

## STOCK MARKET REACTION TO CEO CERTIFICATION: THE SIGNALING ROLE OF CEO BACKGROUND

YAN ZHANG<sup>1\*</sup> and MARGARETHE F. WIERSEMA<sup>2</sup>

<sup>1</sup> *Jesse H. Jones Graduate School of Management, Rice University, Houston, Texas, U.S.A.*

<sup>2</sup> *The Paul Merage School of Business, University of California at Irvine, Irvine, California, U.S.A.*

*As a direct result of the corporate scandals that started with Enron and led to general unrest in the financial markets, the Securities and Exchange Commission required chief executive officers (CEOs) and chief financial officers of large publicly traded companies to certify their financial statements. Using market signaling theory, we propose that attributes of the CEO send important signals to the investment community as to the credibility of the CEO certification and thus the quality of the firm's financial statements, which in turn impact the stock market reaction to the CEO certification. We find that a CEO's shareholdings and external directorships are positively related to the abnormal returns of CEO certification. Further, the stock market penalizes a firm with a CEO who is associated with the firm's prior financial restatement and rewards a firm with a CEO who is appointed after the firm's prior financial restatement. Copyright © 2009 John Wiley & Sons, Ltd.*

### INTRODUCTION

Organization and strategy scholars have shown great interest in how a firm's leadership can affect firm outcomes (e.g., Shen and Cannella, 2002; Zhang and Rajagopalan, 2004). Upper echelon theory (Hambrick and Mason, 1984) suggests that managers' backgrounds affect their cognitive bases and values, and therefore affect their strategic choices. In this view, attributes of a firm's executives can impact firm outcomes by influencing the nature of strategic decision making. Consistent with upper echelon theory, prior research has provided strong evidence that attributes of a firm's executives can significantly affect the firm's strategic choice and its performance (for reviews, see

Carpenter, Geletkanycz, and Sanders, 2004 and Finkelstein and Hambrick, 1996).

Recently, scholars have started to examine the symbolic value of executive decisions. In the context of large firms, research has shown that executives' actions—for example, adopting new structures and policies (such as long-term incentive plans and stock repurchase plans)—are favorably received by investors even if these plans are not actually implemented (Westphal and Zajac, 1998; Zajac and Westphal, 2004). However, this research has not addressed whether the symbolic value of these actions is contingent upon the characteristics of the executives who initiate these actions. In a parallel research stream, scholars have used market signaling theory (Spence, 1973) to examine the signaling<sup>1</sup> role of executive characteristics

---

Keywords: CEO certification; CEO credibility; signaling; upper echelons; Sarbanes-Oxley Act

\*Correspondence to: Yan Zhang, Jesse H. Jones Graduate School of Management, Rice University, 6100 Main Street, Houston, Texas 77005-1892, U.S.A. E-mail: [yanzh@rice.edu](mailto:yanzh@rice.edu)

---

<sup>1</sup> As Zajac and Westphal have distinguished in their studies (Westphal and Zajac, 1998; Zajac and Westphal, 2004), symbol is different from signal. Basically, a signal is an observable attribute that reflects an underlying hard-to-verify reality,

in conveying firm quality to the financial markets in the initial public offering (IPO) context (e.g., Certo, 2003; Certo, Daily, and Dalton, 2001; Cohen and Dean, 2005; Higgins and Gulati, 2003, 2006). It has been argued that, independent of the effect of the executives' background on their strategic decision making, these observable background characteristics function as signals and are used by critical external constituents to infer the quality of the firm<sup>2</sup> (Certo, 2003). Following this approach, studies have found that the prestige of the firm's board of directors (Certo *et al.*, 2001) and the characteristics of the top management team (Cohen and Dean, 2005; Higgins and Gulati, 2006; Lester *et al.*, 2006) provide signals of firm quality, which in turn influences the stock market's valuation of the IPO. This research, however, sheds little light on the manner in which executive background influences how investors respond to specific organizational actions. It is not possible to ascertain the extent to which the valuation of the IPO is influenced by the signaling role of managerial characteristics or managerial action (Higgins and Gulati, 2006).

