

# Disciplining Role of Short Sellers: Evidence From M&A Activity

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*Prior research has focused on the influence of long investors (e.g., institutional investors) on merger-and-acquisition (M&A) decisions. This study investigates the role of short sellers in shaping managerial acquisitiveness and M&A decision quality. Short sellers impose a downward pressure on stock prices by disseminating negative information to the market. Given that managerial wealth and job security hinge on stock prices, top managers respond to increased short selling by refraining from excessive M&A activities because M&As could provide opportunities for short sellers to spread negative information and dampen stock prices. Furthermore, the negative influence of short sellers on managerial acquisitiveness is enhanced by the market for corporate control as an external governance mechanism and by CEO equity ownership as an internal governance mechanism. When firms with increasing short selling do engage in M&As, they gain higher M&A announcement returns and operating performance. We test our hypotheses using firms in the S&P 1500 from 2002 to 2014 and find support for our arguments.*

**Keywords:** *mergers and acquisitions; short sellers; corporate governance; governance complementarity*

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Merger-and-acquisition (M&A) activities have been an enigma for management scholars. While M&As enable firms to increase market power, achieve effective resource deployment, enhance efficiency through cost savings, and create synergistic value (for a review, see Haleblan, Devers, McNamara, Carpenter, & Davison, 2009), they also provide an attractive and often-used avenue for managers to extract private benefits (Devers, McNamara, Haleblan, & Yoder, 2013). Managers may undertake M&As to increase their compensation (Harford & Li, 2007), boost social standing (Shi, Zhang, & Hoskisson, 2017), and diversify managerial employment risk (Lane, Cannella, & Lubatkin, 1998). Indeed, research suggests that agency motives drive about 59% of M&As (Nguyen, Yung, & Sun, 2012), which has led to calls for greater managerial accountability for M&A activities (Bebchuk, 2013).

Capital market participants are important actors that can play a governance role either directly, by influencing executive management and using voting rights (“voice”), or indirectly, by their decisions to buy or threaten to sell their shares (“voting with their feet”) (Aggarwal, Erel, Ferreira, & Matos, 2011). Given that M&As provide an avenue for managerial opportunism, capital market participants have been shown to be important drivers of firm M&A decisions (Andriosopoulos & Yang, 2015; Ferreira, Massa, & Matos, 2010; Goranova, Dharwadkar, & Brandes, 2010; Goranova, Priem, Ndofo, & Trahms, 2017). Such research generally suggests that institutional investors can constrain managers from undertaking value-destroying M&As. Although M&A research has devoted much attention to the role of “long” investors who benefit from rising stock prices, we know little about how the short side of the market (i.e., investors who benefit from stock price declines) influences firm M&A decisions.

This article examines the role of short sellers in affecting M&A decisions. Short sellers are a unique type of investor who borrow the firm’s stock from others with an obligation to sell it back at an agreed-upon price (Shi, Connelly, & Cirik, 2018). They are speculative investors who borrow and sell stocks that they do not own with the expectation that underlying stock prices will fall. In the eyes of managers, short sellers are “hostile” investors who are happy to see firms flounder (Lamont, 2012). Unlike “long” investors, who desire a high stock price, short sellers suffer financial losses when a firm’s stock price rises. We argue that a recent history of high short interest (i.e., the percentage of shares shorted) can dissuade managers from undertaking intensive M&As because short sellers have strong incentives to spread negative information associated with potential M&As with the goal of driving down stock prices (Asquith, Mikhail, & Au, 2005; Boehmer, Jennings, & Wei, 2007; Cohen, Diether, & Malloy, 2007). Top managers will respond to increasing short interest by refraining from excessive M&A activities because their job security and personal wealth are closely tied to firm stock price.

However, CEOs are differentially affected by declining stock prices and thus would respond to the presence of short sellers in different ways depending on factors that affect their stock price sensitivity. First, the presence of takeover contingency provisions can render hostile takeovers triggered by low stock prices ineffective (Walsh & Seward, 1990). As such, CEOs’ job security will be less affected by declining stock prices if CEOs are protected by takeover contingency provisions. In addition, when CEOs have high equity ownership, a high level of their personal wealth will be contingent on stock prices. This makes them more sensitive to factors that directly affect stock prices. We thus argue that the negative effect of short sellers on M&A intensity will be stronger when CEOs are not protected by takeover contingency provisions and have higher equity ownership.

Finally, we contend that a recent history of high short interest can affect M&A decision quality because the presence of short sellers can induce managers to conduct more in-depth due diligence of target firms to avoid short sellers' releasing negative information about M&As. The potential scrutiny of short sellers will lead managers to eschew M&As driven by their private interest motives and to more likely pursue M&As with higher probability of creating value for the firm. We therefore predict that when M&As do occur in the presence of high short interest, they will give rise to higher announcement returns as well as better operating performance.

This study makes a key contribution to M&A research. M&A research has devoted much attention to investigating how activist investors and institutional investors who hold a long position in firms can affect managerial M&A decisions (Gantchev, Sevilir, & Shivdasani, in press; Goranova et al., 2010). Despite growing evidence on the influence of short sellers on firm strategic decisions (De Angelis, Grullon, & Michenaud, 2017; Shi, Connelly, & Cirik, 2018), we know little about how short sellers, who benefit from stock price declines, can shape firm M&A decisions. Our study extends M&A research by showing that short sellers who are not shareholders can attenuate managerial acquisitiveness and dissuade managers from undertaking value-destroying M&As.

## Theoretical Background

### *M&As and Agency Problems*

Agency theory suggests that, due to separation of ownership and control, top executives may engage in activities beneficial for themselves but detrimental to shareholders' interests (Dalton, Hitt, Certo, & Dalton, 2007; Jensen & Meckling, 1976; Shleifer & Vishny, 1989). The theory has been extensively used to explain managerial investment decisions (Hoskisson, Chirico, Zyung, & Gambeta, 2017). The divergence between shareholders' and top executives' interests can incentivize top managers to pursue wasteful, negative-net-present-value investment projects to derive private benefits (Jensen, 1986, 1993). M&As can be one of such investments. Top managers are inclined to pursue empire building through M&As because running large companies can help reduce their job insecurity and is associated with high social recognition (Jensen, 1986).

Managers may engage in M&As to enhance scale economies (Singh & Montgomery, 1987), increase market power (Kim & Singal, 1993), or deploy capabilities more effectively (Capron & Pistre, 2002), which can be in the interests of shareholders. However, payoffs from M&As are often ambiguous in the short term. The difficulty for board members and shareholders to evaluate M&As' successes makes M&As particularly susceptible to managers' private interest motives (Devers et al., 2013). Research has documented extensively that M&As are generally value destroying for acquiring firms (King, Dalton, Daily, & Covin, 2004). Moeller, Schlingemann, and Stulz (2005) find that, between 1998 and 2001, acquiring firms lost \$240 billion, or 12 cents for every dollar spent on acquisitions. Given the negative influence of M&As on shareholder value, shareholders challenged 93% of M&A deals valued over \$100 million and 96% of transactions valued over \$500 million through shareholder lawsuits (Daines & Koumrian, 2012).

Despite the prevalence of value-destroying deals, M&As remain a common strategic action (DesJardine & Shi, in press; Halebian et al., 2009), with M&A transactions amounting to over

\$3.8 trillion in 2015 alone (Baigorri, 2016). M&As remain popular, in part, because they provide managers with an effective channel to extract private benefits (Devers et al., 2013), and M&As can enrich managers through increased compensation. Irrespective of M&A performance, acquiring CEOs generally witness a jump in their compensation (Bliss & Rosen, 2001; Harford & Li, 2007). Relatedly, CEOs who are underpaid relative to peer CEOs undertake intensive M&A activities to match their own compensation with that of industry peers (Seo, Gamache, Devers, & Carpenter, 2015). In addition, CEOs can use M&As to diversify firm business operations, thereby reducing their employment risk (Amihud & Lev, 1981).

Further, M&As provide an effective way for corporate growth, and “corporate growth bolsters social prominence, public prestige, and political power of senior executives” (Jensen, 1986). In this sense, M&As help to enhance CEOs’ social status (Avery, Chevalier, & Schaefer, 1998) and augment managerial power and discretion (Steinbach, Devers, McNamara, & Li, 2016). In addition to self-interest-driven motives, managerial hubris can propel intensive M&A activities and value-destroying deals (Roll, 1986). For instance, managerial hubris explains why some CEOs pay high acquisition premiums (Hayward & Hambrick, 1997), and CEO overconfidence can lead firms to undertake low-quality M&As (Malmendier & Tate, 2008).

As institutional investors and activist investors have become an important force in the governance landscape (Cremers & Sepe, 2018; DesJardine & Durand, in press; Shi, Connelly, Hoskisson, & Ketchen, in press), research has investigated the influence of institutional investors and activist investors on managerial M&A decisions. For instance, Ferreira et al. (2010) suggest that foreign institutional ownership increases the success of cross-border mergers. Fich, Harford, and Tran (2015) find that monitoring by target firms’ institutional investors bears a positive association with a higher probability of deal completion, a higher bid premium offered for the target firms, and a lower acquirer return. Gantchev et al. (in press) show that hedge fund activists can curb managerial empire building through M&As and lead firms to make high-quality M&A decisions. To date, research has focused mainly on long investors (e.g., institutional investors), and little attention has been paid to exploring the influence of the short side of capital markets (i.e., short sellers) on M&A decisions.

### *Short Sellers*

Short sellers are investors who hold negative equity in firms. Different from shareholders who hold long positions, short sellers borrow stock shares from brokers and are motivated by the belief that the security’s price will drop before they must return the shares. For example, a short seller who borrows a \$15 stock from the owner and sells will reap immediate inflow of \$15 (less transaction costs). At any point in time, the short seller is obligated to provide that share back to the owner upon demand. If the shorted stock is recalled when the price is \$10, the short seller goes back to the market, buys the stock for \$10 and then transfers it back to the owner, while keeping the difference of \$5 as profit. Conversely, if the price is \$20, the short seller is still obligated to buy and return the stock, but in this case making a \$5 loss. In addition, during the period the stock is held short, the short seller also pays daily fees to the owner of the stock. This makes short sales a risky investment strategy, as short sellers essentially commit to selling something that they have borrowed for a fee. As a result, they are financial beneficiaries of the firm’s movement in stock price but in a

direction opposite to that of other stakeholders (Hu & Black, 2006). Although short selling is a finite and short-term activity for a given short seller due to its ongoing costs, overall short interest in the stock can be relatively stable in a specific period of time for a firm. Our calculation suggests that the average coefficient of variation of monthly short interest in a given year for S&P 1500 firms from 2000 to 2015 is 0.26, suggesting that short interest is relatively stable in a given year.

Although empirical evidence on what drives short interest is still unclear, shorting activities have been on the rise. In North America, the percentage of shorted shares (i.e., short interest) among companies listed on the New York Stock Exchange (NYSE) increased by approximately 200% between 2001 and 2014. For more technology-focused companies listed on the NASDAQ, short interest increased by over 300% during the same period (Shi et al., 2018). Short selling also accounts for a considerable number of market trades. Diether, Lee, and Werner (2009) document daily shorting activity for both the NYSE and the NASDAQ at 24% and 31% of daily share volume, respectively. Also, the prominence of short selling is not limited to periods of financial crisis. Our analyses of short interest data, for example, show that in the years since the great recession (2011–2018), 70% of firms in the S&P 500 index experienced an increase in short selling (an average increase of 14.35%). Both the growth and the volume of shorting activity make short sellers a prominent, yet often demonized, class of investors.

Anecdotal evidence also suggests that top managers are highly attentive to short-selling activities in their firms. The CEO of Canadian drug maker Concordia International, for example, sued a short seller (Marc Cohodes) for libel (Grant, 2016). Mike Pearson, the then-CEO of Valeant, stated, in regard to short seller Andrew Left, “His motivation is the same as one who runs into a crowded theater and falsely yells fire. He wanted people to run . . . so he could make money for his short-selling” (Celarler, 2015). CEOs, through industry associations and the exchanges, routinely lobby for tighter short-selling restrictions. In congressional testimony, NYSE president Tom Farley told lawmakers that he regularly got complaints from listed companies that short sellers should be forced to have more stringent disclosure (A. Massa, 2017).

