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CEO DISMISSAL: THE ROLE OF INVESTMENT ANALYSTS

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While poor firm performance has been shown to be a predictor of CEO dismissal, little is known about the role of external constituents on the board's decision to dismiss the firm's CEO. In this study, we propose that investment analysts, as legitimate third-party evaluators of the firm and its leadership, provide certification as to the CEO's ability, or lack thereof, and thus help reduce the ambiguity associated with the board's evaluation of the CEO's efficacy. In addition, the board tends to respond to investment analysts because their stock recommendations influence investors, whom the board wants to appease. Using panel data on the S&P 500 companies for the 2000–2005 period, we find that negative analyst recommendations result in a higher probability of CEO dismissal. Copyright © 2011 John Wiley & Sons, Ltd.

INTRODUCTION

Recent research has shown that the frequency of chief executive officer (CEO) dismissal, in which a CEO involuntarily exits the firm, has increased significantly in recent years (Denis and Denis, 1995; Wiersema, 2002; Zhang, 2008).[1] In light of the visibility and publicity of CEO dismissal, as well as its organizational consequences, it is not surprising that the topic has drawn a lot of attention in the management and finance literature. This research establishes that poorly performing firms are more likely to experience involuntary CEO turnover (e.g., Coughlan and Schmidt, 1985; Denis and Kruse, 2000). However, poor financial performance alone cannot explain the increased willingness on the part of the board of directors to take such a drastic action as the dismissal of the firm's CEO.

Research has advanced our understanding of the firm performance—CEO dismissal linkage from the perspective of organizational power and politics. While poor firm performance is instrumental to CEO dismissal, the relative power of the CEO vis-à-vis the board of directors or other top management team members can serve to decouple this linkage (e.g., Boeker, 1992; Fredrickson, Hambrick, and Baumrin, 1988; Ocasio, 1994; Weisbach, 1988; Zhang, 2006). The corporate takeover market, on the other hand, can serve to reinforce the linkage between poor firm performance and CEO dismissal (Denis and Serrano, 1996; Martin and McConnell, 1991). Other researchers have argued that it is not poor firm performance *per se*, but rather deviation from expected performance that triggers CEO dismissal

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[1] Recent studies have provided evidence of CEO dismissal rates of 36 percent (Denis and Denis, 1995), 39 percent (Wiersema, 2002), and 47 percent for CEOs who left office within three years after succession (Zhang, 2008); significantly higher than rates of 13 percent in studies dating from the 1980s (Parrino, 1997).

(Puffer and Weintrop, 1991; Farrell and Whidbee, 2003).

The complex and somewhat ambiguous relationship between poor firm performance and CEO dismissal is in part due to the difficulty the board has in evaluating the performance and capabilities of the firm's CEO. As Holmstrom (1982) noted, firm performance is affected not only by management's decisions but also by organizational and environmental factors outside of managerial control. In addition to the difficulty in attributing firm performance to the CEO (versus other factors), the board must also evaluate the ability of the CEO to improve the firm's future performance. As a result of the uncertainty and complexity surrounding the board's evaluation of the CEO, we propose that visible and legitimate third parties, such as investment analysts, play a critical role in the board's decision to dismiss the firm's CEO by providing the board with an independent assessment of the CEO's past performance as well as his/her ability to positively impact the firm's future performance. Investment analysts are security specialists, typically employed by investment banks and brokerage firms, who analyze the performance and future prospects of a company by gathering and processing information about the firm from published reports as well as directly from management through quarterly earnings conference calls.[2] They share their expert opinions about a firm with the investment community through their research reports and recommendations of the firm's stock (strong buy, buy, hold, underperform, and sell).[3] Investment analysts are considered prominent information intermediaries in the financial markets (Jensen and Meckling, 1976) and their recommendations have significant impact on investors' decisions, and thus on the firm's stock price (e.g., Francis and Soffer, 1997; Frankel, Kothari, and Weber, 2006; Givoly and Lakonishok, 1979; Lys and Sohn, 1990).

In this study, we argue that investment analyst stock recommendations can affect a board's decision to dismiss the firm's CEO for two major reasons. First, as noted above, evaluation of a CEO's efficacy is surrounded by uncertainty. As prominent information intermediaries in the financial markets, investment analysts are legitimate social arbiters, recognized as qualified to assess the firm and its leadership (Wiesenfeld, Wurthmann, and Hambrick, 2008). Thus, their recommendations enable the board to reduce the complexity and uncertainty associated with assessing the efficacy of the CEO and, accordingly, influences the board's decision to dismiss the firm's CEO. Second, because investment analyst recommendations can affect decisions by investors, whom the board wants to appease, the board will tend to respond to investment analysts' recommendations even if their recommendations do not provide new information to the board. Specifically, we predict that negative or unfavorable recommendations by investment analysts will increase the probability of CEO dismissal.

Our theoretical framework is among the first to examine the role of external constituents, and more specifically investment analysts, in the board's decision to dismiss the firm's CEO. In addition, we examine how contextual factors may sway how boards perceive and respond to such recommendations. First, we propose that the firm's prior financial performance will influence the extent to which the board is likely to take note of and respond to analyst recommendations. The firm's financial performance thus plays an important moderating role in how the board responds. Second, the influence of analyst recommendations is likely to vary depending on the credibility of investment analysts as a professional community. Major litigation that questioned the independence of analyst recommendations occurred in 2002, which resulted in the adoption of new rules governing investment analysts by the Security and Exchange Commission (SEC). We argue that this litigation damaged the credibility of investment analysts as a professional community; thus analyst recommendations should have a weaker post-litigation impact on the probability of CEO dismissal. In examining these issues, this study focuses on CEO succession events from 2000–2005, a period in which concerns over shareholder wealth maximization and CEO accountability generated significant pressures

[2] The specific recommendation issued on a company's stock (strong buy, buy, hold, underperform, and sell) represents the overall evaluation by the analyst, based on analyzing the important factors in the firm's industry and economic environment and the firm's competitive position relative to its competitors. Thus, the recommendation issued by an investment analyst is based upon, and consistent with, the analysis presented in his/her report.

[3] Independent security analysts and firms all report their recommendations differently. This five point recommendation system is taken from the I/B/E/S system, which codes and compiles all of the recommendations into a universal system.

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and constraints on companies.[4] In addition, we focus on a set of large, widely held public firms that are covered extensively by investment analysts.

This study's focus on external constituents differs significantly from the internal focus (on firm performance and organizational power and politics) of prior CEO succession research, and extends our understanding of the antecedents of CEO dismissal. Moreover, our theory and findings also contribute to the emerging literature on the role of third-party certification in quality evaluation. While prior studies have focused on how certification from a credible third party can influence the perceived quality of a firm or an executive (Graffin and Ward, 2010; Pfarrer, Pollock, and Rindova, 2010; Wade *et al*., 2006), our study is the first to provide evidence of the certification role of investment analysts. We find that through their recommendations, investment analysts provide information that reduces the uncertainty faced by the board in assessing the quality or performance of the CEO based on the firm's past performance. In addition, their stock recommendations reflect an assessment of the firm's future prospects and thus provide information useful to the board in ascertaining a level of confidence in the abilities of the CEO to continue to lead the firm.

THEORY AND HYPOTHESIS DEVELOPMENT

Investment analysts and CEO dismissal

Financial economists have argued that, as prominent information intermediaries in the financial markets, investment analysts represent an important external control mechanism and can reduce the agency costs associated with the separation of ownership and control (Jensen and Meckling, 1976). Investment analysts collect, process, and disseminate valuable information about companies through their earnings forecasts and stock recommendations. Moreover, unlike firm-reported measures of financial performance, analyst recommendations provide independent and external assessments of the firm. As Jensen and Meckling (1976: 354) noted, investment analysts are one of the groups that possess comparative advantages in specialized monitoring activities.