In this study, we extend prior research by examining the signaling role of the characteristics of the chief executive officer (CEO) in affecting investor reaction to his/her actions in a natural experimental setting. The requirement, issued by the United States Securities and Exchange Commission (SEC), that the firm's financial statements must be certified by the CEO provides an excellent opportunity to conduct such a natural experiment. In response to the wave of corporate scandals (Adelphia, Enron, WorldCom, etc.) that began to undermine investor confidence in the financial markets, on 27 June, 2002 the SEC required CEOs and chief financial officers (CFOs) of all publicly traded companies with revenues greater than \$1.2 billion to certify their financial statements by 14 August 2002.<sup>3</sup> What makes the SEC-required CEO certification a natural experiment is that it

---

whereas a symbol does not make an assumption of an underlying reality.

<sup>2</sup> In his seminal work, Spence (1973) modeled the role of education as a signal in the labor market. In his model, potential employers face information asymmetry in their relations with job candidates regarding these candidates' true quality. Education, even if it does not affect employee productivity, can distinguish high-quality candidates from low-quality candidates.

<sup>3</sup> The senior executives of these companies were required to swear in front of a notary that 'to the best of my knowledge' their latest annual and quarterly reports neither contained an 'untrue

was adopted suddenly to address concerns about the quality of a company's financial disclosures (*Economist*, 2002a),<sup>4</sup> and all publicly listed firms with sales greater than \$1.2 billion had to comply by a specified date (using the same format). While experimental design is commonly used in psychology and economics, there are few studies in strategy that have relied on natural experiments (see Park and Mezias, 2005 for a recent exception). We utilize the SEC ruling to define a natural experiment that allows us to investigate the signaling role of the characteristics of the CEO to investors. In this setting, the attributes of the CEO have no effect on the CEO's action of certifying the firm's financial statement, but they may affect investor perceptions of the credibility of the CEO's certification (and thus the credibility of the firm's financial statements), which in turn may affect how investors respond to CEO certification.

We build on prior studies that have used signaling theory to examine how director and top management team characteristics influence investor valuation of the firm (Certo, 2003; Certo *et al.*, 2001; Higgins and Gulati, 2003, 2006; Podolny and Baron, 1997). We investigate how attributes of the firm's CEO are likely to impact how the financial market responds to CEO certification. Since it is not possible to assess the inherent quality of the firm's financial statements, we propose that the attributes of the CEO communicate important information to investors, and thus serve as important signals regarding the degree of credibility of the CEO certification and the integrity and confidence that investors can have in the firm's financial statements, which in turn impacts the stock market reaction to CEO certification. Thus, our investigation contributes to upper echelon research by examining the signaling role of the characteristics of the CEO in affecting how investors respond to his/her actions.

---

statement' nor omitted any 'material fact' (The SEC's form for the certification is included as Appendix I).

<sup>4</sup> While the scandal at Enron set off initial investor concerns, it was the bankruptcy of WorldCom that led to severe erosion in the confidence of the financial statements of publicly traded firms, which precipitated the SEC to take such quick action. WorldCom filed for bankruptcy on 22 July, 2002 and represented the largest U.S. bankruptcy up to that time.

## STOCK MARKET RESPONSE TO CEO CERTIFICATION

The corporate scandals that started in 2001 with Enron, WorldCom, and other large corporations were rooted in the desire to shore up earnings and thus the firm's stock price. While some of the malfeasance was clearly for personal gain (e.g. Tyco),<sup>5</sup> the scandals that occurred in a few large and highly visible companies had a spillover effect that impacted the overall financial markets. One concept that helps explain how this happens is that of 'reputation spillover' (Tirole, 1996; Yu, Lester, and Sengul, 2002). According to Tirole because individual past behavior is imperfectly observed, '*The past behaviour of the member's group conditions the group's current behaviour and therefore can be used to predict the member's individual behaviour*' (Tirole, 1996: 2, italics in original). As a result, each member's welfare is affected by the group's 'collective' reputation. In applying this logic to our research setting, although the scandals occurred only in some (albeit very large and visible) companies, the reputation crisis 'spilled over' (Yu *et al.*, 2002) or diffused from these companies to others. As an *Economist* article commented, 'In the wake of Enron, WorldCom and a slew of other scandals, America no longer trusts its corporate leaders to tell the truth without being warned by the sound of prison doors slamming' (*Economist*, 2002a: 49). While the press focused on major visible scandals, evidence from the Government Accounting Office (GAO) at the time indicated that the number of financial restatements increased 178 percent over a six-year period (U.S. General Accounting Office, 2003: 15–19), which in aggregate indicates that about 10 percent of all U.S. publicly listed companies on the New York Stock Exchange (NYSE), NASDAQ, and AMEX incurred some sort of correction to their financial statements during the time period.