Empirical research also substantiates the attentiveness of not only top managers but other stakeholders to short-selling activities. With regard to top management, Shi et al. (2018) find that the threat of short selling can lead firms’ managers to refrain from growth actions. Similarly, an increase in short-selling pressure can lead managers to reduce research and development (R&D) and capital investment by their firms (Grullon, Michenaud, & Weston, 2015). Furthermore, there is increasing evidence that short selling also influences governance devices. Short sellers can influence boards’ decisions with respect to CEO compensation structures. De Angelis et al. (2017) find that the removal of short-selling constraints leads firms to grant more stock options to their managers. External stakeholders also pay attention to a firm’s short-selling activity. Hope, Hu, and Zhao (2017) find that the removal of short-selling constraints leads auditors to charge higher audit fees, ostensibly because short selling is a constraining governance device for potential managerial fraud. Taken together, managers and relevant stakeholders are attuned to and aware of short-selling activities, and such awareness can potentially affect their behaviors and facilitate the effectiveness of other governance devices. We examine how short sellers can play a role in constraining managerial acquisitiveness and improving M&A decision quality.

## Hypotheses

### *Short Interest and M&A Intensity*

Capital markets have long been known to affect managerial decisions of public corporations. The market for corporate control suggests that the threat from hostile takeovers can deter managers from pursuing self-interests at the expense of shareholders (Jensen & Ruback, 1983). Specifically, if managers make decisions that are not in the interests of shareholders, the firm's stock price will drop so low as to create an incentive for more competent managers to take control and drive the firm's value back up. Subsequent to hostile takeovers, incumbent executives tend to be forced out. As managers generally value their job security, the threat from hostile takeovers due to depressed share price can lead managers to make decisions that will not adversely affect the firm's share price and thus harm the interests of shareholders.

Similarly, exit by large shareholders can also depress the firm's share price and thus negatively affect the manager's job security. This is particularly the case with institutional investors who own over 70% of the U.S. equity market (Bebchuk, Cohen, & Hirst, 2017). Although some institutional investors may influence firm decisions through voice (Connelly, Shi, Hoskisson, & Koka, 2019; David, Bloom, & Hillman, 2007; Schnatterly & Johnson, 2014; Shi, Connelly, & Hoskisson, 2017), most institutional investors can play a governance role through the threat of exit. Specifically, when institutional investors are dissatisfied with management, they may choose to sell their holdings, which can depress firm stock prices and discipline management. Consistent with such arguments, Parrino, Sias, and Starks (2003) find that the aggregate institutional ownership and the number of institutional investors decline in the year prior to forced CEO turnover.

In other words, an important way for institutional owners to affect managerial decisions is through "voting with feet" by selling their shares and by putting downward pressures on the firm's share price (Hirschman, 1970). A depressed share price, or a firm whose market value is less than its intrinsic value, will likely attract a takeover attempt, thus bringing the market for corporate control into play. In addition, as many managers' personal wealth is closely tied to firm stock price through equity ownership or option pay (Murphy, 1999), this not only will put managers' job security in jeopardy but also can be detrimental to their financial interests. Existing research has devoted much attention to studying how the threat from corporate raiders and institutional investors can affect firm decisions, but the role of short sellers' threats in constraining managers from undertaking decisions that can be potentially value destroying has been neglected in the literature. This is surprising given that short sellers can only profit from stock declines and have strong incentives to depress stock prices, which can pose a salient threat to managerial interests. We seek to not only provide research on this topic, which is lacking, but also specify an explanation as to how the short-seller mechanism works to restrain managerial M&A activities and improve M&A performance.

We propose that short sellers can similarly influence managerial decisions through their effect on the firm's stock price that can jeopardize management's employment and financial interests. First, short sellers can find and disseminate negative information about the firm (the information-revelation channel). Short sellers not only have a superior ability to analyze public information but also can unearth and trade on private information before it becomes publicly available (Engelberg, Reed, & Ringgenberg, 2012). Research has shown that short



sellers can detect and trade on earnings manipulation and corporate misconduct before the public is aware of these activities (Christophe, Ferri, & Angel, 2004; Desai, Krishnamurthy, & Venkataraman, 2006; Fang, Huang, & Karpoff, 2016; Karpoff & Lou, 2010). Some scholars argue that short sellers, as information intermediaries in capital markets, are more informed and sophisticated than are financial analysts (Christophe, Ferri, & Hsieh, 2010). In this sense, short sellers can exert a downward pressure on stock prices due to their ability to reveal negative information.

Second, short sellers can manipulate a firm's stock price by spreading negative rumors (the manipulation channel). "Short and distort" occurs when investors short a stock and then spread negative rumors about the company with the goal of bringing down stock prices. During the 2002 Enron crisis, Chase Bank became a victim of short and distort when short sellers started to spread rumors that Chase had helped Enron set up a "maze of financial transactions that . . . makes Rube Goldberg look like a slacker," leading investors to dump Chase's stock (Surowiecki, 2002). During the takeover of the Bear Stearns Companies by JPMorgan Chase in 2008, short sellers were found to spread rumors in an attempt to drive down Bear Stearns's share prices (Anderson, 2008). More recently, activist investor Bill Ackman launched an audacious attack on Herbalife, claiming that the firm was a pyramid scheme, a claim later refuted by the Federal Trade Commission (Benoit, 2018).

Regardless of whether short sellers are utilizing the information-revelation or the manipulation channel, short selling provides a bearish signal for a firm's stock price. This poses a threat to managers because declining stock prices can threaten top managers' job security as top managers are more likely to be fired for poor stock performance (Brickley, 2003), and firms with poor stock prices have a higher chance of becoming targets of hostile takeovers (Jensen & Ruback, 1983). In addition, low stock prices can be detrimental to top managers' personal wealth, as a large portion of their compensation hinges on stock price performance (Murphy, 1999). Thus, top managers will respond to a recent history of rising short interest by avoiding investment decisions that provide opportunities for short sellers to release negative information.

Despite that M&As are important strategic investments that can attract tremendous investor attention, their value may not be immediately obvious, and they have a high failure rate (King et al., 2004). As such, M&As provide the potential for short sellers to disseminate negative information on such transactions and drive down stock prices. Short sellers can reveal potential strategic and organizational mismatches between acquiring and target firms to the market or claim that top managers engage in M&As to pursue their own interests at the expense of shareholders' interests. Short sellers may even spread negative rumors about acquiring or target firms, as the Bear Stearns example suggests. Aware that short sellers may capitalize on M&A activities to depress stock prices, top managers will react by refraining from undertaking excessive M&As. In sum, because short sellers may capitalize on M&A announcements to spread negative information and drive down stock prices, and low stock prices can threaten top managers' job security and personal wealth, managers will respond to a recent history of increasing short interest by refraining from intensive M&A activities.

*Hypothesis 1:* The percentage of a firm's short interest in the recent past is negatively associated with the number of M&As in a year.

### *Moderating Effects of Takeover Contingency and CEO Equity Ownership*

Not all CEOs are equally exposed to the same level of hostile takeovers or sensitive to their firms' stock prices. As a result, CEOs will respond differentially to short selling based on their susceptibility to hostile takeovers and their sensitivity to stock price movements. Specifically, we argue that takeover contingencies and CEO equity ownership will moderate the effect of recent short selling on M&A activity. We examine takeover contingencies because these contingencies (i.e., poison pills and golden parachutes) make firms less attractive takeover targets, can protect managers from the market for corporate control, and affect top executives' job security. We investigate the moderating effect of CEO equity ownership because when CEOs have a high level of stock ownership, their personal wealth is directly connected with firm stock price (Sanders, 2001), making them more sensitive to factors that can influence the stock price. Because the market for corporate control and CEO ownership both influence managerial actions through the firm's stock price, on which short sellers can impose a downward pressure, we expect them to enhance the negative influence of short sellers on M&A activities.

The market for corporate control suggests that the market will correct for excessive agency costs when managers make strategic decisions oriented to increase their self-interests, resulting in undervalued firm assets and low stock prices. Devalued firm assets and depressed stock prices create hostile-takeover opportunities and can endanger managerial job security (Jensen & Ruback, 1983). Top managers can protect themselves from the market for corporate control through corporate governance provisions. There are two main types of corporate governance provisions: constitutional constraints on shareholder power (i.e., constitutional limits) and takeover contingencies (Bebchuk, Cohen, & Ferrell, 2009; Connelly, Shi, & Zyung, 2017). Constitutional limits, such as staggered boards and supermajority requirements for voting procedures, reflect the level of power that shareholders possess. Takeover contingencies describe what would happen conditional on hostile takeovers. Given that our argument centers on how declining stock prices can threaten CEOs' job security associated with hostile takeovers, we focus on takeover contingencies.

Following Connelly et al. (2017), we consider a firm as having a takeover contingency if it has a poison pill and/or golden parachute. We focus on poison pill and golden parachute because they are the most prevalent in research and practice (Bebchuk et al., 2009; Bebchuk, Cohen, & Wang, 2014; Buchholtz & Ribbens, 1994; Danielson & Karpoff, 2006; Singh & Harianto, 1989; Straska & Waller, 2014). A poison pill is a protective mechanism adopted by boards that issues a dividend to common stockholders when a party (potential acquirer) accumulates a certain percentage of shares in the firm. This makes the cost of a hostile takeover prohibitive. Golden parachute is a management perquisite in employment contracts that guarantees top executives substantial remuneration after a triggering event, such as hostile takeover (Cochran, Wood, & Jones, 1985).

Takeover contingencies render the market for corporate control less effective by making a firm unattractive to potential raiders (poison pill) or ensuring that top managers are well taken care of in the event of ownership change (golden parachute). Top managers protected by takeover contingencies are subject to a low level of job insecurity and can afford to ignore a recent history of increasing short interest. Specifically, even if potential short-selling pressure can drive down stock prices, managers protected by takeover contingencies may be less worried about the consequence of low stock prices because they are comparatively insulated



from hostile takeovers (Boyson, Gantchev, & Shivdasani, 2017). When top managers are not protected by takeover contingencies, however, they will be more attentive to short-selling activities and take actions to protect their job security. Consequently, the negative relationship between short interest and the number of M&As will be enhanced when firms do not have any takeover contingency.

*Hypothesis 2:* The presence of takeover contingencies attenuates the negative relationship between the percentage of a firm's short interest in the recent past and the number of M&As in a year.

We focus on CEO equity ownership instead of CEO option pay because CEOs' personal wealth bears a close relationship with CEO equity ownership. Stock price drop (hike) can directly translate into a loss (gain) in CEO personal wealth. Yet, CEOs' personal wealth may not be affected by their option pay if stock prices are way below option exercise prices. As short sellers can profit only from stock price decline, they have strong incentives to drive down stock prices by dispensing negative news. The higher the level of short interest, the greater the likelihood short sellers will depress the firm's stock price and negatively influence the CEO's personal wealth. Accordingly, a recent history of increasing short interest will represent a salient threat to CEOs who have a high level of equity ownership.

In contrast, when CEOs have a lower level of stock ownership, their financial interests are less affected by stock price fluctuations. As a result, CEOs with low levels of stock ownership may be less sensitive to the downward pressure that short sellers can impose on stock prices. In such a case, CEOs may not respond to a recent history of increasing short interest by reducing M&A activities. As a matter of fact, CEOs may pursue M&As to enhance their compensation and social recognition. In sum, we contend that the influence of short sellers on curtailing firm acquisitiveness is contingent upon the level of CEO stock ownership.

*Hypothesis 3:* The level of CEO stock ownership reinforces the negative relationship between the percentage of a firm's short interest in the recent past and the number of M&As in a year.

### *Investor Perceptions of M&As and M&A Performance Implications*

A recent history of high short interest may not only lead firms to attenuate M&A propensity but also give rise to more positive stock market reactions upon M&A announcements. Under the potential threat and scrutiny of short sellers, managers who initiate M&A activity would exercise greater due diligence in their choice of a target. The foreknowledge that any strategic action, especially M&A activity, would draw the hostile scrutiny of short sellers puts managers on guard so that they only pursue deals with clear and strong value propositions. As a result, when top executives of firms with a recent history of high short interest engage in M&A activity, the value potential is more obvious to investors and thereby will more likely result in a positive stock market response.

Specifically, investors face a high level of information asymmetry when evaluating firm strategic actions and need to look for signals of decision quality (Bell, Filatotchev, & Aguilera, 2014; Certo, Daily, & Dalton, 2001; Sanders & Boivie, 2004). Short selling is a costly trading strategy (Diamond & Verrecchia, 1987). Relative to other investors, short sellers devote more time and resources to gathering and processing information (M. Massa, Qian, Xu, & Zhang, 2015). If a firm pursues M&A activity given a recent history of high

short interest, this will signal to managers that it must have done thorough target screening and due diligence and thereby be more confident about potential M&A returns. Otherwise, this would provide an opportunity for potential short sellers to spread negative news associated with deals, leading to stock price discount and hurting managers' own interests. Thus, investors are less likely to perceive that managers are making low-quality M&A decisions given a high level of recent short interest, triggering more positive reactions to M&A announcements.

