receive shareholders' proposals prior to the annual general meetings.	Support
Hypothesis 2a: Retail investors' attention is positively related to a negative sentiment expressed in the proxy statements.	Support
Hypothesis 2b: The increase of retail investors' attention is more pronounced for less transparent firms.	Support
Hypothesis 3a: Retail investors' attention is positively associated with their participation during high salience activism that resonates with retail investors' interests and preferences.	Support
Hypothesis 3b: The impact of retail investors' attention on their participation during high salience activism is more pronounced for less transparent firms.	Support
Hypothesis 4: Retail investors' participation during high salience activism is facilitated by E-proxy.	Support

Research objective 2: To investigate the link between hedge fund activism and firm risk-taking	
Hypothesis 1: Firms targeted by activist hedge funds become more risk-averse post activism.	Support
Hypothesis 2: Target firms with myopic management experience a more pronounced reduction in risk-taking post hedge fund activism.	Support
Hypothesis 3: The post-intervention reduction in firm risk-taking is associated with firm-level transparency, and the effect is more pronounced for less transparent firms.	Support
Hypothesis 4: Target firms' response plays an essential role in the consequence of hedge fund activism, and firms with no hostile resistance would experience a more pronounced reduction in post-intervention risk-taking.	Support

5.1.1 Essay One: Are retail investors really passive? Shareholder activism in the digital age

In the wake of digital age, the advancement in information technology has provided retail investors with efficient access to information, reducing the time and cost of being informed and making an informed decision. This would make changes to the traditional view that retail investors are rationally apathetic towards corporate governance. Based on a sample of all shareholder activism events in the U.S. covering the period 2005-2016, this essay examines the dynamics of retail investors' attention and retail investors' participation during shareholder activism with the advent of internet search. Google Search Volume Index (GSVI) is used to capture retail investors' "demand for information".

This essay finds new evidence on the role of internet in mitigating retail investors' apathy problems. Retail investors' attention for firms that receive a shareholder proposal increases significantly relative to their matched control firms prior to the annual general meetings. Specifically, the negative sentiment in proxy statements attracts higher retail investors' attention. This increase in attention turns into higher retail investors' participation in the voting process especially among proposals that

resonate with retail investors' interests and preferences.

Moreover, this essay highlights the impact of firm-level information transparency on retail investors' attention and subsequent participation during shareholder activism. Less transparent firms experience a more pronounced increase in retail investors' attention and participation. The introduction of E-proxy also facilitates retail investors in participation during high salience activism.

Overall, this study provides new insights into retail investors' behaviors and decision making in response to dissatisfaction with management. This is consistent with the suggestions of the SEC roundtable that highlights the importance of information technology in mitigation retail investors' apathy issues during proxy voting process.

5.1.2 Essay Two: Hedge fund activism and firm risk-taking

This essay fills in the gap in recent literature on the impact of hedge fund activism on firm risk-taking. Using a sample of all hedge fund activism events in the U.S. during the period 2000-2016, this study provides evidence that target firms experience a significant reduction in risk-taking relative to their matched control peers post hedge fund interventions. This reduction in firm risk-taking is significant even though activist hedge funds do not have explicit demands. This reduction in risk-taking reflects the short-termism nature of activist hedge funds, which pursue short-term profits and reduce long-term investments.

In addition, this essay highlights the role of firm-level characteristics of myopic management and information transparency in the association between hedge fund activism and firm risk-taking. Specifically, this essay provides evidence that myopic managed firms or opaque firms experience a more pronounced reduction in risk-taking post interventions, providing further evidence on activists' engagement in short-termism. This essay also adds new evidence to Boyson and Pichler (2019) that management's hostile resistance to activism offsets its initial effects on target firms.

Overall, this essay is the first study that investigates the link between hedge fund activism and firm risk-taking. It highlights a negative consequence of activists' interventions to target firms, which might negatively affect firm performance in the long-term. This essay provides important policy implications to the current debate on the efficacy of activist hedge funds, and the results support the critics of activist hedge funds, arguing that the hedge fund activism benefits are short-lived, at a long-term cost to shareholders.

5.2 Limitations of this research and potential future research

As with all research, there are some limitations in this thesis. For Essay One, an important caveat lies in the use of GSVI in the measurement of retail investors' attention. According to Da, Engelberg, and Gao (2011) and Drake, Roulstone, and Thornock (2012), large institutional investors have access to better information sources, and hence, Google search is likely to measure the attention of retail investors, or "perhaps less sophisticated" investors. Consequently, GSVI does capture retail investors' seeking of information. However, this study is not able to separate other types of market participant that might also use Google to search for information during shareholder activism.

Secondly, Essay One measures retail investors' participation indirectly by the use of the non-participation rate. This is the best proxy for retail investors' participation based on the data availability of this research. However, it is possible to measure the participation rate more accurately if the voting data is directly available. This suggests a potential line of research in the future.

For Essay Two, one limitation is the identification of hostile activism. Following Boyson and Pichler (2019), this study classifies activism as hostile resistance when target firms disagree publicly to hedge fund demands. However, there is also possible that management resists to activism behind the scene. This study is not able to identify such activism as hostile resistance.

Lastly, there is an interesting research question related to Essay Two, namely the link of risk-taking and M&A activities during hedge fund activism. According to Boyson, Gantchev, and Shivdasani (2017), activist hedge funds create shareholder value by influencing takeover outcomes for target firms. Hence, it is expected that M&A activities would have an impact on risk-taking during hedge fund activism. However, this study has not been able to investigate this question owing to the lack of data on M&A activities. This is a potential research question in the future.