Investment analysts, however, may not be as independent as expected: they are affected by their social context (Fogarty and Rogers, 2005). Research has shown that investment analysts exhibit 'herding' behavior[5] by following the consensus with regard to the recommendations they issue on a particular stock (Hong, Kubik, and Solomon, 2000; Hong and Kubik, 2003; Trueman, 1994). This is especially true when the consensus is optimistic (Welch, 2000). Research has also shown that investment analyst forecasts and stock recommendations tend to be optimistically biased (Brown, Foster, and Noreen, 1985; Chan *et al*., 2008; Chopra, 1988; Stickel, 1992). Analysts generally issue 'strong buy' and 'buy' recommendations and rarely recommend 'sell' (Michaely and Womack, 1999; Boni and Womack, 2002). This upward bias in analyst recommendations has been researched extensively and found to be the result of multiple causes. First, there is an inherent conflict of interest between the analysts who rate a company's stock and the motivation of their employers—for example, the brokerage houses and banks that have an underwriting relationship with the company (Dechow, Hutton, and Sloan, 2000; Lin and McNichols, 1998). Companies can exert pressure on the firms that underwrite their stock to provide more favorable analyst recommendations. Not surprisingly, analysts are more likely to issue positively biased recommendations and opinions on firms that are either clients or potential clients of their employer (Michaely and Womack, 1999; Hong and Kubik, 2003). In addition, studies of analysts' career paths have found that analysts who issue relatively more optimistic forecasts are more likely to be promoted and less likely to be demoted by their employers (Hong and Kubik, 2003). The career implications are even stronger for stock recommendations of companies underwritten by analysts' employers. As a result, the expected rate of return implied by the forecasts issued by analysts is upwardly biased (Easton and Sommers, 2007).

While investment analysts' independence remains debatable, prior research has clearly shown

[4] The majority of CEO turnover studies have relied on samples dating back to a much different corporate governance era, mainly the 1960s and 1970s. Since the 1990s, greater corporate accountability for shareholder wealth maximization has occurred due to increased pressure and clout from various financial community constituents.

[5] Herding can be defined as 'when individuals choose to ignore or downplay their private information and instead jump on the bandwagon by mimicking the actions of individuals who acted previously' (Graham, 1999: 239).

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that analysts are consequential to investors' decisions and, in addition, provide value to investors (Barber *et al*., 2001; Womack, 1996). Chen and Steiner (2000) found that analyst coverage (e.g., the number of investment analysts who follow a firm by providing research reports) increases the value of a firm to investors by reducing specific costs associated with assessing a firm's activities and financial performance. Chung and Jo (1996) found a significant positive relationship between analyst coverage and the firm's market value as measured by its Tobin's q. In fact, it has been shown that analyst initiation, whereby an analyst begins to provide coverage on a firm's stock, results in positive abnormal returns (Irvine, 2003). In this context, analysts serve to direct the attention of investors to those particular firms on which they provide coverage. To the extent that analysts' attention influences investor awareness, analysts can influence stock price even when they provide redundant or dated information (Merton, 1987). Moreover, investment analyst recommendations can influence demand for a firm's stock. When added to the 'buy' list, there is a positive impact on stock price; whereas removal from the 'buy' list or addition to the 'sell' list have been shown to have a significant negative impact on stock price (Stickel, 1992). The impact of being downgraded to a 'sell' has a much greater stock price effect than being upgraded to a 'buy' (Womack, 1996). A recent study (Barber, Lehavy, and Trueman, 2010) has also shown that analyst recommendations of a firm's stock, and changes in their recommendations, predict the firm's future unexpected earnings and the associated market reaction—suggesting that analyst recommendations do provide valuable new information to investors. Overall, the empirical evidence suggests that even though investment analysts may be influenced by their social context (Fogarty and Rogers, 2005), their stock recommendations are nonetheless consequential to investors' decisions.

In this study, we argue that because investment analysts are a legitimate third-party source of information, they should be instrumental in influencing a firm's board of directors' decision to dismiss the firm's CEO. Evaluation of a CEO's performance is difficult because it includes evaluating the causes of, and attribution of responsibility for, the firm's performance (Haleblian and Rajagopalan, 2006) as well as assessing the ability of the CEO to continue to lead the firm. All aspects of the board's evaluation of the CEO involve qualitative judgments, which by their nature represent decisions characterized by uncertainty (e.g., lack of complete information and future unpredictability). According to Wade *et al*. (2006: 645), when qualitative judgments need to be made 'under conditions of evaluative uncertainty,' certification of individual managers by credible and legitimate third parties is likely to become an influential decision criterion. Indeed, investment analysts 'possess prominent and legitimate platforms for rendering assessments of firms and the individuals associated with them' (Wiesenfeld *et al*., 2008: 234). Investment analysts provide the board with legitimate third-party certification that serves to reduce the uncertainty associated with assessing the quality of the CEO as it relates to past performance—for example, evaluative uncertainty. In addition, investment analysts serve to reduce the uncertainty the board faces in evaluating the future performance of the CEO—what has been termed 'performance standard uncertainty,' the 'uncertainty surrounding the standards or yardstick against which the actor's capabilities are to be judged in order for them to be considered acceptable' (Graffin and Ward, 2010: 331). Their recommendations, using a simple and straightforward scale (strong buy, buy, hold, underperforming, and sell), are visible signals that summarize their evaluation of the future earnings prospects of the firm and convey their assessment about the abilities of the CEO. As a result, investment analysts' recommendations serve as an important mechanism by which the board can lessen both evaluative and performance standard uncertainty in their assessment of the CEO's performance and future leadership, and thus have a substantial impact on the board's decision to dismiss the CEO.

In addition, the board is likely to pay attention to, and respond to, analyst recommendations because of the important role of investment analysts as information intermediaries in the financial markets, and the impact that their recommendations have on investor demand for the firm's stock. Due to the prominence and legitimacy of investment analysts' positions, their stock recommendations can alter how investors perceive the firm. Based upon prior research in this area, we know that analyst recommendations, especially if they provide a negative assessment, have a significant impact on the demand for the firm's stock and thus its price (Stickel, 1992; Womack, 1996),

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which provides evidence that investment analysts' stock recommendations can significantly alter how investors perceive the firm. Given that a public company is dependent upon the financial markets for access to capital, the board will want to maintain the support of the investment community and, thus, is likely to be aware of, and respond to, analyst recommendations when they are negative.

For these reasons, we expect that negative or unfavorable investment analyst stock recommendations may trigger the board to take action against the firm's CEO. Specifically, we propose that firms with a lower average analyst recommendation, a downgrade, or a higher percentage of sell recommendations will experience a greater probability of CEO dismissal. Although all three of these aspects of analyst recommendations convey information, they provide different types of information. Average analyst recommendation refers to the average recommendation across investment analysts for a specific firm's stock, with a lower average referring to a less favorable (or more negative) stock recommendation. A downgrade (e.g., from buy to hold) refers to a revision or change in the average analyst stock recommendation.

Finally, the percentage of sell recommendations reflects the percentage of analysts that 'negatively' (underperform or sell) rate the firm's stock. Investment analyst forecasts have been shown to be, on average, optimistically biased (Brown *et al*., 1985; Chopra, 1988; Sinha, Brown, and Das, 1997; Stickel, 1992). Analysts generally issue 'strong buy' and 'buy' recommendations and rarely recommend 'sell'[6] (Boni and Womack, 2006; Michaely and Womack, 1999). Since the firm's management represents one of the most important sources of information about the firm, analysts who issue negative ratings run the risk of having access to future information denied. Mayew (2008) found that investment analysts who issue favorable recommendations did indeed have more conference call participation in terms of the ability to have their questions asked and answered, than analysts with negative recommendations.[7] Westphal and Clement (2008) found supporting evidence that negative ratings can indeed prompt executives to engage in 'negative reciprocity or retaliation,' and that this may in turn deter other analysts from issuing negative ratings. With regard to the consequences of having access to information, Chen and Matsumoto (2006) found that management does indeed provide more information to analysts with more favorable recommendations and, furthermore, that this information resulted in relatively more accurate future forecasts on the part of the analyst (Bowen, Davis, and Matsumoto, 2002).[8] In addition to the importance of access to information, investment analysts also face pressure from their employers—investment banks—to render more positive ratings in order to secure investment clients for the firm. Given the disincentives for investment analysts to issue negative recommendations, as well as the relative infrequency of negative recommendations (Womack, 1996), the board is likely to pay particular attention to, and respond to, negative recommendations issued by investment analysts. By examining three dimensions of analyst stock recommendations, we can provide a more complete picture of how analyst recommendations affect the board's decision to dismiss the firm's CEO.