Conversely, when a firm has a low level of recent short interest, managers are less concerned about the spreading of negative information and the potential threat posed by short sellers. This leaves room for managers to engage in M&As to advance their own interests without as much concern for potential returns to shareholders. As a result, managers may rush into M&A decisions without carefully assessing the strategic and organizational fit between acquiring firms and target firms as well as the potential difficulties in the post-M&A integration stage. Consequently, investors may be unsure whether managers have engaged in high-quality M&A deals. As a result, investors may respond less favorably to M&A announcements by firms with a low level of recent short interest.

*Hypothesis 4:* The percentage of firm stock short interest in the recent past is positively associated with M&A announcement returns.

Short-term investor reactions to M&A announcements, however, are not always an unbiased measure of M&A performance because investor reactions can be driven by investors' behavioral biases (Zollo & Meier, 2008). Schijven and Hitt (2012) document that market reactions can be influenced by boundedly rational investors' high optimism about value creation or views based on managers' perceptions of a deal. Stated differently, market reactions may not correctly capture operating performance change brought by M&As (Humphery-Jenner, Sautner, & Suchard, 2017).

Following the logic of Hypothesis 4, we argue that the discipline from short sellers leads managers to show great caution in making M&A decisions and that such caution can give rise to more effective M&A investment, improving firm operating performance. In contrast, in the absence of the discipline from short sellers, managers may pursue M&As that can be value destroying for investors and may be more in their own interests. Thus, M&A investment is less likely to improve firm operating performance when firms have a recent history of lower short interest.

*Hypothesis 5:* The interaction between M&A investment and the percentage of a firm's short interest in the recent past is positively associated with subsequent firm operating performance such that the M&A investment is less likely to harm firm operating performance given recent high short interest versus recent low short interest.

## Methods

### *Sample*

We use a longitudinal data set that covers 2002 to 2014 to test our hypotheses. Our sample's time frame starts from 2002 because one of the important control variables, lendable

shares, begins from 2002. Our sample selection starts with all the firms in ExecuComp during those years. ExecuComp covers firms included in the S&P 1500 index. We obtain short-interest data from the Compustat Supplemental Short Interest file and M&A data from the Securities Data Corporation (SDC) Mergers and Acquisitions database. Data on lendable shares are from Markit. Executive compensation and demographic data are from ExecuComp.

### *Dependent Variables*

In measuring the number of M&As, we constrain our sample to deals with a transaction value of over \$1 million so that our sample includes only meaningful transactions from the acquirer's perspective (Moeller et al., 2005). We include only those transactions classified as acquisition of majority interests, acquisitions of assets, acquisitions, or mergers by the SDC. We use the number of M&As announced by a firm in a year to capture M&A intensity (Shi, Hoskisson, & Zhang, 2017). In measuring our dependent variable, we consider whether a firm has announced rather than completed a deal in a firm year because short sellers may use merger arbitrage to prevent deal completion, biasing our measure. The number of M&As in our sample ranges between 0 and 4. Around 18% of firm years are associated with one M&A and around 6% of firm years are associated with more than one M&A. The number of M&As is measured in Year  $t + 1$ . In robustness checks, we use a dummy variable to measure our dependent variable, which receives a value of 1 if a firm undertakes an M&A in a given year and 0 otherwise.

Our second dependent variable is M&A announcement returns. Following the event study procedure by Brown and Warner (1985), we first compute abnormal return (AR), or the return over the event window minus the normal return, which represents the expected return if the acquisition had not taken place. We measure cumulative abnormal returns (CARs) by using the market model adjusted stock returns around M&A announcements. We compute 3-day CARs during the window encompassed by event days  $[-1, +1]$ , where Event Day 0 is the M&A announcement date (Bauguess, Moeller, Schlingemann, & Zutter, 2009; Finkelstein & Halebian, 2002; Harford, Klasa, & Walcott, 2009; Masulis, Wang, & Xie, 2007). We use the Center for Research in Security Prices equal-weighted return as the market return and estimate the market model parameters over the 200-day period from Event Day  $-210$  to Event Day  $-11$  (Masulis et al., 2007).

Our last dependent variable is change in operating performance. We use return on assets (ROA) and return on equity (ROE) to capture operating performance. ROA (ROE) is measured as the ratio of operating income after depreciation to total assets (total equity). We create two measures of the acquirers' change in operating performance. The first measure captures changes in ROA (ROE) from 1 year prior to the deal to 1 year after the deal, and the second captures from 1 year prior to the deal to 2 years after the deal (Boyson et al., 2017). We acknowledge that a limitation of this performance measure is that the change in operating performance can come from sources other than M&A investment.

### *Independent Variable*

The independent variable is short interest. The Compustat Supplemental Short Interest database offers short-interest information for each firm at the monthly level. Because the

unit of analysis for Hypotheses 1 through 3 and Hypothesis 5 is at the firm-year level, we calculate the ratio of the number of shorted shares to the total number of shares outstanding for each month (Asquith, Pathak, & Ritter, 2005) and use the average monthly short-interest ratio for each year to obtain the annual percentage of short interest. For Hypotheses 1 through 3 and Hypothesis 5, we measure short interest in Year  $t$ , whereas, as noted, M&A activity is measured in Year  $t + 1$  to mitigate reverse causality concerns. The unit of analysis for Hypothesis 4 is at the deal level. We use the ratio of the number of shorted shares in the month prior to deal announcement to the total number of shares outstanding to measure short interest.

### *Moderating Variables*

The first moderator is takeover contingency, which receives a value of 1 if a firm has a poison pill and/or golden parachute in a given year and 0 otherwise. Data on takeover contingency are from RiskMetrics. The second moderator is CEO stock ownership, which is measured as the ratio of all of the shares held by the CEO to total shares outstanding (Sanders, 2001). Data on CEO stock ownership are obtained from ExecuComp. The last moderator is M&A investment. The variable is measured as the ratio of the total transaction value of all deals in a year to total assets. All moderators are measured in Year  $t$ .

### *Control Variables*

We include the following control variables (measured in Year  $t$ ) when modeling M&A intensity. Managers who take actions to constrain short selling may be more likely to engage in M&A activities. We thus control for lendable share ratio, which is measured as the ratio of lendable shares to total shares outstanding. Data on lendable shares are obtained from Markit. CEOs may scale back from M&A activities because of an overall reduction in their risk-taking propensity. Therefore, we control for three components of risks following Sanders and Hambrick (2007). The first element is the size of risky investment. We take the natural logarithm of the summed R&D expenditure and capital expenditure to measure risky investment. We exclude M&A investment from the measure of risky investment because our dependent variable relates to M&A activities. The second element is performance extremeness. We follow Sanders and Hambrick (2007) by first regressing annual stock returns on firm size (using the natural logarithm of the number of employees), firm business diversification (using the entropy measure), geographic diversification (using the international sales ratio), CEO option pay, CEO equity ownership, three-digit Standard Industrial Classification (SIC) industry fixed effects, and year fixed effects and calculating regression residuals afterward. We then take the absolute value of regression residuals to measure performance extremeness. Third, we create a measure of big loss, which receives a value of 1 if a firm's performance residual is more than one standard deviation below the mean and 0 otherwise. Our results are similar if we measure performance extremeness and big loss based on ROA instead of annual stock returns or use the threshold of two standard deviations below the mean to define big loss. All these three components of risk are measured in Year  $t$ .

Firm size may affect the level of resources available for a firm to conduct M&As and is controlled for by using the natural log of the total number of employees. Firms with better

financial performance may have more resources to undertake M&As (Carper, 1990). We control for firm performance using ROE (except when we test Hypothesis 5). We control for cash-holding ratio and current ratio because firms with larger cash reserves and less constrained by debt are more likely to pursue M&As (Harford, 1999). Cash-holding ratio is measured as the ratio of cash and cash equivalents to total assets, and current ratio is measured as the ratio of current assets to current liabilities.

We also include market-to-book ratio as a control as firms with overvalued equity tend to engage in M&As. Market-to-book ratio is measured as the ratio of the sum of market value of equity and book value of liability to total assets (Chen, Harford, & Lin, 2015). We control for acquisition experience, as it may capture the trend of firm M&A activities. Acquisition experience is measured as the number of completed M&As undertaken by the acquiring firm during the preceding 4 years (Bruton, Oviatt, & White, 1994). Firms may undertake more M&As when their industry peers exhibit strong acquisitiveness (McNamara, Haleblan, & Dykes, 2008). We control for industry takeover intensity, referring to the total number of M&As announced and completed by all of the firms in the same three-digit SIC industry codes for each year (excluding the focal firm; Shi, Zhang, & Hoskisson, 2017c). We take the natural logarithm of acquisition experience and industry takeover intensity to address skewness.

We control for a number of external governance actors (Aguilera, Desender, Bednar, & Lee, 2015). We first include the level of dedicated and transient institutional ownership. Dedicated and transient institutional investors differ from each other in terms of portfolio turnover, momentum trading, and portfolio diversification (Bushee, 1998, 2001). Dedicated (transient) institutions tend to have low (high) portfolio turnover, low (high) momentum trading, and low (high) portfolio diversification. As a result, dedicated institutions have stronger incentives to monitor portfolio firms than does transient institutional ownership. Dedicated (transient) institutional ownership is measured as the ratio of all the shares held by dedicated (transient) institutional investors to total shares outstanding. Data on institutional ownership are obtained from Thomson Reuters 13F.

Financial analysts play an external governance role (Wiersema & Zhang, 2011), and we include analyst coverage as a control, which is measured as the number of analysts covering a firm in a year. Data on analysts are obtained from Institutional Brokers' Estimate System. Rating agencies can exert an external governance effect (Aguilera et al., 2015). We control for the average rating for a firm's debt instruments in a given year, with 22 being the highest quality and 1 being the lowest. Data on credit rating are obtained from Compustat. Last, we control for news sentiment to capture the governance role of media. RavenPack uses a proprietary algorithm that ascribes a news sentiment score for each firm-related news article: The mean is zero (neutral), positive numbers reflect positive sentiment, and negative numbers reflect negative sentiment. We use the average tone of all the news about a firm that appears throughout a year to measure news sentiment annually.

Boards play an important internal governance role, and we control for board monitoring using an index. The first component is outside director ratio, which is measured as the percentage of outside directors on a board. The second component is CEO-appointed director ratio because directors appointed by CEOs are less likely to monitor CEOs (Coles, Daniel, & Naveen, 2014). We reverse code this variable so that a high level suggests a more effective board. The last component is CEO duality. This variable receives a value of 1 if a CEO is board chairman and 0 otherwise. We reverse code CEO duality as well. We standardize

outside director ratio and CEO-appointed director ratio and then add the three components to measure board monitoring.

We control for a number of CEO variables. First, we include CEO tenure as a control because CEOs with a long tenure can have high discretion in undertaking M&A decisions (Finkelstein, 1992). We control for CEO age in that it has been shown to influence firm M&A intensity (Yim, 2013). CEO gender is controlled for because female CEOs and male CEOs may exhibit different risk-taking propensity that can affect M&A intensity (Faccio, Marchica, & Mura, 2016). CEO gender receives a value of 1 if a CEO is male and 0 otherwise. We control for CEO option pay because high levels of option pay may incentivize CEOs to undertake a large number of M&As (Sanders, 2001; Sanders & Hambrick, 2007). CEO option pay ratio is measured as the ratio of the value of options granted in a year to total CEO compensation in that year. Finally, we control for year fixed effects to partial out the influence of overall market performance.

In testing the relationship between short interest and M&A announcement returns (Hypothesis 4), we include all the firm-level control variables, governance control variables, and CEO control variables. In addition, we include a number of deal-level control variables: related deals (coded as 1 if the target and acquirer belong to the same two-digit SIC code and 0 otherwise), tender offer (coded as 1 if a deal is a tender offer and 0 otherwise), public target firms (coded as 1 if target firms are public and 0 if target firms are private), cash payment (coded as 1 if a deal is paid entirely with cash and 0 otherwise), and relative size (measured as the ratio of transaction value to the acquirers' market value). In testing Hypothesis 5, we control for firm size, risky investment, sales growth rate, governance variables, and CEO variables. As we use a cross-sectional data set to test Hypotheses 4 and 5, we control for industry fixed effects using the three-digit SIC codes and year fixed effects.

Table 1 shows descriptive statistics for variables used to test Hypotheses 1 through 3, and Table 2 shows descriptive statistics for variables used to test Hypothesis 4.