Given the overall contagion of mistrust in the financial disclosures of public firms, it became imperative to restore investor confidence. While Congress responded to concerns over the accuracy of financial statements by the passage of the

Sarbanes-Oxley Act in July of 2002, total compliance was still years away. Thus, the CEO certification requirement suddenly issued by the SEC<sup>6</sup> in June of 2002 was viewed as a crucial initial step in restoring investor confidence (Beckett, 2002; *Economist*, 2002a, 2002b), and represented a precursor to the requirements dictated by the Sarbanes-Oxley Act.

The major purpose of certification is to narrow the legal loophole between a company's financial statements and its senior executives' personal responsibilities; thus enhancing the quality of a company's financial disclosures (*Economist*, 2002a). According to a *Wall Street Journal* article, 'Currently, top executives at many companies do not sign every filing with the SEC, and when they do it is on behalf of the company and not a personal endorsement. ... After the sworn statements are submitted, subsequent revisions of financial reports could potentially expose executives to criminal charges' (Beckett, 2002). Further, CEO certification can help create a system of accountability within companies, as they tend to require middle managers to sign documents certifying the accuracy of the information they send up to the CEO's office (*Economist*, 2002a). Therefore, CEO certification<sup>7</sup> can serve to restore credibility as to the truthfulness of a firm's financial statements.

For these reasons, we expect that CEO certification will have a direct and positive impact on the market value of the firm by restoring investor confidence in the integrity of the firm's financial

<sup>6</sup> While a firm's financial statements have to be filed in accordance with generally accepted accounting principles (GAAP), the enforcement of accounting standards is the domain of the SEC. The SEC's primary mission is 'to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation' ([www.sec.gov](http://www.sec.gov)). The SEC gave the following reason for this particular order (File No. 4-460): 'In light of recent reports of accounting irregularities at public companies, including some large and seemingly well-regarded companies, the purpose of the Commission's investigation is to provide greater assurance to the Commission and to investors that persons have not violated, or are not currently violating, the provisions of the federal securities laws governing corporate issuers' financial reporting and accounting practices, and to aid the Commission in assessing whether it is necessary or appropriate in the public interest or for the protection of investors for the Commission to adopt or amend rules and regulations governing corporate issuers' reporting and accounting practices and/or for the Commission to recommend legislation to Congress concerning these matters.'

<sup>7</sup> In this study's data, all companies but two filed CEO and CFO certifications on the same day. In those two companies, the CEO certification was filed prior to the CFO certification. For simplicity, this article uses the term 'CEO certification' to refer to both CEO and CFO certifications.

<sup>5</sup> Tyco International executives Dennis Kozlowski and Mark Swartz treated the company as their personal bank and misappropriated \$600 million from it, and were convicted of looting the company and defrauding shareholders.

statements. Some may argue that CEO certification will not reveal any new information to investors because certification is a SEC-imposed requirement that all firms must comply with. However, note that the sudden imposition by the SEC of CEO certification represents the first time that a governmental agency required that a firm's CEO take an oath affirming that the firm's financial statements are true. This undoubtedly created some uncertainty in the financial markets as to whether or not companies would be able to comply in such a short period of time. Many firms would have needed to recheck the numbers prior to affirming their financial statements, and the possibility existed that some would even miss the deadline. As a result, we believe that the stock market would respond positively to the certification of the financial statements by the firm's CEO, since this announcement is a significant event conveying additional information to investors regarding the level of integrity and confidence justifiably placed in the firm's financial statements. In support of our argument, Chang *et al.* (2006) observed, on average, positive abnormal returns for firms of which the CEO/CFO certified the financial statements using the SEC's standard format by the deadline of 14 August 2002.<sup>8</sup>

For firms that complied with the SEC's certification requirement by the deadline, the variance in the market response to CEO certification is not based on the event itself, but as we will argue, on the credibility of the CEO certification. Based on market signaling theory, we propose that attributes of the CEO send important signals to the investment community as to the credibility of the CEO certification, which in turn impacts the stock market reaction to the CEO certification.