Hypothesis 1a: A lower average investment analyst recommendation for the company's stock will result in a greater probability that the CEO will be dismissed.
Hypothesis 1b: The greater the investment analyst downgrade for the company's stock, the greater the probability that the CEO will be dismissed.
Hypothesis 1c: The greater the percentage of investment analysts that issue a sell recommendation for the company's stock, the greater the probability that the CEO will be dismissed.

The moderating role of firm financial performance

Whether the board is likely to dismiss the firm's CEO in response to the stock recommendations of the investment analysts that follow the firm is dependent not only on the nature of the recommendations but also on the contextual environment in

[6] Eighty-six percent of all analyst recommendations recommend buying stock versus 14 percent who recommend selling stock (Womack, 1996).

[7] During quarterly earnings conference calls individual analysts can ask management questions. However, management has the discretion to field questions from analysts of their choosing.

[8] Chen and Matsumoto (2006) also found that this effect persisted after the SEC issued Regulation FD, which requires that firms make public all nonpublic information that is conveyed to investment analysts.

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which those recommendations occur. One important aspect of that contextual environment is the firm's prior financial performance, which with analyst stock recommendations represent different but complementary information regarding the assessment of the firm and its leadership. The firm's financial performance provides information regarding the past performance of the firm and its leadership. Research has consistently shown that poor prior performance increases the probability of CEO dismissal (Coughlan and Schmidt, 1985; Denis and Kruse, 2000; Ocasio, 1994). In comparison, analyst recommendations convey information on how investment analysts evaluate the future prospects of the firm and its leadership. The complementary information conveyed by the firm's prior financial performance and analyst stock recommendations is likely to be used jointly by the board in verifying their assessment about the firm and its leadership.

Specifically, the firm's prior financial performance may influence the degree to which the board is likely to take notice and pay heed to negative news conveyed by analyst stock recommendations. For example, for a company with unfavorable analyst stock recommendations but good financial performance, the board is likely to discount the negative news conveyed by analyst stock recommendations and thus be less likely to take action to dismiss the firm's CEO. In this case, the firm's unfavorable analyst stock recommendations diverge from the quality of its actual financial performance and, thus, the board may not necessarily see the need for a change in leadership.[9] Whereas, in a company with unfavorable analyst stock recommendations and poor financial performance, the information conveyed by analyst stock recommendations validates the firm's financial results and provides evidence that poor financial performance is likely to continue. Here, the board is likely to use the firm's financial performance as an important confirmation about the negative prospects conveyed in the analyst stock recommendations and thus is more likely to hold the CEO directly accountable, resulting in a greater probability of CEO dismissal.

Hypothesis 2a: The effect of lower average investment analyst recommendation for the company's stock on the probability of CEO dismissal is greater when the company's financial performance is low.

Hypothesis 2b: The effect of investment analyst downgrade for the company's stock on the probability of CEO dismissal is greater when the company's financial performance is low.

Hypothesis 2c: The effect of the percentage of investment analysts that recommend a sell recommendation for the company's stock on the probability of CEO dismissal is greater when the company's financial performance is low.

The impact of analyst recommendations: pre- versus post-litigation

Whether the board is likely to dismiss the firm's CEO in response to the stock recommendations of the investment analysts that follow the firm is also dependent on the credibility ascribed to investment analysts as a professional community. Investment analysts are viewed to be credible to the degree that they are perceived as providing an independent, accurate assessment of the firm's future prospects. During our time period of investigation (2000–2005), investment analysts and the banks for which they worked were subject to major litigation, which led the SEC to adopt new rules governing investment analysts. The litigation damaged the credibility of investment analysts as information intermediaries in the financial markets. This dramatic shift in the perceived independence and accuracy of analyst stock recommendations is likely to influence how boards interpret and respond to such recommendations.

As discussed earlier, there is an inherent conflict of interest between investment analysts and their employers' investment banking businesses (Dechow *et al*., 2000; Lin and McNichols, 1998). As a result of the inherent conflict of interest, the independence and accuracy of analyst stock recommendations can be compromised and analysts tend to issue positively biased recommendations on firms that are either clients or potential clients of their employer (Michaely and Womack, 1999; Hong and Kubik, 2003). The decade of the 1990s represented an era when overly optimistic recommendations by investment analysts were rampant, especially in the technology sector. The behavior of analysts became highly visible, in part because

[9] Analysts may issue an unfavorable stock rating when the firm's stock price is considered 'overpriced,' which may have no reflection on the actual financial performance of the firm.

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certain analysts (e.g., Blodget of Merrill Lynch) promoted dot-com stocks, which led to a significant run up in value. However, with the end of the tech boom and the substantial decline in Internet firm stock prices, an investigation into misleading analyst recommendations was initiated by New York State Attorney General Eliot Spitzer. In April of 2002, Mr. Spitzer pressed for 'significant structural change' on Wall Street in order to alleviate the potential conflict existing between the research and investment banking departments (McGeehan, 2002). By publicizing his accusations and providing proof with the release of internal emails from analysts on the stocks they followed, Mr. Spitzer was successful in getting a $100 million settlement from Merrill Lynch in May of 2002.[10] The settlement by Merrill Lynch motivated the SEC to start its own formal inquiry into stock analysts and the potential conflicts of interest. This investigation of analysts' practices was coordinated with the New York Stock Exchange (NYSE), National Association of Securities Dealers (NASD), and the North American Securities Administrators Association, and resulted in a $1.4 billion global research settlement with the largest U.S. investment banks (December, 2002); a requirement of analyst certification (February, 2003); and extensive changes in the NYSE and NASD rules governing investment analysts (July, 2003). The intent of these actions was to resolve the conflicts of interest that exist between investment analysts and their employers by placing prohibitions and restrictions on how investment banks manage their research and investment banking departments, and by imposing additional disclosure requirements on analysts.[11]

The litigation against investment analysts by Attorney General Spitzer, the SEC inquiry, and the penalties assessed against the 10 largest investment banks all served to undermine the credibility of analysts as external and independent experts. It became clear that some analysts and their employers had violated social and legal expectations of independence and thus were subject to legitimacy challenges (Deephouse and Carter, 2005). Because these events served to discredit the independence of analysts' forecasts and recommendations, analysts' credibility and trustworthiness suffered (Suchman, 1995).

Whether or not the board of directors will dismiss the CEO in response to unfavorable analyst stock recommendations should depend on the credibility ascribed to investment analysts. Because investment analysts' credibility was damaged by the litigation, their recommendations are less likely to provide certification as to the firm's CEO's efficacy or lack thereof. Thus, in the post-litigation era, analyst recommendations should play a weaker role in helping the board to make sense of the uncertainty surrounding the evaluation of the CEO's effectiveness. Moreover, investors' perceptions of analysts as credible and trustworthy also suffered and thus analyst recommendations should be less influential to investors' decisions. Thus, we propose that analyst stock recommendations will have less of an influence on the board's evaluation of the CEO. As a result, the effect of analyst recommendations that convey negative news (i.e., a lower average stock recommendation, a greater downgrade, and a higher percentage of sell recommendations) will be less likely to lead to CEO dismissal in the post-litigation period.

Hypothesis 3a: The effect of lower average investment analyst recommendation for the company's stock on the probability of CEO dismissal is less post-litigation.
Hypothesis 3b: The effect of investment analyst downgrade for the company's stock on the probability of CEO dismissal is less post-litigation.
Hypothesis 3c: The effect of the percentage of investment analysts that recommend a sell recommendation for the company's stock on the probability of CEO dismissal is less post-litigation.

METHODS

Sample

The sample for this study includes the public companies listed in Standard and Poor's 500 in the year 2000. The choice of sample was dictated by the need to identify firms that have widely traded stocks and are, thus, extensively monitored by the investment community. We tracked these firms over a six-year period—2000–2005—to ensure

[10] In internal communications, Merrill Lynch analysts were caught denigrating the companies they touted to investors (McGeehan, 2002).
[11] NASD and NYSE Rulemaking: Relating to Corporate Governance, SEC, 29 July 2003.