## Empirical Models and Results

### *Testing Hypotheses 1 Through 3*

The dependent variable of Hypotheses 1 through 3 is a count variable: the number of M&As announced in a year. Poisson and negative binomial regressions are appropriate for estimating a count dependent variable (Long & Freese, 2014). Given that our dependent variable has the property of overdispersion, we choose negative binomial regressions to test our hypotheses. In such regressions, the dispersion parameter in a group (i.e., firm) can take on any value. To choose between fixed-effects and random-effects regressions, we conduct a Hausman test. The test result ( $\chi^2 = 3053, p < .001$ ) suggests that fixed-effects regressions are more appropriate. Because fixed-effects negative binomial regressions cannot control for the influence of time-invariant firm heterogeneity on our dependent variable, we also test our hypotheses by conducting fixed-effects Poisson regressions that can mitigate the influence of time-invariant firm heterogeneity on the number of M&As.

Table 3 presents the results used to test Hypotheses 1 through 3. Hypothesis 1 predicts that short interest in recent past is negatively associated with the number of M&As. In Model 1, we report results with all the control variables. Model 2 is used to test Hypothesis 1. In Model 2, the coefficient estimate of short interest is negative ( $b = -1.67, p = .001$ ), supporting



**Table 1**  
**Descriptive Statistics for Variables Used in Testing Hypotheses 1 to 3**

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
1. Number of M&As	0.35	0.73	—																											
2. Short interest	0.05	0.05	-0.11	—																										
3. Takeover contingency	0.81	0.40	0.00	-0.01	—																									
4. CEO stock ownership	0.02	0.04	-0.05	-0.09	-0.15	—																								
5. Short Interest × Takeover Contingency	0.04	0.05	-0.08	.81	.42	.03	—																							
6. Short Interest × CEO Stock Ownership	0.00	0.00	-0.07	.37	-0.11	.71	.23	—																						
7. Lendable share ratio	0.20	0.13	-0.03	.28	.02	.11	.23	.14	—																					
8. Risky investment	4.23	1.97	.07	-0.11	-0.01	-0.12	-0.10	-0.10	.02	—																				
9. Performance extremeness	0.28	0.29	-0.05	.13	.01	.05	.13	.05	-0.06	-0.09	—																			
10. Big loss	0.10	0.30	-0.05	.10	.01	.03	.09	.05	-0.05	-0.04	.35	—																		
11. Firm size	1.48	1.71	.08	-0.16	-0.07	-0.12	-0.17	-0.11	-0.01	.60	-0.14	-0.10	—																	
12. Firm performance	0.21	0.36	.03	-0.01	-0.02	-0.03	-0.02	-0.01	.03	.13	-0.09	-0.09	.21	—																
13. Market-to-book ratio	1.47	1.16	.03	.07	-0.05	.04	-0.03	.05	-0.06	.06	.08	-0.06	-0.10	.14	—															
14. Cash-holding ratio	0.38	0.57	.02	.06	-0.04	.02	.04	.03	-0.02	.02	.08	.02	-0.03	.21	.06	—														
15. Current ratio	2.01	1.84	-0.02	.11	-0.01	.07	.09	.06	.02	.02	.08	.04	-0.23	-0.10	.33	.07	—													
16. Acquisition experience	0.65	0.69	.34	-0.11	-0.01	-0.08	-0.10	-0.08	.01	.17	-0.06	-0.02	.17	.02	-0.05	-0.01	-0.07	—												
17. Industry takeover intensity	49.41	1.83	1.73	.12	-0.06	.03	-0.01	-0.04	-0.03	.00	-0.02	.02	.01	-0.28	-0.10	.16	.03	.11	.15	—										
18. Dedicated ownership	0.04	0.06	.01	-0.04	.03	-0.09	-0.03	-0.07	-0.23	.04	-0.03	-0.02	.06	.01	.03	-0.01	-0.01	.04	.02	—										
19. Transient ownership	0.15	0.11	.03	.18	.08	-0.04	.18	.03	.09	-0.03	.06	.00	-0.04	.03	.08	.05	.11	.04	.02	.14	—									
20. Analyst coverage	10.20	7.95	.14	-0.06	-0.01	-0.10	-0.06	-0.05	.11	.45	-0.12	-0.05	.41	.11	.13	.05	-0.11	.27	.11	.09	.14	—								
21. Credit rating	12.71	2.63	.14	-0.29	-0.08	-0.11	-0.28	-0.12	-0.09	.20	-0.22	-0.09	.28	.13	.00	.03	-0.22	.17	-0.03	.02	-0.16	.30	—							
22. News sentiment	49.41	1.52	.11	-0.09	-0.03	-0.03	-0.10	-0.05	.06	.10	-0.14	-0.15	.15	.20	.17	-0.03	-0.08	.08	.02	-0.05	.01	.12	.19	—						
23. Board monitoring	0.28	1.66	-0.02	.00	.12	-0.18	.07	-0.14	.19	-0.06	.00	.00	-0.09	-0.03	-0.09	.00	-0.03	-0.07	-0.06	-0.04	-0.04	-0.08	-0.04	—						
24. CEO age	55.60	7.51	-0.02	-0.08	-0.04	.14	-0.07	.06	.03	.03	-0.06	-0.03	.09	.01	-0.08	-0.04	-0.02	-0.02	.07	.00	-0.05	.01	.07	.01	-0.21	—				
25. CEO tenure	7.42	7.36	-0.01	-0.02	-0.13	.38	-0.03	.26	.02	-0.08	-0.02	.01	-0.07	-0.02	.05	-0.01	.09	.00	.03	-0.03	-0.02	-0.03	-0.04	.02	-0.43	.42	—			
26. CEO gender	0.97	0.17	.02	-0.02	.00	.02	-0.02	.00	-0.03	.01	-0.01	-0.01	-0.01	-0.02	.00	.00	.04	.01	.00	.01	.03	.02	-0.03	-0.04	.02	-0.43	.42	—		
27. CEO option pay	0.21	0.24	.06	-0.03	.05	-0.12	-0.03	-0.08	-0.22	.15	.01	.01	.09	.00	.18	.06	.14	.10	.11	.10	.11	.13	.06	.01	-0.11	-0.12	-0.08	.02	—	

Note:  $N = 21,168$ . M&As = mergers and acquisitions. Absolute value of correlations greater than .01 statistically significant at  $p < .05$  level.

**Table 2**  
**Descriptive Statistics for Variables Used in Testing Hypothesis 4**

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28				
1. CAR [-1, +1]	0.01	0.07	—																															
2. Short interest	0.04	0.05	.03	—																														
3. Lendable share ratio	0.22	0.12	.02	.24	—																													
4. Risky investment	4.74	2.26	-.04	-.18	-.14	—																												
5. Performance extremeness	0.25	0.26	.04	.14	-.01	-.12	—																											
6. Big loss	0.07	0.26	.04	.04	-.03	-.04	.38	—																										
7. Firm size	1.89	1.88	-.01	-.22	-.14	.72	-.16	-.09	—																									
8. Firm performance	0.23	0.30	.00	-.03	-.01	.20	-.07	-.04	.25	—																								
9. Cash-holding ratio	1.60	1.11	-.03	.08	-.07	.01	.13	.00	-.08	.06	—																							
10. Current ratio	0.38	0.59	-.01	.04	-.02	.12	.11	.01	.09	.35	.01	—																						
11. Market-to-book ratio	2.02	1.77	.01	.20	-.07	-.05	.09	.06	-.20	-.13	.28	.04	—																					
12. Acquisition experience	1.21	0.78	-.05	-.16	-.12	.25	-.10	-.04	.26	.08	-.02	.05	-.21	—																				
13. Industry takeover intensity	2.49	1.65	-.05	-.05	-.01	-.19	.01	.04	-.36	-.08	.13	.02	-.05	.16	—																			
14. Dedicated ownership	0.04	0.05	.00	-.04	-.03	-.02	-.06	-.06	-.02	-.02	.01	-.04	-.02	-.02	.04	—																		
15. Transient ownership	0.15	0.10	.03	.20	.33	-.15	.21	.03	-.15	-.03	.08	.04	.15	-.14	.00	.11	—																	
16. Analyst coverage	12.80	8.73	-.04	-.14	-.02	.49	-.08	-.04	.38	.10	.22	.06	-.09	.21	.13	.01	-.04	—																
17. Credit rating	13.48	3.09	-.04	-.36	-.13	.46	-.21	-.08	.52	.18	.04	.10	-.28	.35	.01	.00	-.24	.35	—															
18. News sentiment	49.81	1.20	.02	-.11	-.03	.06	-.04	-.07	.14	.13	.15	-.03	-.14	.13	.02	-.08	-.03	.12	.17	—														
19. Board monitoring	0.18	1.58	.03	-.02	.16	-.11	.01	.03	-.13	-.03	-.10	-.02	.00	-.12	-.03	.00	-.02	-.12	-.06	-.09	—													
20. CEO tenure	7.40	7.21	.00	.07	.04	-.06	-.01	-.01	-.02	-.04	.01	-.03	.03	.05	.03	-.02	-.06	-.05	-.01	.04	-.44	—												
21. CEO age	55.49	7.75	.00	-.09	.04	.05	-.09	-.03	.11	.02	-.11	-.03	-.06	.04	-.06	-.04	-.12	-.02	.11	.01	-.24	.46	—											
22. CEO gender	0.98	0.15	.01	-.01	-.03	.03	.00	-.01	.05	.00	-.08	.01	-.03	.03	.01	-.01	.00	.00	-.01	.02	-.05	.04	.03	—										
23. CEO option pay	0.23	0.26	-.03	-.04	-.14	.18	.03	.04	.12	-.01	.26	.06	.14	.09	.05	.07	.09	.17	.06	.02	-.17	-.05	-.08	-.01	—									
24. Unrelated deal	0.45	0.50	-.02	-.09	-.01	-.12	-.04	.00	-.03	.01	-.07	.02	-.11	.11	.01	-.01	-.05	-.01	.11	.03	.04	-.03	.04	.01	-.04	—								
25. Tender offer	0.04	0.20	-.01	-.02	.02	.09	-.01	-.02	.09	.03	.07	.02	.05	.01	.00	.00	.02	.07	.07	.00	-.03	.00	.02	.02	.05	.03	—							
26. Public target firm	0.30	0.46	-.01	-.07	-.06	.18	-.03	-.01	.15	.03	-.04	.02	-.02	.02	-.01	.01	-.01	.09	.12	-.03	-.05	.02	.02	.00	.06	-.06	.31	—						
27. Cash payment	0.44	0.50	.01	.01	.04	.07	-.01	.00	.09	.01	.08	.00	.09	.03	-.03	-.01	.01	.07	.01	.04	-.01	.01	-.01	.00	.07	-.02	.14	.11	—					
28. Relative size	0.10	0.20	.09	.06	.03	-.15	.07	.05	-.15	-.05	-.12	-.03	.07	-.18	-.05	.02	.07	-.15	-.24	-.09	.08	-.02	-.01	-.02	-.08	-.09	.06	.21	-.08	—				

Note:  $N = 6,710$ . CAR = cumulative abnormal return. Absolute value of correlations greater than .03 statistically significant at  $p < .05$  level.