## THE MARKET SIGNALING ROLE OF CEO BACKGROUND

As noted above, the purpose of the SEC's certification requirement is to restore investor confidence in the financial statements of publicly traded companies. In general, however, executives have superior information, relative to investors, about the extent to which the certified financial statements are true and complete. It has been noted that words such as

'willfully' and 'knowingly' have often been used in CEO certification (*Economist*, 2002a). How the phrase 'to the best of my knowledge' will be interpreted also remains unclear (Beckett, 2002). Thus, CEO certification is characterized by information asymmetry between the executive who files the certification and investors. As a result, the stock market response to CEO certification will differ based on the credibility that investors assign to a company's CEO certification; this assigned credibility of certification in turn influences investor assessment of the quality and truthfulness of the firm's financial statements.

We draw upon signaling theory (Spence, 1973) to investigate how the background of the CEO may serve as a market signal of the credibility of CEO certification, and thus the quality of the firm's financial statements. Recent studies have examined how the backgrounds of boards of directors (Certo, 2003; Certo *et al.*, 2001) and top management teams (Cohen and Dean, 2005; Higgins and Gulati, 2003, 2006; Lester *et al.*, 2006) may signal information about the quality of an IPO firm to investors, thereby affecting investor valuation of the market value of the firm. Uncertainty and information asymmetry surrounding IPOs make it difficult for investors to ascertain the earnings prospects, and as a result, they come to rely on executive characteristics as 'signals' by which to differentiate the quality of firms.

Information asymmetry also exists with regard to the CEO and the CEO's certification of his/her firm's financial statements (Zhang, 2008). In light of the corporate scandals and earnings management that were predominant in the financial news at the time, there was considerable ambiguity as to truthfulness of firms' financial statements.<sup>9</sup> Given the uncertainty at the time of CEO certification, we would expect investors to look to alternative sources of information to determine the quality of the firm's financial statements. We argue that the background of the CEO can serve as a strong signal of the credibility of CEO certification because the CEO is the symbolic representative of his/her

<sup>8</sup> Chang *et al.* (2006) reported that 12 firms that failed to file or filed a different form of certification had on average a significantly lower abnormal return (CARs = -0.0012) as compared to a matched sample of firms that did comply (CARs of 0.0024).

<sup>9</sup> Earnings management refers to managers directly influencing the quarterly earnings reported by the firm to external parties, with the objective of reporting earnings consistent with analysts' forecasts. This serves to reduce earnings surprises, increase predictability and dependability, and increase the firm's stock price. The practice of earnings management to meet Wall Street earnings expectations served to undermine the quality of reported earnings (Schipper, 1989).

company (Pfeffer and Salancik, 1978) and, in this particular context, the oath taken by the CEO in filing the certification statement results in a personal liability on the part of the CEO by legally holding him/her accountable for the accuracy of the company's financial statements (*Economist*, 2002a). Thus, market signaling theory can shed light on how the stock market may respond to CEO certification by suggesting that investors may look to alternative sources of information with which to evaluate the credibility of the CEO's certification, and thus alleviate concerns over the truthfulness of the firm's financial statements.

We propose and test the premise that the stock market will respond differently to CEO certification based on the credibility of the CEO certification. Certain attributes of the CEO (i.e., CEO shareholdings, the number of external directorships, tenure as CEO, and whether or not the CEO is associated with his/her company's prior financial restatement) can serve as signals as to the credibility of CEO certification. That investors may look to market signals to ascribe credibility to the CEO's certification is also consistent with the notion that images of organizations and their leaders are intertwined (Sutton and Callahan, 1987). If constituents of an organization do not trust an organization's leaders, their confidence in the organization declines (Sutton and Callahan, 1987), and they tend to withdraw their support from the organization (D'Aveni, 1990). In this study, we focus on specific CEO attributes which may affect investor perceptions of the credibility of CEO certification and, in turn, their assessment of the quality of the firm's financial statements at the time of CEO certification.