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a sufficient number of years to capture CEO dismissal events. Thus, our initial dataset consists of a panel of 500 companies over a six-year period (3000 firm-year observations). Further, because data on investment analyst stock recommendations were not available for some companies in some years, we dropped 270 firm-year observations. The final sample consists of 2,730 firm-year observations (429 companies in 2000, 444 in 2001, 450 in 2002, 460 in 2003, 469 in 2004, and 478 in 2005). A comparison of the observations included in our sample and the dropped firm-year observations indicate that there are no significant differences between the firms in terms of their size and the incidence of CEO dismissal.

Dependent variable

CEO dismissal

For each of the 500 companies in the initial dataset, we identified whether and when the firm experienced a CEO succession during the six-year period (2000–2005). The two sources used to identify CEO successions are the annual surveys conducted by Booz Allen and Hamilton on CEO successions and 'Who's News' listings in the *Wall Street Journal*, which lists items of interest with regard to executive appointments and replacements. We then verified each CEO succession event by confirmation of a company announcement appearing in the business press.

In assessing the nature of the CEO succession, many prior studies relied on the CEO's age at departure or on company announcements to ascertain whether the succession was voluntary or involuntary. This procedure can be problematic since a CEO's age is not a direct indicator of the nature of his/her departure. Furthermore, many companies will indicate that a CEO departed voluntarily in order to maintain the CEO's retirement and severance package, when in fact the departure was forced by the board. Instead, we utilized a very detailed investigative method to ascertain the exact nature of the CEO succession event and thus capture not only direct firings, but also resignations that are clearly forced by the board. We examined the nature of the CEO succession announcement issued by the company as well as news articles on the company up to one year prior to the CEO succession event to identify whether or not there were concerns over the CEO's performance that could lead to a forced departure. To summarize, we coded CEO successions as a dismissal only if a) the succession announcement itself indicated that the CEO's departure was forced; b) the news coverage leading up to the CEO succession event provided strong evidence that the board contemplated removing the CEO as a result of performance concerns; c) the CEO resigned effective immediately after a board meeting with no designated CEO replacement; or d) the CEO left abruptly with the board employing a search firm to identify a CEO replacement.[12] To confirm our coding of CEO succession events, we collected additional data for each company on the date that the CEO departure was announced to the public, the date that the new CEO was appointed, and the date that the new CEO took office. This procedure validated our coding by identifying that for firms with a CEO dismissal a substantial gap exists (three months, on average) between the date of the CEO's departure and the date announcing the appointment of the new CEO for the firm. For firms with a routine CEO succession, no such gap exists. Following this approach, within the 2,730 firm-year observations in our sample, we identified a total of 239 CEO successions, of which 69 are dismissals (29%). In our panel of firms, we coded the dependent variable as a '1' if the firm experiences a CEO dismissal in a given year. For firms with no CEO succession events or a routine CEO succession event in a given year, the dependent variable is coded as '0.'

Explanatory variables

Our study uses three measures of investment analyst stock recommendations: average analyst recommendation, change in average analyst recommendation, and percentage of sell recommendations. Each of the analyst measures was calculated from data gathered from the Institutional Brokers Estimate System I/B/E/S database. I/B/E/S uses a five-point recommendation scale, with a recommendation of 1 meaning 'strong buy,' 2 meaning 'buy,' 3 meaning 'hold,' 4 meaning 'underperform,' and 5 meaning 'sell.' Thus in the I/B/E/S's scale, higher scores mean lower recommendations. We used a six-month lag period for the analyst recommendation measures (months $t-6$ to $t-1$ for

[12] When the CEO resigned or left abruptly, we made sure that the CEO did not leave to pursue other opportunities.

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a firm with a CEO succession event in a given year and July 1 to December 31 of the prior year for a firm without a CEO succession event in a given year). To test the robustness of our results, we also examined a 12-month lag period for the analyst recommendation measures with highly consistent results, with the six-month lag period providing somewhat stronger results.

Average analyst recommendation

Average analyst recommendation is measured as the mean analyst recommendation for all investment analysts who cover a firm in the six-month period. To measure this variable, we first collected data on the mean analyst recommendation (of all analysts that cover a firm) for the firm for each of the six months from the I/B/E/S database. As noted earlier, on the I/B/E/S five-point scale, a higher score means a lower recommendation. To facilitate interpretation, we reverse coded the monthly mean recommendation by subtracting it from six so that a higher score means a higher recommendation. In addition, the number of investment analysts who cover a firm can vary over time (i.e., more analysts cover a firm in some months than in other months). To account for this issue, we calculated the weighted average of the monthly mean recommendation in the six-month period, which is weighted by the number of investment analysts who provide firm coverage for each month. Thus, average analyst recommendation is measured by a weighted average of the monthly mean recommendation. For our sample of firms, the average analyst recommendation ranges from 2.18 to 5, with a mean of 3.76.

Change in average analyst recommendation

Change in average analyst recommendation is measured as the difference between the average analyst recommendation in the six-month period immediately prior to the month in which CEO succession occurred ($t-1$ to $t-6$) and the average analyst recommendation in the six-month period seven months prior to the month in which CEO succession occurred ($t-7$ to $t-12$). Since we reverse coded the analyst recommendations so that a higher score means a higher recommendation, a negative value for change in average analyst recommendation indicates that there has been a downgrade in the average analyst recommendation. No change in the average analyst recommendation would be indicated by a zero, whereas a positive value would indicate an upgrade in the average analyst recommendation for the firm. For our sample of firms, the change in average analyst recommendation ranges from -2 to 1.5, with a mean of -0.04.

Percentage of sell recommendations

Percentage of sell recommendations is measured as the weighted average percentage of analyst recommendations in the six-month period that are rated either as underperform (4) or sell (5).[13] To measure this variable, we first collected data on the percentage of sell recommendations in each of the six months. To account for the variance in monthly analyst coverage, we weighted this measure by the number of analysts who provide firm coverage for each of the six months. For our sample of firms, the percentage of sell recommendations ranges from 0 to 0.66 with a mean of 0.05.

Firm financial performance

Firm performance is operationalized using both accounting and stock return measures of prior firm performance adjusted for industry differences. Industry adjusted return on assets (ROA) is measured as a firm's return on assets in the prior year minus the median firm ROA (excluding the focal firm) in the firm's core industry (two-digit Standard Industrial Classification [SIC] code) in the prior year (Huson, Malatesta, and Parrino, 2004). Data for this variable was gathered from COMPUSTAT. Industry-adjusted stock return is measured by the firm's total return to shareholders minus the median stock return (excluding the focal firm) of firms in the focal firm's core two-digit industry. The industry-adjusted stock return was measured for the same six-month period as that used to calculate the analyst recommendations measures. Data used to calculate this variable were gathered from the Center for Research in Security Prices.[14]

[13] In the I/B/E/S database, a firm's percentage of sell recommendations refers to the percentage of recommendations that are either underperform or sell.

[14] In supplementary analyses, we also used industry-adjusted Tobin's q as an alternative measure of prior firm financial performance. Tobin's q was calculated following the procedure suggested by Chung and Pruitt (1994) using data from COMPUSTAT.

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Pre- and lost-litigation

In the theory section, we propose that the impact of negative analyst recommendations on CEO dismissal will be less post-litigation than pre-litigation. We use the imposition of a $100 million fine on Merrill Lynch in May of 2002 as the point in time that captures the shift in investment analyst credibility in the financial community since this event precipitated the SEC to initiate a formal inquiry into 10 other investment banks and led to approved rule changes filed by the NYSE and NASD governing research analyst conflicts of interest.[15] In order to examine the effect of analyst recommendation on CEO dismissal in the pre- versus post-litigation periods, we created two variables for each of our analyst recommendation measures. The pre-litigation analyst measure captures the value of the specific analyst measure for the years 2000–2002 and has a value of '0' otherwise. The post-litigation analyst measure captures the value of the specific analyst measure for the years 2003–2005 and has a value of '0' otherwise.

Control variables

Firm size

We controlled for firm size since larger firms, by virtue of their more extensive shareholdings, will be more closely scrutinized by the financial community. Firm size is measured as the log of the firm's market capitalization at the end of the prior year, gathered from COMPUSTAT.

CEO stock ownership

We controlled for the stock ownership of the firm's CEO since CEO ownership affects CEO power and, thus, has been found to be negatively related to the probability of CEO dismissal (Huson, Parrino, and Starks, 2001). CEO ownership may also be used as a signal by external investors to judge a CEO's credibility (Zhang and Wiersema, 2009). CEO stock ownership was measured as the percentage of shares held by the CEO in a given year.