Appendix

Appendix A: Calculation of LM-tone, Essay One: Are retail investors really passive? Shareholder activism in the digital age

This appendix provides the steps taken to process proxy statements before using McDonald and Loughran Dictionary. This study sources all the proxy materials from the SEC-EDGAR website, mainly DEF-14A or DEFA-14A for each firm-year, during which the firms receive a shareholder proposal. The procedures are as follows:

1. The heading information that is contained between hSEC-HEADERi and h/SEC-HEADERi is deleted.
2. All the tables that begin with hTABLEi and end with h/TABLEi or the paragraphs that contain hSi or hCi are deleted because some firms use hSi and hCi tags to present tables.
3. All the tags in the format of h...i and h&yi, which are used widely in documents in SEC HTML or XML format documents, are replaced with blanks.
4. To ensure that all the tables, tabulated text, or financial statements are excluded, all the paragraphs with more than 50% of non-alphabetic characters (e.g., white spaces or numbers) were deleted.
5. To make the analysis possible, the typical stop words such as “and,” “or,” or “the” are also removed

After the editing, the files, the files are analyzed based on custom developed R codes. Loughran and McDonald (2011) financial dictionary is applied to calculate the typical text statistics, including the total, number of words, number of positive words, number of negative words, litigious, uncertain, and superficial words.

Appendix B: Propensity Score Paradox, Essay One: Are retail investors really passive? Shareholder activism in the digital age

King & Nielsen (2019) "discovered a serious problem that causes PSM, as commonly used, to act like random matching and degrade inferences, sometimes worse than the original data." This appendix investigates the potential propensity score paradox in this dissertation. As presented in Chapter Three, Essay One has one-to-one match for each target and control firm for each industry and year to make more precise comparisons. Table 3.6 on page 61 seems to be an unbalanced panel. However, the targets and their matched peers are actually identical in all firm-level characteristics before taking GSVI into consideration, as shown Table 1A.

Table Appendix 1: Balance test post PSM and before downloading SVI

This table reports the balance test of Propensity Score Matching before downloading SVI. The target and matched firms are actually identical in all firm-level characteristics before taking GSVI into consideration.

Variables	Target	Matched	Diff.
Mcap	8.626	8.592	-0.034
Advertising	0.012	0.013	0.001
TobinQ	2.003	1.952	-0.051
InstOwn	77.797	77.356	-0.441
Tangibility	0.288	0.28	-0.008
3yrReturns	8.174	7.428	-0.746
#Employees	2.84	2.886	0.046
FirmAge	3.249	3.246	-0.003

N= 2,290

The significant difference between the target and control firms arise due to missing SVI. Firms that did not receive shareholder proposals might attract low or even no attention from retail investors (i.e. zero GSVI), leading to the exclusion of more matched firms (than target firms) from the sample. Although it is possible to identify the search volume data of each individual firm when downloading the search volume data from the Google's website, it is not likely to establish which firms have invalid

(zero) SVI for the relevant period ex-ante. Hence, it is hard to come up with an exact match.

To address the Propensity Score Paradox, this study uses the previously calculated Propensity Scores to identify each pair of target and matched firms, and drop observations based on the p-score to achieve a better balance of covariates. The new balance is reported in Table 2A, and the Equation 14 is re-examined using the new PSM sample. Relevant results are reported in Table 3A. The coefficient of $Pre[22] \times Target$ is positively related to retail investors' attention, statistically significant at 10% or below. These results confirm the main findings of Essay One.

Table Appendix 2: New coerced balance matrix

This table reports the balance test of the new coerced balance matrix. This study identifies each pair of target and matched firms based on their Propensity Scores, and drops observations to achieve a better balance of covariates.

Variables	Target	Matched	Diff.
Mcap	8.779	8.774	-0.005
Advertising	0.013	0.013	0.001
TobinQ	1.969	2.02	0.051
InstOwn	79.895	78.525	-1.370*
Tangibility	0.263	0.262	-0.001
3yrReturns	8.02	7.895	-0.125
#Employees	2.942	3.01	0.068
FirmAge	3.356	3.389	0.033

N= 1,273

Table Appendix 3: Retail investors' attention during shareholder activism, new PSM sample

This table provides the incremental retail investors' attention before the annual general meetings based on the new PSM sample. The definitions of all the variables are same as the main tests reported in Table 3.7.

	(1)	(2)	(3)
	All firms	High salience firms	Firms with no earning announcements
Variables	**GASVI**	**GASVI**	**GASVI**
Pre[22]×Target	0.011*	0.013**	0.018*
	(0.006)	(0.006)	(0.011)
Pre[22]	0.003	0.009	-0.001
	(0.006)	(0.008)	(0.006)
Target	-0.005	-0.007	-0.004
	(0.005)	(0.006)	(0.011)
Mcap	0.011***	0.013***	0.018***
	(0.003)	(0.004)	(0.006)
Advertising	-0.203*	-0.158	-0.087
	(0.107)	(0.140)	(0.246)
$TobinQ^X$	0.288	0.0146	-0.676
	(0.262)	(0.305)	(0.583)
$InstOwn^X$	0.0474***	0.0588***	0.0340
	(0.0165)	(0.0215)	(0.0289)
Tangibility	0.025	0.031*	-0.003
	(0.018)	(0.018)	(0.027)
$3yrReturns^X$	-0.0192	-0.0353	-0.0475
	(0.0179)	(0.0248)	(0.0352)
#Employees	-0.003	-0.008*	0.017**
	(0.004)	(0.004)	(0.007)
FirmAge	0.001	0.009**	0.007
	(0.003)	(0.004)	(0.007)
Constant	-0.130***	-0.157***	-0.356***
	(0.031)	(0.043)	(0.053)
Observations	259,744	138,784	102,566
R-squared	0.001	0.002	0.018
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

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