### **CEO shareholdings**

Jensen and Meckling (1976) argued that because managers incur greater costs from misconduct as their stock ownership in the firm increases, managerial shareholdings can limit their opportunistic behavior. In their examination of whether or not entrepreneurs possess and utilize 'inside' information about the projects for which they seek financing, Leland and Pyle (1977) found that entrepreneurs did indeed have a higher fraction of ownership in more favorable projects, which served as a signal of more favorable or higher quality projects to external investors. In addition, Han and Suk (1998) found that the abnormal stock

returns associated with the announcement of stock splits are positively related to managerial ownership. They argued that as managerial equity in the firm increases, the information sent out by management via stock splits becomes more credible, and as a result stock splits should have a positive impact on market value.

Similarly, we propose that a CEO's stock ownership in his/her company can serve as a market signal that can be used by the financial community to judge the credibility of the CEO certification and thus the quality of the firm's financial statements. As a shareholder of the company, the costs of certifying fraudulent financial statements will be borne, at least partially, by the CEO. Hence, when the level of a CEO's shareholdings is higher, so is the CEO's portion of the costs of certifying fraudulent statements. As a result, investor perceptions of the credibility of CEO certification may be proportional to the CEO's costs of certifying fraudulent statements, with greater credibility at higher levels of CEO shareholdings. Therefore, the stock market will respond more positively to CEO certification when the CEO has more stock ownership in his/her company than when the CEO has less stock ownership. Thus, we predict:

*Hypothesis 1: A CEO's shareholdings will be positively related to the firm's abnormal stock returns associated with CEO certification.*

### **CEO external directorships**

Previous studies have emphasized the importance of an executive's affiliations or ties as sources of social capital that provide access to resources (Geletkanycz and Hambrick, 1997; Gulati and Higgins, 2003; Higgins and Gulati, 2006; Zhang, 2008). For example, Hillman and Dalziel (2003) referred to board members' external directorships as a board's relational capital, which represents one primary antecedent to the board's provision of resources to the firm. Board members can use their external directorships to form direct and indirect links with other individuals and organizations to obtain information and influence (Adler and Kwon, 2002). Board members' external directorships can also serve as important information sources to keep the firm up-to-date with other firms' practices and procedures (Davis, 1991; Haunschild, 1993).

In addition, the number of external directorships held by the CEO serves as an indicator of the

degree to which others seek to link with the CEO, and thus connotes status or prestige of the CEO. Status defined in this way becomes a signal of quality, in that highly sought after individuals having numerous external directorships are perceived as having higher status. The number of external directorships can be indicative of a CEO's reputation or prestige in the managerial labor market (Certo, 2003; D'Aveni, 1990; Davis and Mizruchi, 1999; Lester *et al.*, 2006) since companies invite CEOs with more valuable human capital and social capital to serve as their outside directors (Brickley, Linck, and Coles, 1999).

Constituents tend to have higher confidence in CEOs with more external directorships, and be less likely to withdraw support from them (D'Aveni, 1990). Similarly, the number of external directorships held by the CEO can also serve as a market signal to investors as to the credibility of the CEO certification and thus the quality of the firm's financial statements. Thus, we predict:

*Hypothesis 2: A CEO's external directorships will be positively related to the firm's abnormal stock returns associated with CEO certification.*

## CEO tenure

Many studies in the upper echelon literature have paid significant attention to executive tenure. The underlying logic of much of this research is that executive tenure serves as a proxy for his/her cognitive perspective, task interest, and power, which in turn affect his/her decision making and organizational outcomes (Hambrick and Fukutomi, 1991). Reflecting this logic, previous studies have linked executive tenure to strategic persistence and conformity (Finkelstein and Hambrick, 1990), innovation and product innovation (Miller and Shamsie, 2001; Wu, Levitas, and Priem, 2005), corporate strategic change (Wiersema and Bantel, 1992), and performance (Miller and Shamsie, 2001).