CEO tenure

We also controlled for CEO tenure since previous studies have found that the probability of CEO turnover/dismissal as well as a CEO's impact on organizational outcomes varies across CEO tenure (Ocasio, 1994; Zhang and Rajagopalan, 2010). CEO tenure was measured by counting the years that the CEO held the position.

CEO duality

The combination or separation of the CEO position and the board chairman position is an important governance variable. A CEO who is also the board chairman tends to have greater power and, thus, this may reduce the probability of CEO dismissal. CEO duality was coded as '1' if the CEO and the board chairman positions are combined and a '0' otherwise.

Board size

We also controlled for board size, referring to the total number of directors on the board (Zajac and Westphal, 1996).

Percentage of outside directors

We also controlled for percentage of outside directors, referring to the proportion of outside directors on the board, as gathered from the RiskMetrics database.

Analyst coverage

We controlled for the number of analysts who follow a firm (e.g., provide research coverage) since more extensive investment analyst coverage is likely to lead to greater investor scrutiny. Because the number of investment analysts who cover a company can vary over time, analyst coverage is measured by the average number of investment analysts who provide recommendations for the firm in the six-month period as reported in the I/B/E/S database.

Analyst consensus

We controlled for the variation across analyst recommendations of a firm since greater variation is likely to lead to a lessened response on the part

[15] On 30 July 2002, President George W. Bush signed into law the Sarbanes-Oxley Act of 2002, which requires, among other things, that the SEC adopt rules governing analyst conflicts.

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Table 1. Descriptive statistics and correlations[ab]

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. CEO dismissal	0.03	0.16	—													
2. Firm size	9.13	1.14	0.04	—												
3. Prior industry- adjusted stock return	0.02	0.27	−0.08	0.00	—											
4. Industry-adjusted ROA	−0.01	0.09	−0.04	0.16	0.10	—										
5. Industry-adjusted stock return	0.02	0.28	−0.08	0.00	0.12	−0.02	—									
6. CEO stock ownership	0.02	0.06	−0.03	−0.04	0.04	0.02	0.02	—								
7. CEO tenure	9.65	8.33	−0.02	0.04	0.01	0.06	−0.04	0.28	—							
8. CEO duality	0.74	0.44	0.01	0.03	−0.03	−0.03	−0.03	0.06	0.26	—						
9. Board size	10.93	3.04	0.07	0.34	−0.10	0.04	−0.10	−0.12	0.05	0.01	—					
10. Percentage of outside directors	0.68	0.17	0.01	0.05	−0.03	−0.01	−0.04	−0.22	−0.18	0.19	0.07	—				
11. Analyst coverage	16.17	6.70	0.03	0.53	−0.06	−0.04	−0.07	−0.03	0.10	−0.05	0.10	0.01	—			
12. Analyst consensus	−0.80	0.17	0.00	−0.05	0.05	0.04	0.07	0.03	0.00	0.04	0.00	−0.09	−0.13	—		
13. Average analyst recommendation	3.76	0.45	−0.10	0.16	0.13	0.14	0.09	0.07	0.05	−0.02	−0.05	−0.22	0.06	0.22	—	
14. Change in average analyst recommendation	−0.04	0.23	−0.08	0.09	0.20	0.09	0.17	0.03	0.04	0.04	0.01	0.01	−0.03	0.01	0.27	—
15. Percentage of sell recommendations	0.05	0.09	0.09	−0.12	−0.07	−0.17	−0.04	−0.04	−0.04	−0.01	−0.01	0.13	−0.02	−0.39	−0.70	−0.21

N=2,730 firm years.

[a] Year dummies are omitted.

[b] Correlations larger than 0.04 are significant at the level of $p < 0.05$ and those larger than 0.05 are significant at the level of $p < 0.01$.

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of the board. This measure was calculated as the standard deviation of analyst recommendations for a firm in the six-month period. This measure was multiplied by −1 to be consistent with the meaning of analyst consensus. Further, to account for the variance in monthly analyst coverage, we weight this measure by the number of analysts who provide firm coverage for each of the six months.

Time

We added five year dummy variables for the years 2001, 2002, 2003, 2004, and 2005, using 2000 as the omitted year.

Analysis

Table 1 presents descriptive statistics and correlations for the full dataset we use in our analysis. In this study, we examine how investment analyst stock recommendations (i.e., average analyst recommendation, change in average analyst recommendation, and percentage of sell recommendations) may affect the probability of CEO dismissal. However, a major concern with such an empirical examination is the potential endogeneity between analyst recommendations of a company's stock with other factors that may also influence the probability of CEO dismissal. In particular, analyst recommendations of a firm's stock may be influenced by the firm's prior performance, which has been shown to influence the probability of CEO dismissal (Shen and Cannella, 2002; Zhang, 2006). Thus, it is important to identify whether or not analyst stock recommendations have an independent effect above and beyond that of prior firm performance on the probability of CEO dismissal. To address the issue, we follow the approach utilized by Yu (2008) and create a proxy for each of the analyst recommendations measures that is uncorrelated with the firm's financial performance as follows. First, we estimate the following model for each of the analyst recommendations measures:

$$\begin{aligned}\text{Analyst recommendation(average recommendation, change in average recommendation, percentage of sell recommendations)} &= \text{firm size} + \text{industry-adjusted ROA} + \text{prior industry-adjusted stock return} \\ &\quad + \text{time(year dummies)}. \qquad (1)\end{aligned}$$

This model estimates the firm's analyst recommendations based on its prior year industry-adjusted ROA and the previous period industry-adjusted stock return as well as firm size and time period. To account for the possibility that the firm's analyst recommendations in the period immediately before CEO dismissal ($t-1$ to $t-6$) may be influenced by the firm's prior financial performance, we include both the firm's industry-adjusted ROA in the prior year and the firm's stock return in the six-month period prior to the period used to measure the analyst recommendations ($t-7$ to $t-12$).[16]

Table 2 reports the results from these regressions. Average analyst recommendation and change in average analyst recommendation are positively related to firm size, prior industry-adjusted stock return, and industry-adjusted ROA. Percentage of sell recommendations is negatively related to firm size and industry-adjusted ROA. We use the residuals from these models as proxies for the analyst recommendation measures to test our hypotheses. The residuals can be considered as a component of the firm's analyst recommendations that is uncorrelated with firm size, time period, and the firm's prior financial performance (Yu, 2008). This approach removes potential endogeneity between the firm's analyst recommendations and its prior reported financial performance and stock return.

Limited dependent variable

The dependent variable of this study—CEO dismissal—is dichotomous where CEO dismissal is coded as '1' and all other potential outcomes are coded as '0' (i.e., routine CEO succession or no CEO succession). The appropriate statistical technique when using a binary dependent variable is logit regression, which will lead to consistent and unbiased coefficient estimates (Greene, 2004).

We estimate our model in a pooled cross-sectional data sample that includes 2,730 firm-year

[16] For a firm without a CEO succession event in a given year, this refers to the firm's stock return in the six-month period from 1 January to 30 June of the prior year).

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Table 2. Regressions that generate residuals to be used as proxies for investment analyst measures[a]

Variables	Dependent variables		
	Average analyst recommendation	Change in average analyst recommendation	Percentage of sell recommendations
Constant	2.84***	−0.06*	15.51***
	(0.11)	(0.03)	(1.81)
Firm size	0.13***	0.01***	−1.60***
	(0.01)	(0.003)	(0.20)
Prior industry-adjusted stock return	0.09***	0.12***	−0.49
	(0.02)	(0.02)	(0.37)
Industry-adjusted ROA	0.36***	0.09*	−10.11***
	(0.09)	(0.04)	(2.36)
Year 2001	0.03	−0.07***	0.11
	(0.02)	(0.01)	(0.13)
Year 2002	−0.10***	−0.10***	0.43*
	(0.02)	(0.01)	(0.18)
Year 2003	−0.37***	−0.25***	5.97***
	(0.02)	(0.01)	(0.39)
Year 2004	−0.57***	−0.04***	9.37***
	(0.02)	(0.01)	(0.55)
Year 2005	−0.53***	−0.04***	7.94***
	(0.02)	(0.01)	(0.52)
R-square	0.31	0.18	0.23
Wald chi-square	984.26***	451.07***	387.75***

$n = 2730$ firm-years.
$^{\dagger}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$ (two-tailed tests).
[a] Robust standard errors are reported in parentheses.

observations. In a pooled cross-sectional sample like ours, unobserved heterogeneity is a potential problem because each firm contributes multiple observations that are not independent from each other (Petersen and Koput, 1991). A common approach to addressing this issue is to insert additional firm-specific error terms that are either fixed over time for each firm (fixed-effects models), or vary randomly over time for each firm (random-effects models) (Sayrs, 1989). A fixed-effects model requires variance in both the dependent and independent variables to assure that these variables are distinguishable from the fixed effects (Judge *et al*., 1985). In our sample, many firms did not have CEO dismissals during the study period and thus the value of the dependent variable—CEO dismissal—does not change over time for these firms. If a fixed-effects model was used, all firms that did not have CEO dismissals in the study period would be dropped from the data analyses, leading to biased estimation. For this reason, we elect to use a random-effects logit model to test our hypotheses.