**Table 3**  
**Short Interest and M&A Intensity**

Variable	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Short interest				-1.67	0.49	.001	-1.49	0.55	.006	-4.15	1.12	.000	-0.91	0.52	.079	-2.90	1.17	.013
Takeover contingency							0.00	0.05	.943	-0.12	0.07	.087				-0.09	0.07	.209
Short Interest × Takeover Contingency										3.13	1.13	.006				2.49	1.15	.030
CEO stock ownership							-0.46	0.78	.557				1.34	0.85	.113	1.67	0.97	.084
Short Interest × CEO Stock Ownership													-47.26	12.52	.000	-50.83	15.04	.001
Lendable share ratio	0.26	0.28	.353	0.48	0.29	.092	0.38	0.34	.256	0.40	0.34	.234	0.55	0.29	.055	0.49	0.34	.149
Risky investment	-0.02	0.02	.278	-0.02	0.02	.283	-0.04	0.02	.084	-0.04	0.02	.083	-0.03	0.02	.259	-0.04	0.02	.059
Performance extremeness	-0.19	0.06	.001	-0.19	0.06	.001	-0.16	0.07	.024	-0.16	0.07	.022	-0.20	0.06	.001	-0.17	0.07	.018
Big loss	-0.11	0.05	.047	-0.10	0.05	.060	-0.09	0.06	.124	-0.09	0.06	.114	-0.10	0.05	.073	-0.09	0.06	.127
Firm size	-0.06	0.05	.174	-0.07	0.05	.160	-0.10	0.06	.067	-0.11	0.06	.058	-0.07	0.05	.136	-0.11	0.06	.049
Firm performance	0.05	0.06	.403	0.05	0.06	.405	0.07	0.07	.307	0.06	0.07	.337	0.05	0.06	.380	0.06	0.07	.342
Market-to-book ratio	0.09	0.02	.000	0.09	0.02	.000	0.10	0.03	.000	0.10	0.03	.000	0.09	0.02	.000	0.10	0.03	.000
Cash-holding ratio	-0.03	0.04	.408	-0.03	0.04	.524	-0.07	0.05	.148	-0.07	0.05	.150	-0.03	0.04	.503	-0.07	0.05	.158
Current ratio	0.14	0.02	.000	0.14	0.02	.000	0.14	0.02	.000	0.14	0.02	.000	0.14	0.02	.000	0.14	0.02	.000
Acquisition experience	-0.21	0.03	.000	-0.21	0.03	.000	-0.24	0.03	.000	-0.24	0.03	.000	-0.21	0.03	.000	-0.24	0.03	.000
Industry takeover intensity	0.08	0.03	.001	0.08	0.03	.001	0.05	0.03	.057	0.05	0.03	.051	0.08	0.02	.001	0.05	0.03	.051

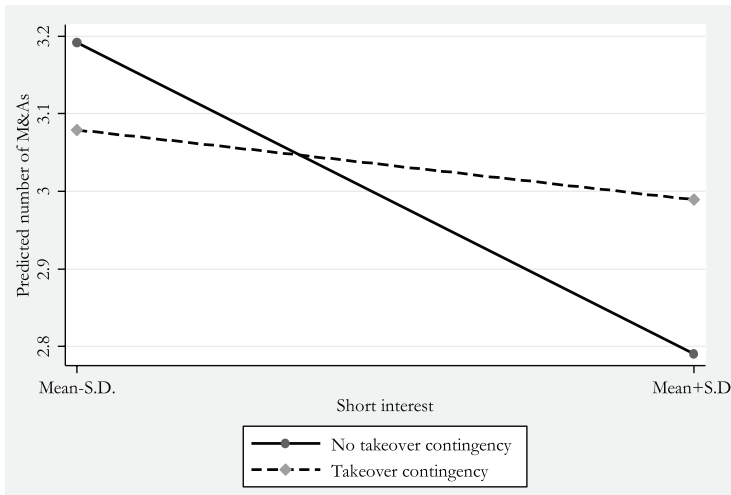
(continued)

**Table 3 (continued)**

Variable	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	b	SE	p	b	SE	p	b	SE	p	b	SE	p	b	SE	p	b	SE	p
Dedicated ownership	0.39	0.33	.235	0.44	0.33	.181	0.33	0.36	.354	0.36	0.36	.317	0.41	0.33	.210	0.33	0.36	.353
Transient ownership	0.72	0.22	.001	0.81	0.22	.000	0.35	0.25	.164	0.35	0.25	.167	0.80	0.22	.000	0.32	0.25	.204
Analyst coverage	0.01	0.00	.000	0.01	0.00	.000	0.00	0.00	.417	0.00	0.00	.374	0.01	0.00	.000	0.00	0.00	.339
Credit rating	0.06	0.02	.000	0.06	0.02	.001	0.07	0.02	.000	0.07	0.02	.000	0.06	0.02	.001	0.07	0.02	.000
News sentiment	0.07	0.01	.000	0.06	0.01	.000	0.06	0.01	.000	0.06	0.01	.000	0.06	0.01	.000	0.06	0.01	.000
Board monitoring	0.02	0.01	.166	0.02	0.01	.197	0.02	0.02	.175	0.02	0.02	.167	0.02	0.01	.202	0.02	0.02	.190
CEO age	0.00	0.00	.745	0.00	0.00	.725	0.00	0.00	.698	0.00	0.00	.737	0.00	0.00	.734	0.00	0.00	.751
CEO tenure	-0.00	0.00	.878	-0.00	0.00	.888	0.00	0.00	.386	0.00	0.00	.393	-0.00	0.00	.980	0.00	0.00	.393
CEO gender	-0.13	0.14	.354	-0.14	0.14	.320	-0.06	0.14	.687	-0.07	0.14	.641	-0.13	0.14	.325	-0.06	0.14	.666
CEO option pay	0.01	0.07	.857	0.02	0.07	.810	0.01	0.07	.859	0.01	0.07	.878	0.01	0.07	.906	0.00	0.07	.980
Constant	-2.08	0.77	.007	-1.79	0.78	.021	-0.89	1.01	.382	-0.80	1.00	.428	-1.61	0.78	.040	-0.62	1.03	.550
Observations	15,997			15,997			12,965			12,965			15,997			12,965		
Firm FE	Yes			Yes			Yes			Yes			Yes			Yes		
Year FE	Yes			Yes			Yes			Yes			Yes			Yes		
$\chi^2$	543.3			553			485.3			490.3			563			498.4		
Log-likelihood	-9788			-9782			-8184			-8180			-9773			-8173		

Note: Two-tailed tests. M&A = mergers and acquisitions; FE = fixed effects.

**Figure 1**  
**Moderating Effect of Takeover Contingency**



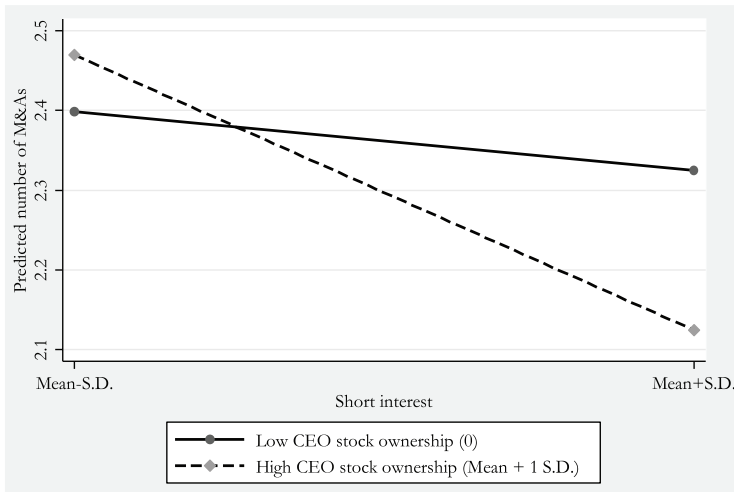
Hypothesis 1. In terms of economic magnitude, the number of M&As will decrease 7% when short interest increases from zero to its mean plus one standard deviation.

In Model 3, we introduce takeover contingency and CEO stock ownership as two control variables. The coefficient estimate of short interest is still negative ( $b = -1.49, p = .006$ ). Hypothesis 2 proposes that the presence of a takeover contingency attenuates the negative relationship between short interest in recent past and the number of M&As. In Model 4, the coefficient estimate of the interaction between short interest and takeover contingency is positive and statistically significant ( $b = 3.13, p = .006$ ). For firms having a takeover contingency, the number of M&As will decrease 3% when short interest increases from zero to its mean plus one standard deviation. For firms with no takeover contingency, however, the number of M&As will decline 13% for the same increase in short interest. As seen in Figure 1, there is a stronger negative relationship between short interest and number of M&As in the absence of a takeover contingency (the solid line) than in the presence of a takeover contingency (the dotted line).

The coefficients of interaction terms in nonlinear models do not always represent the true interactions (Ai & Norton, 2003; Hoetker, 2007; Wiersema & Bowen, 2009). Thus, we follow Wiersema and Bowen (2009) to examine the marginal effect of interacted variables. To do so, we consider the sign and statistical significance of short interest for different moderator values. We find that the marginal effect of short interest on the number of M&As is stronger when takeover contingency takes the value of 0 ( $b = -4.01, z = -3.62$ ) than when it takes the value of 1 ( $b = -0.90, z = -1.61$ ), consistent with Hypothesis 2.

Hypothesis 3 proposes that CEO stock ownership reinforces the negative relationship between short interest and the number of M&As. In Model 5, the coefficient estimate of Short Interest  $\times$  CEO Stock Ownership is negative ( $b = -47.26, p < .01$ ), consistent with Hypothesis 3. For CEOs with low ownership level (0%), the number of M&As decreases by

**Figure 2**  
**Moderating Effect of CEO Stock Ownership**



3% when short interest increases from zero to its mean plus one standard deviation. For CEOs with high stock ownership (mean plus one standard deviation), however, the number of M&As decreases by 13% for the same increase in short interest. Figure 2 shows a stronger negative relationship between short interest and the number of M&As in the presence of high CEO stock ownership (taking the value of mean plus one standard deviation; the dotted line) than in the presence of low CEO stock ownership (taking the value of zero; the solid line).

We find that the marginal effect of short interest on the number of M&As is stronger when CEO stock ownership takes mean plus one standard deviation ( $b = -3.45$ ,  $z = -4.73$ ) than when it takes the value of zero ( $b = -0.73$ ,  $z = -1.44$ ), supporting Hypothesis 3.

Model 6 reports regression results with all of the interaction terms. The coefficient estimates of both interaction terms are statistically significant in the hypothesized directions.

In unreported results using firm fixed-effects Poisson regressions, we find similar results to those from firm fixed-effects negative binomial regressions. Because firm fixed-effects negative binomial and Poisson regressions can include only firms with a time-variant dependent variable, firms that have not engaged in any M&A during our sample period were excluded from estimation. To check the robustness of our findings, we also test Hypotheses 1 through 3 using negative binomial regressions (with industry fixed effects rather than firm fixed effects) that allow us to include all the firms (regardless of whether a firm has engaged in an M&A during our sample period). In unreported results, we continue to find support for Hypothesis 1 and Hypothesis 3, but we fail to find support for Hypothesis 2.

In addition, we measure our dependent variable using the total transaction value of M&As (instead of using the number of M&As) in a given year. We take the natural logarithm of this variable given that it is highly skewed. Using this alternative dependent variable, we conduct firm fixed-effects ordinary least squares (OLS) regressions (allowing us to include firms that have never undertaken M&As during our sample period) and continue to find support for Hypothesis 1 and Hypothesis 3 but fail to find support for Hypothesis 2. The inconsistent



finding with respect to Hypothesis 2 from negative binomial regressions and using total transaction value as the alternative dependent variable implies that the inclusion of firms without any M&A during our sample period may affect our estimation. Furthermore, using the number of completed (rather than announced) M&As as the dependent variable, we continue to find support for Hypotheses 1 through 3 using firm fixed-effects negative binomial and Poisson regressions.

### *Testing Hypotheses 4 and 5*

The data used to test Hypothesis 4 is at the deal level. Similar to the approaches used in prior studies (Capron & Shen, 2007; Goranova et al., 2010; Haleblan & Finkelstein, 1999), we use pooled OLS regressions to test our Hypothesis 4 on the relationship between short interest and CARs. Given that around 80% of firms undertook multiple deals during our sample period, we cluster standard errors by firms to alleviate the estimation bias arising from nonindependent residuals of the same firm (Petersen, 2009).

Firms may not undertake M&A activity at random, and there can be unobservable heterogeneity that drives whether a firm undertakes an M&A in a given year as well as M&A performance. To mitigate potential selection bias, we utilize Heckman models (Certo, Busenbark, Woo, & Semadeni, 2016). In the first-stage probit regression, we include all the control variables used to predict the number of M&As plus industry fixed effects and year fixed effects. The exclusion restriction used in the first-stage probit regression is state M&A intensity, which is measured as the ratio of all the M&As by firms in a state (after excluding focal firms) to the total number of firms located in the same state. Research suggests that firm strategic decisions can be affected by geographic peers (Marquis & Battilana, 2009); however, state M&A intensity should not exert a direct influence on M&A performance. In unreported first-stage probit regression, we find that the coefficient estimate of state M&A intensity is positive ( $b = 0.24, p < .01$ ). On the basis of the first-stage probit regression, we calculate the inverse Mills ratio and control for it in the second-stage regressions.

Hypothesis 4 proposes that short interest in recent past is positively associated with stock market reactions to M&A announcements. In Model 1 (using a 3-day window of  $[-1, +1]$ ), the coefficient estimate of short interest is positive ( $b = 0.04, p = .033$ ), supporting Hypothesis 4. This indicates that CARs are 150% higher for firms with high short interest (mean plus one standard deviation) than for firms with no short interest. Model 2 of Table 4 presents results using a 2-day window of  $[0, +1]$ . The coefficient estimate of short interest is positive ( $b = 0.04, p = .044$ ), consistent with Hypothesis 4. In unreported results, we also use longer windows, such as  $[-2, +2]$ ,  $[-3, +3]$ , and  $[-4, +4]$ . We find that the coefficient estimate of short interest is positive but statistically not significant. This is probably because longer windows may capture other events that can potentially affect investor reactions as well.