The CEO's tenure in office can also serve as a market signal to investors, with higher tenure signaling higher credibility of CEO certification. First, as a CEO's tenure increases, a CEO's human capital becomes more specific to the top position in the particular company and less generic (Harris and Helfat, 1997; Zhang and Rajagopalan, 2004). The value of his/her human capital thus becomes increasingly less diversified and more tied to the

company. Second, as a CEO's tenure increases, the company's strategy and performance are increasingly shaped by the CEO's knowledge, skills, and previous decision making (Hambrick and Fukutomi, 1991). The reputation and image of the CEO thus become increasingly intertwined with those of the company. For these reasons, as a CEO's tenure increases, the costs of certifying fraudulent financial statements will be more likely to be shifted to the CEO. Thus, because investor perceptions of the credibility of CEO certification may be proportional to the CEO's costs of certifying fraudulent statements, these perceptions will increase as a CEO's tenure increases. Consistent with our argument, prior research (e.g., Cohen and Dean, 2005) has shown that CEO tenure is indicative of a higher quality IPO to the financial markets. Similarly, we propose that a CEO's tenure can serve as a market signal which can be used by investors to judge the credibility of CEO certification and the quality of the firm's financial statements. Thus, we predict:

*Hypothesis 3: A CEO's tenure will be positively related to the firm's abnormal stock returns associated with CEO certification.*

## CEO and prior financial restatement

Financial restatements acknowledge that a company's prior financial statements were not in accordance with generally accepted accounting principles (Palmrose and Scholz, 2004) and indicate problems in a company's internal control system (Kinney and McDaniel, 1989). Restatements occur because of the need to rectify historically reported results that did not comply with GAAP. Researchers have found that financial restatements occur more frequently in firms that engage in aggressive accounting to maintain consistent patterns of meeting analyst earnings targets (Dechow, Sloan, and Sweeney, 1996). Thus restatements are the direct outcomes of intentional actions by the company's executives, and the need to restate a company's financial statements is likely to violate investor trust (Arthaud-Day *et al.*, 2006).

Prior studies have found that there is a significant negative market response to the announcement of financial restatements (Feroz, Park, and Pastena, 1991; Owers, Lin, and Rogers, 2002; Palmrose, Richardson, and Scholz, 2004). In addition, prior research has shown that restatements can damage the reputations of the firm's top

executives and board members. Desai, Hogan, and Wilkins (2006) found that 59 percent of the restating firms experienced CEO or president turnover within two years of the restatement, and 92 percent of the displaced managers were unable to secure comparable employment within four years of the restatement announcement. Similarly, Arthaud-Day *et al.* (2006) found that CEOs, CFOs, outside directors, and audit committee members of firms with financial restatements are all more likely to leave their positions than are their counterparts in firms that do not experience financial restatements. In addition, Srinivasan (2005) found that outside directors are more likely to leave the board of a company that announces a financial restatement and subsequently lose directorships at other firms.

Based upon these studies, we argue that a CEO's reputation will be damaged when he/she is associated with the company's prior financial restatement—that is, the company filed a restatement in the prior three years and the filing of the restatement occurred during the CEO's tenure. Therefore, being associated with a company's prior restatement can serve as a market signal to investors of diminished credibility regarding the CEO's certification, and in turn serve as an indicator of less trustworthiness or quality of the firm's financial statements. As Arthaud-Day *et al.* argued, 'The executives in office *at the time of a restatement* are inextricably linked to the restatement by virtue of their physical proximity, temporal connection, and positional authority. This linkage results in their being stigmatized, or discredited, *by association with the restatement event*' (Arthaud-Day *et al.*, 2006: 1122, *italics added*). Therefore, we predict:

*Hypothesis 4a: A CEO associated with his/her company's prior financial restatement (i.e., restatement filed during the CEO's tenure) will negatively impact the firm's abnormal stock returns associated with CEO certification.*

Further, as previous studies (e.g., Arthaud-Day *et al.*, 2006; Desai *et al.*, 2006) have shown, a firm often replaces its CEO after a financial restatement. The turnover of the CEO is often used to signal a firm's commitment to change. It is an important 'structural change to symbolically distance the organization from "bad influences"' and 'persuade

some constituents that they can safely resume pragmatic exchanges with the troubled organization' (Suchman, 1995: 598). A CEO who is appointed after the company has restated their earnings will not be associated with the firm's prior financial restatement and thus is not stigmatized or discredited. In such instances, CEO certification may be perceived as more credible and serve as a signal of a higher standard for the quality of a firm's financial statements. Therefore, we predict:

*Hypothesis 4b: A CEO not associated with his/her company's prior financial restatement (i.e., appointed after the restatement) will positively impact the firm's abnormal stock returns associated with CEO certification.*

## METHODS

### Sample

In this study, we focused on companies that had their CEOs certify their financial statements by the SEC's first deadline of 14 August 2002. These oaths were 'the first wave in a flood of new regulations enveloping companies in America' (*Economist*, 2002a), followed by the New York Stock Exchange's (NYSE) and the NASDAQ's new listing standards, and then the 2002 Sarbanes-Oxley Act. These certifications have been viewed as a crucial initial step in restoring investor confidence, and attracted great public attention (Beckett, 2002; *Economist*, 2002a, 2002b). Chang *et al.* (2006) also focused on these certifications; focusing on the same event thus enabled us to build upon their research and further examine why the stock market reacted differently to CEO certifications filed by the same deadline.