We use the Hausman test to evaluate whether the choice of a random-effects model is appropriate for our data (Greene, 2008). The key difference between a fixed-effects and a random-effects model is that the random-effects model assumes that the unobserved firm heterogeneity (e.g., individual effects) is not correlated with the observed explanatory variables in the model. In all three of our models, the Hausman test was not rejected (not significant), which suggests that the unobserved individual effects are uncorrelated with the observed explanatory variables. Therefore, the choice of a random-effects model is appropriate.

In logit, model estimates are derived using the method of maximum likelihood estimation (MLE). Analysis of the results from MLE focuses on the significance of each estimated coefficient, and on the overall significance of the model as judged by a chi-square statistic derived from the ratio of the log-likelihoods of two models: one that includes all explanatory variables (full model) and one that includes only a constant term (the partial model). Goodness of fit of the logit model is assessed using

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pseudo R-square as suggested by recent work on the use of limited dependent variable techniques in management research (Bowen and Wiersema, 2004; Hoetker, 2007).

RESULTS

Using the residuals from our estimation of the analyst recommendation measures (see Table 2) as proxies for analyst recommendations, we estimate the effect of analyst recommendations on the probability of CEO dismissal using a random-effects logit model. The estimated coefficients are reported in Table 3.[17] Model 1 in Table 3 provides the base model of control variables only. CEO dismissal is negatively related to industry-adjusted ROA and industry-adjusted stock return, as expected and positively related to board size.

We utilize separate models (Models 2, 3, and 4) for each of the three analyst measures: average analyst recommendation, change in average analyst recommendation, and percentage of sell recommendations. The chi-square statistic indicates strong significance ($p < 0.001$) for each model. The goodness of fit for each of the models can be assessed through the McFadden pseudo R-square measure, which in our models ranges from 0.174 to 0.214. Our models thus have good predictive ability for CEO dismissal.

As shown in Model 2a, the coefficient for average analyst recommendation is negative and significant ($b = -1.69$, $p < 0.001$). It should be noted that in limited dependent variable models like ours, 'an explanatory variable's *marginal effect*— the effect of a unit change in an explanatory variable on the dependent variable—does not equal the variable's model coefficient' (Wiersema and Bowen, 2009: 681–682, emphasis in original). As a result, to test our hypotheses we also need to examine the direction and significance of the marginal effect of average analyst recommendation on the probability of CEO dismissal over all values of the model variables. We conduct this supplementary analysis and find, as expected, that the value of the marginal effect are negative and significant with the marginal effect computed at the mean value of all variables to be -0.021 ($p < 0.001$). Therefore, Hypothesis 1a, which proposes that the lower the average analyst recommendations for the company's stock, the greater the probability that the CEO will be dismissed, is supported.

As shown in Model 3a, the coefficient for change in average analyst recommendation ($b = -1.24$, $p < 0.05$) is negative and significant. We also run a supplementary analysis to examine the direction and statistical significance of the marginal effect of change in average analyst recommendation on the probability of CEO dismissal over all values of the model variables and find, as expected, that the value of the marginal effect is negative and significant, with the marginal effect computed at the mean value of all variables to be -0.018 ($p < 0.05$). Thus, Hypothesis 1b, which proposes that the greater the analyst downgrade for the company's stock, the greater the probability that the CEO will be dismissed, is supported.

As shown in Model 4a, the coefficient for the percentage of sell recommendations ($b = 4.83$, $p < 0.001$) is positive and significant. Supplementary analysis examining the direction and statistical significance of the marginal effect of percentage of sell recommendations on the probability of CEO dismissal are positive and significant, with the marginal effect computed at the mean value of all variables to be 0.068 ($p < 0.001$). These results support Hypothesis1c, which proposes that the greater the percentage of analysts that issue a sell recommendation for the company's stock, the greater the probability that the CEO will be dismissed, is also supported.

In addition to the analysis reported in Table 3, we also examine whether changes (e.g., upgrades or downgrades) in analyst recommendations on the probability of CEO dismissal is conditional on the initial analyst stock recommendation. This extensive analysis examines different categories of changes in analyst recommendations (depending on the initial average recommendation and whether the change involved an upgrade or downgrade). We find that ffor firms initially rated as a buy or strong buy, a downgrade has a significant impact. For firms already rated as relatively unfavorable (e.g., hold), further downgrades are not significant. While for upgrades, there is no significant effect regardless of the initial average analyst recommendation. This analysis indicates that an upgrade does not materially reduce the

[17] In our analyses, we added industry dummy variables for the 58 two-digit SIC industries that represent the primary industry in which the companies in our sample competed. None of the industry dummy variables was significant, so we dropped them from our final models.

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Table 3. Logistic regression results for the probability of CEO dismissal[abc]

Variables	Model 1	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
		Average analyst recommendation		Change in average analyst recommendation		Percentage of sell recommendations	
Constant	−5.70***	−5.22***	−5.16***	−5.86***	−6.10***	−4.94***	−4.89***
	(1.32)	(1.32)	(1.33)	(1.33)	(1.35)	(1.31)	(1.31)
Firm size	0.16	0.17	0.18	0.18	0.20	0.17	0.17
	(0.13)	(0.13)	(0.14)	(0.13)	(0.13)	(0.13)	(0.13)
Industry-adjusted ROA	−2.34*	−2.45*	−2.48*	−2.28*	−2.28*	−2.12*	−2.19*
	(1.02)	(1.05)	(1.06)	(1.01)	(1.06)	(1.03)	(1.05)
Industry-adjusted stock return	−3.18***	−3.14***	−2.60***	−2.75***	−2.44***	−3.13***	−2.94***
	(0.61)	(0.62)	(0.58)	(0.63)	(0.61)	(0.61)	(0.65)
CEO stock ownership	−8.79	−6.77	−6.65	−8.68	−9.12	−7.81	−7.67
	(7.02)	(6.46)	(6.43)	(7.16)	(7.37)	(6.91)	(6.83)
CEO tenure	−0.01	−0.01	−0.01	−0.01	−0.01	−0.01	−0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
CEO duality	0.11	0.10	0.12	0.15	0.16	0.09	0.09
	(0.31)	(0.31)	(0.32)	(0.31)	(0.32)	(0.31)	(0.31)
Board size	0.10*	0.07†	0.07†	0.10*	0.10*	0.09*	0.09*
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Percentage of outside directors	−0.32	−1.00	−1.09	−0.34	−0.39	−0.61	−0.66
	(0.81)	(0.84)	(0.84)	(0.82)	(0.83)	(0.81)	(0.82)
Analyst coverage	0.00	−0.01	−0.01	−0.01	−0.01	0.00	0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Analyst consensus	0.39	0.35	0.41	0.35	0.30	1.13	1.17
	(0.79)	(0.73)	(0.73)	(0.78)	(0.79)	(0.75)	(0.75)
Analyst measure (residual)[c]		−1.69***	−1.41***	−1.24*	−0.69	4.83***	4.26**
		(0.34)	(0.35)	(0.58)	(0.59)	(1.17)	(1.40)
Analyst measure × ind-adj. stock return			2.56**		3.24***		−5.24
			(0.98)		(0.72)		(6.53)
Log likelihood	−292.54	−280.15	−278.51	−290.32	−286.04	−285.26	−284.93
Pseudo R-square	0.174	0.209	0.214	0.181	0.193	0.195	0.196
Wald chi-square	51.28***	70.25***	79.05***	57.06***	68.55***	67.27***	69.87***

$n = 2730$ firm-years.
† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed tests).
[a] All models also include time dummies.
[b] Standard errors are reported in parentheses.
[c] Analyst measure refers to the residual of the respective analyst measure from the analysis conducted in Table 2.