Hypothesis 5 suggests that M&A activity will be associated with a higher operating performance given a recent history of high short interest versus low short interest. We use a sample of firm years associated with M&As to test Hypothesis 5. We cluster standard errors by firms to mitigate potential residual correlations and include the inverse Mills ratio as a control variable to address potential sample selection bias. Table 5 presents the OLS regression results used to test Hypothesis 5. We use different measures of performance change across the four models. The coefficient of Short Interest  $\times$  M&A Investment is positive and statistically significant across the four models, supporting Hypothesis 5.

**Table 4**  
**Short Interest and Market Reactions**

Variable	Model 1			Model 2		
	[-1, +1]			[0, +1]		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Short interest	0.04	0.02	.033	0.04	0.02	.044
Lendable share ratio	-0.01	0.01	.275	-0.01	0.01	.456
Risky investment	-0.00	0.00	.305	-0.00	0.00	.322
Performance extremeness	0.01	0.00	.092	0.01	0.00	.043
Big loss	0.01	0.01	.144	0.01	0.01	.158
Firm size	-0.00	0.00	.563	-0.00	0.00	.541
Firm performance	0.00	0.00	.927	-0.00	0.00	.888
Market-to-book ratio	-0.00	0.00	.032	-0.00	0.00	.095
Cash-holding ratio	-0.00	0.00	.554	-0.00	0.00	.454
Current ratio	-0.00	0.00	.350	-0.00	0.00	.200
Acquisition experience	-0.01	0.00	.012	-0.01	0.00	.022
Industry takeover intensity	0.00	0.00	.559	0.00	0.00	.643
Dedicated ownership	-0.01	0.02	.606	-0.01	0.02	.460
Transient ownership	0.02	0.02	.391	0.01	0.02	.483
Analyst coverage	-0.00	0.00	.175	-0.00	0.00	.142
Credit rating	0.00	0.00	.630	0.00	0.00	.692
News sentiment	-0.00	0.00	.828	-0.00	0.00	.923
Board monitoring	-0.00	0.00	.961	0.00	0.00	.975
CEO tenure	-0.00	0.00	.950	-0.00	0.00	.848
CEO age	0.00	0.00	.194	0.00	0.00	.452
CEO gender	-0.00	0.00	.834	0.00	0.00	.994
CEO option pay	0.00	0.00	.922	0.00	0.00	.756
Unrelated deal	-0.00	0.00	.397	-0.00	0.00	.537
Tender offer	-0.00	0.00	.555	-0.00	0.00	.664
Public target firm	-0.00	0.00	.467	-0.00	0.00	.443
Cash payment	0.00	0.00	.330	0.00	0.00	.534
Relative size	0.02	0.01	.118	0.02	0.01	.133
Inverse Mills ratio	-0.03	0.01	.027	-0.03	0.01	.054
Constant	0.05	0.08	.512	0.04	0.08	.582
Observations	6,710			6,710		
Industry FE	Yes			Yes		
Year FE	Yes			Yes		
Adjusted <i>R</i> <sup>2</sup>	.111			.116		

Note: Standard errors clustered by firms. FE = fixed effects. Two-tailed tests.

### Supplementary Analyses

*The risk-reduction effect or the disciplining effect.* Our findings so far suggest that firms refrain from undertaking M&As in the presence of a recent increase in short interest. This, however, could result from two possible effects. First, it is possible that the threat from short sellers may make executives risk averse and scale back from risky M&A decisions

**Table 5**  
**Operating Performance Change Around M&As**

Variable	Model 1			Model 2			Model 3			Model 4		
	ROA <sub>t+1</sub> - ROA <sub>t-1</sub>			ROA <sub>t+2</sub> - ROA <sub>t-1</sub>			ROE <sub>t+1</sub> - ROE <sub>t-1</sub>			ROE <sub>t+2</sub> - ROE <sub>t-1</sub>		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Short Interest × M&A Investment	0.20	0.04	.000	0.21	0.04	.000	0.45	0.13	.001	0.50	0.16	.001
Short interest	-0.18	0.03	.000	-0.19	0.04	.000	-0.27	0.13	.041	-0.36	0.15	.014
M&A investment	-0.06	0.01	.000	-0.05	0.01	.000	-0.13	0.02	.000	-0.12	0.03	.000
Lendable share ratio	-0.02	0.02	.346	-0.03	0.02	.124	-0.05	0.06	.363	-0.14	0.08	.079
Firm size	0.00	0.00	.035	0.00	0.00	.027	0.00	0.00	.242	0.01	0.01	.243
Risky investment	-0.00	0.00	.496	-0.00	0.00	.574	-0.00	0.00	.172	-0.01	0.00	.151
Sales growth	0.09	0.01	.000	0.07	0.01	.000	0.19	0.02	.000	0.17	0.03	.000
Dedicated ownership	0.03	0.02	.101	0.03	0.02	.246	0.20	0.08	.019	0.21	0.11	.066
Transient ownership	0.02	0.01	.241	0.02	0.02	.185	0.04	0.06	.551	-0.02	0.07	.765
Analyst coverage	-0.00	0.00	.416	-0.00	0.00	.414	0.00	0.00	.484	0.00	0.00	.303
Credit rating	-0.00	0.00	.000	-0.00	0.00	.002	-0.00	0.00	.185	-0.01	0.00	.091
News sentiment	0.00	0.00	.145	-0.00	0.00	.079	0.00	0.00	.844	-0.00	0.00	.215
Board monitoring	0.00	0.00	.470	0.00	0.00	.928	-0.00	0.00	.816	-0.00	0.00	.564
CEO age	0.00	0.00	.112	-0.00	0.00	.669	0.00	0.00	.106	0.00	0.00	.798
CEO tenure	-0.00	0.00	.053	-0.00	0.00	.007	-0.00	0.00	.009	-0.00	0.00	.004
CEO gender	-0.00	0.01	.895	0.00	0.01	.821	0.02	0.03	.417	0.03	0.04	.462
CEO option pay	-0.01	0.00	.111	-0.01	0.01	.100	0.01	0.02	.426	-0.01	0.02	.580
Inverse Mills ratio	-0.01	0.00	.001	-0.01	0.00	.088	-0.00	0.02	.977	0.01	0.02	.751
Constant	-0.12	0.04	.007	0.05	0.05	.331	-0.29	0.17	.088	0.10	0.21	.632
Observations	4,790			4,301			4,790			4,301		
Industry FE	Yes			Yes			Yes			Yes		
Year FE	Yes			Yes			Yes			Yes		
Adjusted <i>R</i> <sup>2</sup>	.188			.166			.0908			.107		

*Note:* Standard errors clustered by firms. M&A = mergers and acquisitions; ROA = return on assets; ROE = return on equity; FE = fixed effects. Two-tailed tests.

(i.e., risk-reduction effect). Alternatively, the presence and thus potential scrutiny of short sellers could make managers more diligent in selecting M&A activities to pursue (disciplining effect). To explore whether short sellers have a risk-reduction effect or a disciplining effect, we identify scenarios under which CEOs tend to pursue M&As for their own interests. Our logic is that if short sellers play a disciplining role, the negative influence of short interest on the number of M&As should be stronger when CEOs are more likely to engage in self-motivated behaviors.

Specifically, we identify two scenarios based on existing M&A research. The first scenario is related to whether a CEO has “lost” a CEO award to his or her competitor CEO. Shi, Zhang, and Hoskisson (2017) find that CEOs are more likely to undertake M&As to enhance their social recognition in the period subsequent to competitor CEOs’ winning prestigious CEO awards than in the period prior to competitor CEOs’ winning such awards. If this is the case, short sellers should play a stronger role in disciplining CEOs by constraining their

acquisitiveness in the post-award period than in the pre-award period. To test such an argument, we adopt the measure of post-award period used by Shi, Zhang, et al. As the sample of Shi, Zhang, et al. ends in 2010, we have a smaller sample size after matching the post-award period variable with our data. Post-award period receives a value of 1 for the 4 years subsequent to not winning the first CEO award (but competitor CEOs won such an award) and 0 for the 4 years prior to not winning the CEO award. In unreported results from firm fixed-effects negative binomial regressions, we find that the interaction between short interest and post-award period is negative ( $b = -2.91, p = .023$ ).

The second scenario pertains to CEO tenure. Walters, Kroll, and Wright (2007) find that longer-tenured CEOs are more likely to engage in value-destroying M&As in the absence of vigilant boards because such CEOs are more entrenched in their firms. Thus, we investigate the moderating effect of CEO tenure on the relationship between short interest and the number of M&As. We find that the interaction between short interest and CEO tenure is negative ( $b = -0.15, p = .008$ ). This indicates that the negative influence of short interest on the number of M&As is stronger among longer-tenured CEOs, also more consistent with the discipline effect. Overall, these results collectively imply that the negative effect of short sellers on managerial acquisitiveness may be driven by the role of short sellers in constraining managers from pursuing self-interest-motivated M&As (i.e., the disciplining effect).

*The likelihood of M&As as the dependent variable.* To check the robustness of our findings, we use the presence of M&As as an alternative dependent variable and implement firm fixed-effects logit regressions to test the first three hypotheses. This alternative receives a value of 1 if a firm undertook an M&A in a year and 0 otherwise. In unreported results, we find the coefficient of short interest is negative ( $b = -2.45, p < .01$ ). In addition, the coefficient of Short Interest  $\times$  Takeover Contingency is positive ( $b = 5.04, p = .002$ ) and the coefficient of Short Interest  $\times$  CEO Stock Ownership is negative ( $b = -62.06, p < .01$ ). This provides additional support for our findings.

*Propensity-score-weighted regressions.* To address potential endogeneity concerns associated with Hypotheses 1 through 3, we also use propensity-score-weighted regressions to test these hypotheses. To conduct such analyses, we first use a panel data set to conduct a probit regression to estimate a propensity score, that is, the probability of the firm's having a high level of short interest. The dependent variable of the probit regression is a short-interest dummy (based on the top quintile ranking). Following Karpoff and Lou (2010), we include market value, market-to-book ratio, institutional ownership, and stock turnover volatility as predictors. We also include exchange-traded fund (ETF) ownership as a predictor because ETFs are one of the main lenders to short sellers and are passive investors who almost certainly do not exert an influence on managerial decisions (because they generally just follow an index; M. Massa et al., 2015). We also include industry and year fixed effects. Based on the first-stage probit regression, we calculate propensity score  $\hat{\lambda}$ . In the second-stage negative binomial regressions, an observation receives a weight of  $\hat{\lambda} / (1 - \hat{\lambda})$  if short interest does not fall into the top quintile and 1 otherwise (Nichols, 2008). The propensity-score-weighted approach is akin to simulating what would occur if all firms had the same level of short interest, addressing the possibility that specific types of firms systematically have a higher level of short interest. In unreported results, we find support for Hypotheses 1 through 3 using propensity-score-weighted negative binomial regressions.

*Alternative independent variables.* We use three alternative measures to capture the threat from short sellers. First, we measure our independent variable using a dummy variable, short interest dummy. The rationale behind such a measure is that managers could pay attention to a salient level of short interest in the recent past. A firm year is considered to have high short interest if its short interest in a year falls in the top quintile and receives a value of 1 and 0 otherwise (Grullon et al., 2015). Second, we calculate a measure of abnormal short interest following Karpoff and Lou (2010). We regress short interest on firm market value, market-to-book ratio, annual stock returns, stock turnover volatility, institutional ownership ratio, and industry fixed effects and then use the residual from the regression as a predictor. Third, we measure our independent variable as the ratio of shorted shares to lendable shares. This measure takes short constraints into consideration. In unreported results, we find support for Hypothesis 1 using all these three different measures.

## Discussion

Our findings indicate that increasing short interest in recent past is negatively associated with the number of M&As, and the negative association between short interest in recent past and the number of M&As is moderated by takeover contingency and CEO equity ownership. Furthermore, when firms have a high level of short interest in their recent past, investors react to M&A announcements more positively, and the same level of M&A investment is associated with a higher change in operating performance. Our robustness analyses suggest that the negative influence of short interest on the number of M&As is stronger among CEOs who are more motivated to pursue M&As for their own interests. We expect our findings could have important implications for research and practice.