Table 4. Moderating effect analysis of firm financial performance on the marginal effect of analyst measures on the probability of CEO dismissal[a]

Level of industry-adjusted stock return	Value of industry-adjusted stock return	Marginal effect of average analyst recommendation	z-statistic
Low	−0.26	−0.055	−5.54***
High	0.30	−0.008	−1.67†
		Marginal effect of change in average analyst recommendation	
Low	−0.26	−0.048	−3.15**
High	0.30	0.001	0.09

$n = 2730$ firm-years.
† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed tests).
[a] The high(low) value of industry-adjusted stock return is its value one standard deviation above (below) its sample mean.

probability of CEO dismissal, while a downgrade increases the probability of CEO dismissal significantly, which is consistent with prior findings that negative information alters investor perceptions more than positive information. Furthermore, the impact of a downgrade varies depending on the firm's initial average analyst recommendation. For a firm already rated as relatively unfavorable (e.g., hold), a downgrade has no significant impact, while a downgrade for a firm rated as favorable (i.e., buy or strong buy) increases the probability of CEO dismissal.

To test the moderating hypotheses that the effect of analyst recommendations on the probability of CEO dismissal would be greater when the company's financial performance is low (Hypotheses 2a, 2b, 2c), we add interaction terms that are the product of the firm's industry-adjusted stock return (mean-centered) and the residual proxy for the analyst measure (mean-centered).[18] As shown in Model 2b, the interaction term of the residual proxy for average analyst recommendation and industry-adjusted stock return is positive and significant ($b = 2.56$, $p < 0.01$). As shown in Model 3b, the interaction term of the residual proxy for change in average analyst recommendation and industry-adjusted stock return is positive and significant ($b = 3.24$, $p < 0.001$). However, in Model 4b, the interaction term of the residual proxy for the percentage of sell recommendations and industry-adjusted stock return is not significant ($b = -5.24$, n.s.), thus not supporting Hypothesis 2c, which proposes that the effect of the percentage of analysts that recommend a sell recommendation for the company's stock on the probability of CEO dismissal is greater when the company's financial performance is low.

To test for the direction and statistical significance of the moderator effect in a logit model, however, one cannot rely on the direction and statistical significance of the interaction coefficient (Hoetker, 2007). Instead, a moderator hypothesis in a limited dependent variable model is tested by examining the sign (positive or negative) and statistical significance of the values of the moderator variable's marginal effect on the relationship between analyst recommendations and CEO dismissal over all sample values of the model variables (Wiersema and Bowen, 2009). We report the marginal effect of the residual proxies for average analyst recommendation and change in average analyst recommendation on the probability of CEO dismissal for low and high values of industry-adjusted stock return as shown in Table 4. The negative marginal effect of average analyst recommendations on the probability of CEO dismissal is greater when industry-adjusted stock return is low ($b = -0.055$, $p < 0.001$) than when it is high ($b = -0.008$, $p < 0.10$), supporting Hypothesis 2a, which proposes that the effect of lower average analyst recommendations for the company's stock on the probability of CEO dismissal is greater when the company's financial performance is low. The negative marginal effect of change in average analyst recommendation on the probability of CEO dismissal is also greater when industry-adjusted stock return is low ($b =$

[18] We also examine the moderating effect of industry-adjusted ROA and industry-adjusted Tobin's q. We find that neither of these performance measures are significant moderators of the effect that analyst recommendations have on the probability of CEO dismissal.

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-0.048, $p < 0.01$) than when it is high ($b = 0.001$, n.s.), supporting Hypothesis 2b, which proposes that the effect of analyst downgrade for the company's stock on the probability of CEO dismissal is greater when the company's financial performance is low.

To test the moderating hypotheses that the effect of analyst recommendations on the probability of CEO dismissal is less post- than pre-litigation, we split each of our analyst measures into two variables: one for the pre-litigation period and one for the post-litigation period.[19] The pre-litigation analyst measure captures the value of the specific analyst measure for the years 2000–2002 and has a value of '0' for the years 2003–2005. The post-litigation analyst measure captures the value of the specific analyst measure for the years 2003–2005 and has a value of '0' for the years 2000–2002. We further examine whether the coefficients for the pre-litigation analyst measure and that for the post-litigation analyst measure are statistically different using the Wald chi-square test statistic.

The results of the impact of average analyst recommendations in the pre- and post- litigation periods are shown in Table 5. As shown in Model 1, the coefficient for average analyst recommendation is negative and significant in both the pre-litigation period ($b = -1.72$, $p < 0.001$) and the post-litigation period ($b = -1.67$, $p < 0.001$). The Wald chi-square test statistic indicates that these two coefficients (pre- versus post-litigation) are not significantly different. Thus, our results do not support Hypothesis 3a, which proposes that the effect of lower average analyst recommendations for the company's stock on the probability of CEO dismissal is less post-litigation.

As shown in Model 2 in Table 5, the coefficient for the change in average analyst recommendation is negative and significant in the pre-litigation period ($b = -2.47$, $p < 0.001$), but not significant in the post-litigation period ($b = -0.41$, n.s.). The Wald chi-square test statistic indicates that these two coefficients are significantly different (chi-square $= 3.33$, $p < 0.05$). Thus, our results support Hypothesis 3b, which proposes that the effect of analyst downgrade for the company's stock on the probability of CEO dismissal is less post-litigation.

As shown in Model 3 in Table 5, the coefficient for the percentage of sell recommendations is positive and significant in both the pre-litigation period ($b = 16.53$, $p < 0.001$) and the post-litigation period ($b = 3.96$, $p < 0.001$). A chi-square test statistic indicates that the coefficient in the pre-litigation period is significantly larger than that in the post-litigation period (chi-square $= 8.51$, $p < 0.01$). Thus, our results support Hypothesis 3c, which proposes that the effect of the percentage of analysts that issue a sell recommendation for the company's stock on the probability of CEO dismissal is less post-litigation.

DISCUSSION

Main findings and contributions

This study was motivated by the highly visible and increasing incidence of CEO dismissal in large public U.S. firms. While prior research on CEO succession has focused largely on the effects of poor firm performance and organizational power and politics (Fredrickson *et al.*, 1988; Ocasio, 1994; Shen and Cannella, 2002; Zhang, 2006), we address the role that external constituents may have on a board's decision to dismiss or retain the firm's CEO. Specifically, we investigate the role of investment analysts as prominent information intermediaries in the financial markets. Our study's findings are the first to show that firms that have lower average analyst recommendations, a downgrade in their analyst recommendations, or a higher percentage of sell recommendations all experience a greater probability of CEO dismissal. In addition, we provide new insight into the board's decision to dismiss the company's CEO by integrating how prior firm performance and the credibility of analysts in the financial community may moderate the linkage between analyst recommendations and CEO dismissal. This study's findings demonstrate the influence that investment analysts' stock recommendations, independent of prior firm financial performance, have on the board's decision to retain or dismiss the CEO.

Our study contributes to the CEO succession literature by examining the role of an important external constituent—namely, investment analysts. In their evaluation of the CEO, the board faces both evaluative as well as performance standard uncertainty. It must determine the degree to which

[19] As in our analyses reported in Table 3, we used the residuals from our estimation of the analyst measures in these analyses.

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Table 5. Logistic regression results for the probability of CEO dismissal: pre- and post-litigation periods[abc]

Variables	Model 1 Average analyst recommendation	Model 2 Change in average analyst recommendation	Model 3 Percentage of sell recommendations
Constant	−5.22***	−5.89***	−4.02**
	(1.32)	(1.34)	(1.35)
Firm size	0.17	0.18	0.09
	(0.13)	(0.13)	(0.13)
Industry-adjusted ROA	−2.45*	−2.23*	−2.48*
	(1.05)	(1.03)	(1.06)
Industry-adjusted stock return	−3.14***	−2.65***	−3.06***
	(0.62)	(0.63)	(0.61)
CEO stock ownership	−6.77	−9.32	−7.72
	(6.46)	(7.35)	(6.73)
CEO tenure	−0.01	−0.01	−0.01
	(0.02)	(0.02)	(0.02)
CEO duality	0.10	0.20	0.12
	(0.31)	(0.32)	(0.31)
Board size	0.07†	0.10*	0.08*
	(0.04)	(0.04)	(0.04)
Percentage of outside directors	−1.00	−0.36	−0.71
	(0.84)	(0.82)	(0.83)
Analyst coverage	−0.01	−0.01	0.00
	(0.02)	(0.02)	(0.02)
Analyst consensus	0.35	0.44	1.43†
	(0.73)	(0.79)	(0.73)
Analyst measure (residual)[c] pre-litigation	−1.72***	−2.47**	16.53***
	(0.53)	(0.88)	(4.14)
Analyst measure (residual)[c] post-litigation	−1.67***	−0.41	3.96***
	(0.44)	(0.75)	(1.24)
Log likelihood	−280.15	−288.63	−281.42
Pseudo R-square	0.209	0.186	0.206
Wald chi-square	70.18***	59.05***	74.10***
Chi square test : Analyst measure-pre-litigation vs. analyst measure-post-litigation	0.01	3.33*	8.51**

$n = 2730$ firm-years.
† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed tests for model estimations and one-tailed tests for chi square tests).
[a] All models also include time dummies.
[b] Standard errors are reported in parentheses.
[c] Analyst measure refers to the residual of 'average analyst recommendation' in Model 1, the residual of 'change in average analyst recommendation' in Model 2, and the residual of 'percentage of sell recommendations' in Model 3.

it holds the CEO accountable for past performance as well as assess the level of confidence it has in the CEO's ability to lead the firm in the future. Our study indicates that as visible and legitimate sources of information, investment analysts provide the board with third-party certification of the CEO's ability and performance. Thus, their recommendations serve to reduce the evaluative uncertainty surrounding the board's evaluation of the CEO's past performance as well as reduce performance standard uncertainty regarding the board's perception of whether the CEO has the requisite capabilities for future performance.

In addition, because investment analysts' recommendations affect the decisions of investors (whom the board wants to appease), the board will tend to respond to investment analysts' recommendations. As a result, the board is likely to notice and take action when investment analysts issue negative or unfavorable recommendations for the firm's stock. The dismissals of the CEOs at Pfizer, Merck, and Bristol-Myers, three large pharmaceuticals with solid, long-term performance records, are actions indicative of the board's willingness to replace the firm's CEO when lack of confidence regarding the company's future prospects is conveyed

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by investment analysts. Consistent with our predictions, our study shows that investment analysts' stock recommendations that convey negative or unfavorable information have a significant impact on the board's decision to take action and dismiss the firm's CEO.

In addition, our findings suggest that the board does not perceive and respond to analyst stock recommendations in isolation but, in addition, the firm's prior financial performance and the credibility of investment analysts represent important contextual factors. Our results suggest that when poor prior performance validates the negative information conveyed by the firm's analyst stock recommendations, a board is more likely to dismiss the CEO. Interestingly, we find that industry-adjusted stock return moderates the effects of average analyst recommendation and change in average analyst recommendation, but not the effect of the percentage of sell recommendations. Since analysts rarely issue sell recommendations, they have a large negative impact on investors (Womack, 1996) and, thus, the board is likely to respond to the negative information conveyed by sell ratings, regardless of the firm's prior stock return.

This paper also contributes to the emerging research on the role of investment analysts in influencing firm behavior. Most previous studies on investment analysts have focused on how analyst forecasts and recommendations affect investors' demand for a firm's stock, and thus its price. Recent research has revealed that investment analysts can also influence managers' behavior and corporate governance (Westphal and Graebner, 2010; Yu, 2008). Our study is the first to provide evidence that investment analysts' stock recommendations can influence the board's decision to dismiss the firm's CEO, and that the board's reaction to analyst recommendations may vary across contexts. We find that analyst recommendations had more of an influence on the board's decision to dismiss the CEO when the firm's performance is poor. In addition, we find that the board responds to negative or unfavorable analyst recommendations in its decision to dismiss the firm's CEO only to the extent that analysts are perceived as credible, and, thus, consequential to investors' decisions.

This study also contributes to the emerging literature on the role of third-party certification in quality evaluation. Previous studies on this topic (e.g., Graffin and Ward, 2010; Pfarrer *et al*., 2010; Wade *et al*., 2006) have found evidence that certification from a credible third party can influence the perceived quality of a firm or an executive. In our investigation of CEO dismissal we find that investment analysts serve an important certification role for boards by reducing both 'evaluative' as well as 'standard' uncertainty' in its evaluation of the CEO. Importantly, investment analysts in their stock recommendations convey an evaluation of both the firm's performance as well as its future earnings prospects. Thus, investment analysts serve an important certification role in that they reduce the uncertainty associated with evaluating not only the quality of the CEO based on past performance but also the uncertainty surrounding the future performance of the CEO and thus whether the CEO has the capabilities to continue to lead the firm.

Our study highlights the significant pressure that both boards and CEOs operate under in today's investment climate, and has major implications for CEOs and boards of directors. From the perspective of the CEO, managing 'The Street' has become a primary responsibility. The CEO must be highly attuned to the investment community; not only in terms of its concern over the firm's quarterly earnings but also and more importantly, the future prospects of the company given its strategy and competitive position. Not surprisingly, the CEOs of public companies are directing more of their attention to serving the investment community.[20]

Limitations and future research directions

We acknowledge some limitations of this study that, in turn, suggest interesting avenues for future research. First, we have demonstrated that the effects of investment analysts' recommendations on a board's decision to dismiss the firm's CEO depend upon the credibility of investment analysts as a professional community. However, individual analysts differ in the accuracy of forecasts and recommendations, and thus individual credibility and reputation (Stickel, 1992). Moreover, those analysts listed in *Institutional Investor's* All-American Research Team, the most prestigious analyst ranking in the investment industry, are assumed to be

[20] GE's CEO Jeff Immelt reports that he spends 25 percent of his time with the investment community (Bartlett, 2006).

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more highly skilled and, thus, possess higher status in the investment community (Desai, Liang, and Singh, 2000; Reingold and Reingold, 2006).[21] Future research may examine whether a board's response to investment analysts' recommendations may be influenced by the credibility and reputation of the individual analyst who issues the recommendations.

Second, our finding that the effect of investment analysts' stock recommendations on the probability of CEO dismissal is moderated by the company's financial performance was significant only when we measured financial performance in terms of the firm's industry adjusted stock return. Alternative performance measures such as the firm's industry-adjusted ROA and industry-adjusted Tobin's q were not found to have a significant moderating effect. Future research may examine why lower relative stock performance further accentuates the effect of lower analyst ratings on the board's decision to dismiss, while other performance indicators do not seem to have such an effect.

Third, while we have examined the moderating roles of prior firm performance and analyst credibility on the linkage between investment analyst recommendations and CEO dismissal, additional research that examines other contextual factors as moderators may also prove insightful. Since we theoretically propose that investment analysts enable the board to lessen the uncertainty surrounding the evaluation of the CEO's efficacy, it may be interesting to investigate the level of environmental, technological, or market uncertainty that the firm faces. Boards of firms in more dynamic markets may find it more difficult to ascertain the relative roles of the CEO and external factors that drive firm performance outcomes. Thus, a higher level of environmental, technological, or market volatility may be associated with greater uncertainty that surrounds the evaluation of the firm and its leadership, and, as a result, investment analysts' recommendations may be more consequential in such an environment.

In conclusion, our study is the first to examine the role of investment analyst recommendations in influencing the board's decision to dismiss the firm's CEO. Thus, while poor firm performance and organizational power and politics have been shown to be important antecedents of CEO dismissal, this study provides strong evidence that investment analysts have an independent and separate effect on this decision. These findings highlight the importance of investment analysts as legitimate third-party evaluators of the firm and its leadership, and suggest that how these external constituents evaluate the firm is an important factor in understanding CEO dismissal.

[21] Analysts are selected to the team based on a survey of over 2,000 money managers who are asked to rank analysts on different dimensions, including forecasting ability and stock picking ability.

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