### *Research Implications*

Foremost, our study contributes to M&A research by highlighting the important role of short sellers in shaping a firm's acquisitiveness and M&A decision quality. How to prevent managers from engaging in excessive M&A activities has become a key concern for investors, given the profound performance implications of M&As. Monitoring by institutional investors and activist investors can lead firms to make high-quality M&A decisions (Ferreira et al., 2010; Gantchev et al., in press; Goranova et al., 2017). Our study extends this stream of research by showing that short sellers can constrain managers from pursuing excessive M&A activities through imposing a downward pressure on stock prices. Short-selling pressure in constraining agency behavior of managers differs from existing research on the governance of financial market participants. Unlike activist investors and institutional investors, short sellers can benefit only from declining stock prices and have irreconcilable interest conflicts with managers whose job safety and personal wealth are contingent on appreciating stock prices. As a result, managers may find it challenging to appease short sellers as opposed to activist investors and institutional investors.

Our empirical findings also indicate that the negative effect of short-selling pressure on M&A intensity is more salient when CEOs are not protected by takeover contingencies and have high equity ownership. Whether different governance mechanisms work as substitutes or complements has been a key topic in governance research (Misangyi & Acharya, 2014; Walsh & Seward, 1990). Most existing research has focused on substituting or complementary effects

between different internal governance mechanisms (e.g., board structures and managerial compensation decisions; Agrawal & Knoeber, 1996; Rediker & Seth, 1995). Misangyi and Acharya (2014) rely on qualitative comparative analysis to demonstrate that internal and external monitoring work in concert. Our findings not only indicate that there is complementarity between CEO stock ownership (internal governance) and short sellers but also demonstrate that two types of external disciplining mechanisms (short sellers and takeover contingencies as a proxy for protection against the market for corporate control) are complementary to each other.

### *Practical Implications*

From a practical perspective, our findings suggest that short sellers can also play a constructive role in the market. Regulatory discussion on the role of short selling has mostly focused on the ability of short sellers to find and disclose hidden information about the firm and thus reduce information asymmetry between management and investors. This research points to an added role. Short sellers can potentially serve an external governance role in constraining managers from undertaking excessive M&As, which can reflect managerial opportunism. We find that this role is even more salient when the CEO's job security and wealth are more sensitive to a firm's stock price. This potential governance role should be a factor as regulators across different markets debate on ways to regulate, restrict, or even ban short selling.

### *Limitations and Future Research*

Our study has some limitations that could provide avenues for future research. One key limitation is that we did not directly measure managerial perceptions of short sellers. Building on finance research, we argued that managers are aware of the level of short interest, given the significant influence of short sellers on stock prices. In particular, firms use a variety of methods to impede short selling, including legal threats, investigations, lawsuits, and various technical actions (Lamont, 2012), which indicates that managers are highly attentive to short-selling activities. Future research may obtain richer information about managerial perceptions of short sellers as hostile investors via primary data collection methods, such as interviews and surveys.

In addition, although we examine the interaction effect between short sellers and takeover protection/CEO equity ownership, the disciplining effect of short-selling pressure may hinge on monitoring by other governance actors. In unreported analyses, we examine the interaction between short interest and board governance, for example. Yet, we fail to find empirical support. This is probably because boards of directors cannot exert a direct influence on stock prices. Future research can investigate whether other governance actors that have a direct influence on stock prices (i.e., hedge fund activists) interact with short sellers to affect M&A decisions as well as other corporate-level strategies. Future research can investigate other moderators that help tease out these two effects.

## **Conclusion**

In this article, we have argued that the presence of short sellers can curb firm acquisitiveness and lead firms to make high-quality M&A decisions. We found that a recent history of high



short interest dissuaded managers from undertaking intensive M&As. In addition, because short sellers primarily affect managerial decision making through their (negative) effect on stock prices, CEOs would respond to the presence of short sellers in different ways depending on factors that affect their stock price sensitivity—especially takeover contingencies and CEO equity ownership. Furthermore, we found that a recent history of high short interest can affect M&A decision quality because the presence of short sellers can induce managers to conduct more in-depth due diligence of target firms to avoid short sellers' releasing negative information about M&As. Collectively, our findings attest to the important governance role of the short side of financial markets in constraining managerial agency behavior.

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## References

- Aggarwal, R., Erel, I., Ferreira, M., & Matos, P. 2011. Does governance travel around the world? Evidence from institutional investors. *Journal of Financial Economics*, 100: 154-181.
- Agrawal, A., & Knoeber, C. R. 1996. Firm performance and mechanisms to control agency problems between managers and shareholders. *Journal of Financial and Quantitative Analysis*, 31: 377-397.
- Aguilera, R., Desender, K., Bednar, M. K., & Lee, J. H. 2015. Connecting the dots: Bringing external corporate governance into the corporate governance puzzle. *Academy of Management Annals*, 9: 483-573.
- Ai, C. R., & Norton, E. C. 2003. Interaction terms in logit and probit models. *Economics Letters*, 80: 123-129.
- Amihud, Y., & Lev, B. 1981. Risk reduction as a managerial motive for conglomerate mergers. *Bell Journal of Economics*, 12: 605-617.
- Anderson, J. 2008. A new wave of vilifying short sellers. *New York Times*, April 30. Retrieved from <https://www.nytimes.com/2008/04/30/business/30shorts.html>
- Andriosopoulos, D., & Yang, S. 2015. The impact of institutional investors on mergers and acquisitions in the United Kingdom. *Journal of Banking & Finance*, 50: 547-561.
- Asquith, P., Mikhail, M. B., & Au, A. S. 2005. Information content of equity analyst reports. *Journal of Financial Economics*, 75: 245-282.
- Asquith, P., Pathak, P. A., & Ritter, J. R. 2005. Short interest, institutional ownership, and stock returns. *Journal of Financial Economics*, 78: 243-276.
- Avery, C., Chevalier, J. A., & Schaefer, S. 1998. Why do managers undertake acquisitions? An analysis of internal and external rewards for acquisitiveness. *Journal of Law, Economics, and Organization*, 14: 24-43.
- Baigorri, M. 2016. 2015 was best-ever year for M&A. *Bloomberg*, January 5. Retrieved from <https://www.bloomberg.com/news/articles/2016-01-05/2015-was-best-ever-year-for-m-a-this-year-looks-pretty-good-too>
- Bauguess, S. W., Moeller, S. B., Schlingemann, F. P., & Zutter, C. J. 2009. Ownership structure and target returns. *Journal of Corporate Finance*, 15: 48-65.
- Bebchuk, L. A. 2013. The myth that insulating boards serves long-term value essay. *Columbia Law Review*, 113: 1637-1694.
- Bebchuk, L. A., Cohen, A., & Ferrell, A. 2009. What matters in corporate governance? *Review of Financial Studies*, 22: 783-827.
- Bebchuk, L. A., Cohen, A., & Hirst, S. 2017. The agency problems of institutional investors. *Journal of Economic Perspectives*, 31: 89-102.
- Bebchuk, L. A., Cohen, A., & Wang, C. C. 2014. Golden parachutes and the wealth of shareholders. *Journal of Corporate Finance*, 25: 140-154.
- Bell, R. G., Filatotchev, I., & Aguilera, R. V. 2014. Corporate governance and investors' perceptions of foreign IPO value: An institutional perspective. *Academy of Management Journal*, 57: 301-320.
- Benoit, D. 2018. Bill Ackman surrenders in his five-year war against herbalife. *Wall Street Journal*, March 1. Retrieved from <https://www.wsj.com/articles/bill-ackman-surrenders-his-in-five-year-war-against-herbalife-1519854456>

- Bliss, R. T., & Rosen, R. J. 2001. CEO compensation and bank mergers. *Journal of Financial Economics*, 61: 107-138.
- Boehmer, E., Jennings, R., & Wei, L. 2007. Public disclosure and private decisions: Equity market execution quality and order routing. *Review of Financial Studies*, 20: 315-358.
- Boyson, N. M., Gantchev, N., & Shivdasani, A. 2017. Activism mergers. *Journal of Financial Economics*, 126: 54-73.
- Brickley, J. A. 2003. Empirical research on CEO turnover and firm-performance: A discussion. *Journal of Accounting and Economics*, 36: 227-233.
- Brown, S. J., & Warner, J. B. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics*, 14: 3-31.
- Bruton, G. D., Oviatt, B. M., & White, M. A. 1994. Performance of acquisitions of distressed firms. *Academy of Management Journal*, 37: 972-989.
- Buchholtz, A. K., & Ribbens, B. A. 1994. Role of chief executive officers in takeover resistance: Effects of CEO incentives and individual characteristics. *Academy of Management Journal*, 37: 554-579.
- Bushee, B. J. 1998. The influence of institutional investors on myopic R&D investment behavior. *Accounting Review*, 73: 305-333.
- Bushee, B. J. 2001. Do institutional investors prefer near-term earnings over long-run value? *Contemporary Accounting Research*, 18: 207-246.
- Capron, L., & Pistre, N. 2002. When do acquirers earn abnormal returns? *Strategic Management Journal*, 23: 781-794.
- Capron, L., & Shen, J. C. 2007. Acquisitions of private vs. public firms: Private information, target selection, and acquirer returns. *Strategic Management Journal*, 28: 891-911.
- Carper, W. B. 1990. Corporate acquisitions and shareholder wealth: A review and exploratory analysis. *Journal of Management*, 16: 807-823.
- Celarler, M. 2015. Valeant “short” smells smoke—even when there’s no fire. *New York Post*, October 27. Retrieved from <https://nypost.com/2015/10/27/valeant-short-smells-smoke-even-when-theres-no-fire/>
- Certo, S. T., Busenbark, J. R., Woo, H. s., & Semadeni, M. 2016. Sample selection bias and Heckman models in strategic management research. *Strategic Management Journal*, 37: 2639-2657.
- Certo, S. T., Daily, C. M., & Dalton, D. R. 2001. Signaling firm value through board structure: An investigation of initial public offerings. *Entrepreneurship Theory & Practice*, 26: 33-50.
- Chen, T., Harford, J., & Lin, C. 2015. Do analysts matter for governance? Evidence from natural experiments. *Journal of Financial Economics*, 115: 383-410.
- Christophe, S. E., Ferri, M. G., & Angel, J. J. 2004. Short-selling prior to earnings announcements. *Journal of Finance*, 59: 1845-1876.
- Christophe, S. E., Ferri, M. G., & Hsieh, J. 2010. Informed trading before analyst downgrades: Evidence from short sellers. *Journal of Financial Economics*, 95: 85-106.
- Cochran, P. L., Wood, R. A., & Jones, T. B. 1985. The composition of boards of directors and incidence of golden parachutes. *Academy of Management Journal*, 28: 664-671.
- Cohen, L., Diether, K. B., & Malloy, C. J. 2007. Supply and demand shifts in the shorting market. *Journal of Finance*, 62: 2061-2096.
- Coles, J. L., Daniel, N. D., & Naveen, L. 2014. Co-opted boards. *Review of Financial Studies*, 27: 1751-1796.
- Connelly, B., Shi, W., Hoskisson, R., & Koka, B. 2019. Shareholder influence on joint venture exploration. *Journal of Management*, 45: 3178-3203.
- Connelly, B. L., Shi, W., & Zyung, J. 2017. Managerial response to constitutional constraints on shareholder power. *Strategic Management Journal*, 38: 1499-1517.
- Cremers, K. J. M., & Sepe, S. M. 2018. Institutional investors, corporate governance, and firm value. *Seattle University Law Review*, 41: 387-418.
- Daines, R. M., & Koumrian, O. 2012. *Shareholder litigation involving mergers and acquisitions*. Cornerstone Research. Retrieved from <http://www.cornerstone.com/Publications/Reports/2012-Shareholder-Litigation-Involving-M-and-A>
- Dalton, D. R., Hitt, M. A., Certo, S. T., & Dalton, C. M. 2007. The fundamental agency problem and its mitigation: Independence, equity, and the market for corporate control. *Academy of Management Annals*, 1: 1-64.
- Danielson, M. G., & Karpoff, J. M. 2006. Do pills poison operating performance? *Journal of Corporate Finance*, 12: 536-559.

- David, P., Bloom, M., & Hillman, A. J. 2007. Investor activism, managerial responsiveness, and corporate social performance. *Strategic Management Journal*, 28: 91-100.
- De Angelis, D., Grullon, G., & Michenaud, S. 2017. The effects of short-selling threats on incentive contracts: Evidence from an experiment. *Review of Financial Studies*, 30: 1627-1659.
- Desai, H., Krishnamurthy, S., & Venkataraman, K. 2006. Do short sellers target firms with poor earnings quality? Evidence from earnings restatements. *Review of Accounting Studies*, 11: 71-90.
- DesJardine, M. R., & Durand, R. in press. Disentangling the effects of hedge fund activism on firm financial and social performance. *Strategic Management Journal*.
- DesJardine, M. R., & Shi, W. in press. CEO temporal focus and behavioral agency theory: Evidence from mergers and acquisitions. *Academy of Management Journal*.
- Devers, C. E., McNamara, G., Haleblan, J., & Yoder, M. E. 2013. Do they walk the talk? Gauging acquiring CEO and director confidence in the value creation potential of announced acquisitions. *Academy of Management Journal*, 56: 1679-1702.
- Diamond, D. W., & Verrecchia, R. E. 1987. Constraints on short-selling and asset price adjustment to private information. *Journal of Financial Economics*, 18: 277-311.
- Diether, K. B., Lee, K.-H., & Werner, I. M. 2009. Short-sale strategies and return predictability. *Review of Financial Studies*, 22: 575-607.
- Engelberg, J. E., Reed, A. V., & Ringgenberg, M. C. 2012. How are shorts informed? Short sellers, news, and information processing. *Journal of Financial Economics*, 105: 260-278.
- Faccio, M., Marchica, M.-T., & Mura, R. 2016. CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance*, 39: 193-209.
- Fang, V. W., Huang, A. H., & Karpoff, J. M. 2016. Short selling and earnings management: A controlled experiment. *Journal of Finance*, 71: 1251-1294.
- Ferreira, M. A., Massa, M., & Matos, P. 2010. Shareholders at the gate? Institutional investors and cross-border mergers and acquisitions. *Review of Financial Studies*, 23: 601-644.
- Fich, E. M., Harford, J., & Tran, A. L. 2015. Motivated monitors: The importance of institutional investors' portfolio weights. *Journal of Financial Economics*, 118: 21-48.
- Finkelstein, S. 1992. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, 35: 505-538.
- Finkelstein, S., & Haleblan, J. 2002. Understanding acquisition performance: The role of transfer effects. *Organization Science*, 13: 36-47.
- Gantchev, N., Sevilir, M., & Shivdasani, A. in press. Activism and empire building. *Journal of Financial Economics*.
- Goranova, M., Dharwadkar, R., & Brandes, P. 2010. Owners on both sides of the deal: Mergers and acquisitions and overlapping institutional ownership. *Strategic Management Journal*, 31: 1114-1135.
- Goranova, M. L., Priem, R. L., Ndofor, H. A., & Trahms, C. A. 2017. Is there a "dark side" to monitoring? Board and shareholder monitoring effects on M&A performance extremeness. *Strategic Management Journal*, 38: 2285-2297.
- Grant, C. 2016. CEO faces off with short seller in libel suit. *Wall Street Journal*, July 29. Retrieved from <https://www.wsj.com/articles/ceo-faces-off-with-short-seller-in-libel-suit-1469812949>
- Grullon, G., Michenaud, S., & Weston, J. P. 2015. The real effects of short-selling constraints. *Review of Financial Studies*, 28: 1737-1767.
- Haleblan, J., Devers, C. E., McNamara, G., Carpenter, M. A., & Davison, R. B. 2009. Taking stock of what we know about mergers and acquisitions: A review and research agenda. *Journal of Management*, 35: 469-502.
- Haleblan, J., & Finkelstein, S. 1999. The influence of organizational acquisition experience on acquisition performance: A behavioral learning perspective. *Administrative Science Quarterly*, 44: 29-56.
- Harford, J. 1999. Corporate cash reserves and acquisitions. *Journal of Finance*, 54: 1969-1997.
- Harford, J., Klasa, S., & Walcott, N. 2009. Do firms have leverage targets? Evidence from acquisitions. *Journal of Financial Economics*, 93: 1-14.
- Harford, J., & Li, K. 2007. Decoupling CEO wealth and firm performance: The case of acquiring CEOs. *Journal of Finance*, 62: 917-949.
- Hayward, M. L. A., & Hambrick, D. C. 1997. Explaining the premiums paid for large acquisitions: Evidence of CEO hubris. *Administrative Science Quarterly*, 42: 103-127.
- Hirschman, A. O. 1970. *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states*. Cambridge, MA: Harvard University Press.

- Hoetker, G. 2007. The use of logit and probit models in strategic management research: Critical issues. *Strategic Management Journal*, 28: 331-343.
- Hope, O.-K., Hu, D., & Zhao, W. 2017. Third-party consequences of short-selling threats: The case of auditor behavior. *Journal of Accounting and Economics*, 63: 479-498.
- Hoskisson, R. E., Chirico, F., Zyung, J., & Gambeta, E. 2017. Managerial risk taking: A multitheoretical review and future research agenda. *Journal of Management*, 43: 137-169.
- Hu, H. T., & Black, B. S. 2006. The new vote buying: Empty voting and hidden (morphable) ownership. *Southern California Law Review*, 79: 811-908.
- Humphery-Jenner, M., Sautner, Z., & Suchard, J.-A. 2017. Cross-border mergers and acquisitions: The role of private equity firms. *Strategic Management Journal*, 38: 1688-1700.
- Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76: 323-329.
- Jensen, M. C. 1993. The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance*, 48: 831-880.
- Jensen, M. C., & Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3: 305-360.
- Jensen, M. C., & Ruback, R. S. 1983. The market for corporate control: The scientific evidence. *Journal of Financial Economics*, 11: 5-50.
- Karpoff, J. M., & Lou, X. 2010. Short sellers and financial misconduct. *Journal of Finance*, 65: 1879-1913.
- Kim, E. H., & Singal, V. 1993. Mergers and market power: Evidence from the airline industry. *American Economic Review*, 83: 549-569.
- King, D. R., Dalton, D. R., Daily, C. M., & Covin, J. G. 2004. Meta-analyses of post-acquisition performance: Indications of unidentified moderators. *Strategic Management Journal*, 25: 187-200.
- Lamont, O. A. 2012. Go down fighting: Short sellers vs. firms. *Review of Asset Pricing Studies*, 2: 1-30.
- Lane, P. J., Cannella, A. A., & Lubatkin, M. H. 1998. Agency problems as antecedents to unrelated mergers and diversification: Amihud and Lev reconsidered. *Strategic Management Journal*, 19: 555-578.
- Long, J. S., & Freese, J. 2014. *Regression models for categorical dependent variables using Stata* (3rd ed.). College Station, TX: Stata Press.
- Malmendier, U., & Tate, G. 2008. Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics*, 89: 20-43.
- Marquis, C., & Battilana, J. 2009. Acting globally but thinking locally? The enduring influence of local communities on organizations. *Research in Organizational Behavior*, 29: 283-302.
- Massa, A. 2017. NYSE president calls short sellers "icky." *Bloomberg*, June 27. Retrieved from <https://www.bloomberg.com/news/articles/2017-06-27/short-sellers-icky-to-nyse-chief-seeking-better-disclosure>
- Massa, M., Qian, W., Xu, W., & Zhang, H. 2015. Competition of the informed: Does the presence of short sellers affect insider selling? *Journal of Financial Economics*, 118: 268-288.
- Masulis, R. W., Wang, C., & Xie, F. 2007. Corporate governance and acquirer returns. *Journal of Finance*, 62: 1851-1889.
- McNamara, G. M., Halebian, J., & Dykes, B. J. 2008. The performance implications of participating in an acquisition wave: Early mover advantages, bandwagon effects, and the moderating influence of industry characteristics and acquirer tactics. *Academy of Management Journal*, 51: 113-130.
- Misangyi, V. F., & Acharya, A. G. 2014. Substitutes or complements? A configurational examination of corporate governance mechanisms. *Academy of Management Journal*, 57: 1681-1705.
- Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. 2005. Wealth destruction on a massive scale? A study of acquiring-firm returns in the recent merger wave. *Journal of Finance*, 60: 757-782.
- Murphy, K. J. 1999. Executive compensation. In Ashenfelter, O., & Card, D. (Eds.), *Handbook of labor economics*, Vol. 3: 2485-2563.
- Nguyen, H. T., Yung, K., & Sun, Q. 2012. Motives for mergers and acquisitions: Ex-post market evidence from the US. *Journal of Business Finance & Accounting*, 39: 1357-1375.
- Nichols, A. 2008. Erratum and discussion of propensity-score reweighting. *Stata Journal*, 8: 532-539.
- Parrino, R., Sias, R. W., & Starks, L. T. 2003. Voting with their feet: Institutional ownership changes around forced CEO turnover. *Journal of Financial Economics*, 68: 3-46.
- Petersen, M. A. 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, 22: 435-480.

- Rediker, K. J., & Seth, A. 1995. Boards of directors and substitution effects of alternative governance mechanisms. *Strategic Management Journal*, 16: 85-99.
- Roll, R. 1986. The hubris hypothesis of corporate takeovers. *Journal of Business*, 59: 197-216.
- Sanders, W. G. 2001. Behavioral responses of CEOs to stock ownership and stock option pay. *Academy of Management Journal*, 44: 477-492.
- Sanders, W. G., & Boivie, S. 2004. Sorting things out: Valuation of new firms in uncertain markets. *Strategic Management Journal*, 25: 167-186.
- Sanders, W. G., & Hambrick, D. C. 2007. Swinging for the fences: The effects of CEO stock options on company risk taking and performance. *Academy of Management Journal*, 50: 1055-1078.
- Schijven, M., & Hitt, M. A. 2012. The vicarious wisdom of crowds: Toward a behavioral perspective on investor reactions to acquisition announcements. *Strategic Management Journal*, 33: 1247-1268.
- Schnatterly, K., & Johnson, S. G. 2014. Independent boards and the institutional investors that prefer them: Drivers of institutional investor heterogeneity in governance preferences. *Strategic Management Journal*, 35: 1552-1563.
- Seo, J., Gamache, D. L., Devers, C. E., & Carpenter, M. A. 2015. The role of CEO relative standing in acquisition behavior and CEO pay. *Strategic Management Journal*, 36: 1877-1894.
- Shi, W., Connelly, B. L., & Cirik, K. 2018. Short seller influence on firm growth: A threat-rigidity perspective. *Academy of Management Journal*, 61: 1892-1919.
- Shi, W., Connelly, B. L., & Hoskisson, R. E. 2017. External corporate governance and financial fraud: Cognitive evaluation theory insights on agency theory prescriptions. *Strategic Management Journal*, 38: 1268-1286.
- Shi, W., Connelly, B. L., Hoskisson, R., & Ketchen, D. in press. Portfolio spillover of institutional investor activism: An awareness-motivation-capability perspective. *Academy of Management Journal*.
- Shi, W., Hoskisson, R. E., & Zhang, Y. A. 2017. Independent director death and CEO acquisitiveness: Build an empire or pursue a quiet life? *Strategic Management Journal*, 38: 780-792.
- Shi, W., Zhang, Y., & Hoskisson, R. 2017. Ripple effects of CEO awards: Investigating the acquisition activities of superstar CEOs' competitors. *Strategic Management Journal*, 38: 2080-2102.
- Shleifer, A., & Vishny, R. W. 1989. Management entrenchment: The case of manager-specific investments. *Journal of Financial Economics*, 25: 123-139.
- Singh, H., & Harianto, F. 1989. Top management tenure, corporate-ownership structure and the magnitude of golden parachutes. *Strategic Management Journal*, 10: 143-156.
- Singh, H., & Montgomery, C. A. 1987. Corporate acquisition strategies and economic performance. *Strategic Management Journal*, 8: 377-386.
- Steinbach, A., Devers, C. E., McNamara, G., & Li, J. 2016. Peering into the executive mind: Expanding our understanding of the motives for acquisitions. In Finkelstein, S., & Cooper, C. L. (Eds.), *Advances in mergers and acquisitions*, Vol. 15: 145-160.
- Straska, M., & Waller, H. G. 2014. Antitakeover provisions and shareholder wealth: A survey of the literature. *Journal of Financial and Quantitative Analysis*, 49: 933-956.
- Surowiecki, J. 2002. Short and distort. *New Yorker*, August 12. Retrieved from <https://www.newyorker.com/magazine/2002/08/12/short-and-distort>
- Walsh, J. P., & Seward, J. K. 1990. On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review*, 15: 421-458.
- Walters, B. A., Kroll, M. J., & Wright, P. 2007. CEO tenure, boards of directors, and acquisition performance. *Journal of Business Research*, 60: 331-338.
- Wiersema, M. F., & Bowen, H. P. 2009. The use of limited dependent variable techniques in strategy research: Issues and methods. *Strategic Management Journal*, 30: 679-692.
- Wiersema, M. F., & Zhang, Y. 2011. CEO dismissal: The role of investment analysts. *Strategic Management Journal*, 32: 1161-1182.
- Yim, S. 2013. The acquisitiveness of youth: CEO age and acquisition behavior. *Journal of Financial Economics*, 108: 250-273.
- Zollo, M., & Meier, D. 2008. What is M&A performance? *Academy of Management Perspectives*, 22: 55-77.