The SEC listed all publicly traded companies with revenues greater than \$1.2 billion that were required to file statements certifying the truth of the firm's financial statements (see Appendix I) on their Web site (<http://www.sec.gov/rules/other/4-460list.htm>). Once a CEO certification was received by the SEC, it was scanned and posted on the SEC Web site and could then be viewed by the public. Of the 940 companies listed, 688 companies had to certify by 14 August 2002, since their financial year coincided with the calendar year. The remaining companies had until later in the year to comply. Of the 688 companies that were required to certify by 14 August

of 2002, 670 filed their certification in the form of Exhibit A (see Appendix I); twelve companies filed their own versions of certification, in which the CEO typically explained why he/she was unable to certify (e.g., the company needed to restate financial statements or the CEO assumed office after the previous financial reports were filed); and six companies did not file anything by 14 August 2002.<sup>10</sup> An additional 72 companies, which had until later in the year to certify, also filed certification by 14 August 2002, resulting in a total of 742 companies that certified their financial statements by 14 August 2002.

We used the event study method to estimate the stock market reaction to the CEO certification of the firm's financial statements. Like others using event study methodology (See Appendix II), our study has already taken into account prior firm performance and all of the factors that might influence firm performance, and thus is able to capture the impact on the firm's valuation beyond the normal return of one piece of information—the certification of the financial statements by the CEO.

In deciding on the appropriate study sample, it is critical to control for confounding events around the event date, since they may have an impact on the share price and thus cloud the relationship between the event of interest and shareholder returns (Arthur, 2003; Foster, 1980; McWilliams and Siegel, 1997; Salinger, 1992). Following McWilliams and Siegel's (1997) suggestions, this study utilized LexisNexis to check for confounding events such as declarations of dividends, mergers and acquisitions, unexpected earnings or losses, top executive appointments or departures, major contract awards and new product announcements, and significant liability suits during a 21-day window (from day -10 to day +10) around the actual date of the filing of the CEO certification. Of the 742 companies that officially certified their financial statements by 14 August 2002, 419 companies had no confounding events in the 21-day window and composed the sample for this study.

<sup>10</sup>Three of these companies filed certification in the form of Exhibit A by 22 August 2002, and the other three filed their own version of certification by 26 August 2002.

## Measures

### Dependent variable

This study used an event study methodology (Arthur, 2003; Friedman and Singh, 1989; Kumar and Sopariwala, 1992; McWilliams and Siegel, 1997; Westphal and Zajac, 1998) in measuring the stock market response to CEO certification with the abnormal stock returns, or the cumulative difference between a company's observed return and its expected return, during a specific period surrounding the actual filing date of CEO certification. We first collected data on each company's daily returns over a 255-day window ending on day -50 (i.e., 50 days prior to the actual filing date of CEO certification), from the Center for Research on Security Prices (CRSP) tapes. Then we calculated the normal or expected returns of these stocks during the period surrounding the actual filing date of CEO certification, using the rate of return on the CRSP equally weighted market index. The abnormal returns represent returns earned by the company after the markets have adjusted for the 'normal' return process. The abnormal returns then were cumulated over the number of days in the event window to derive a measure of the cumulative abnormal returns for each company. In this study, we used the cumulative abnormal returns during a three-day window (-1, +1) as the dependent variable (the actual filing date of CEO certification is day 0).

### Independent variables

**CEO shareholdings.** CEO shareholdings were measured by the proportion of a firm's outstanding shares owned by the CEO (Zajac and Westphal, 1996; Zhang, 2006).

**CEO external directorships.** CEO external directorships refer to the number of external boards of directors (other than the focal firm's board) on which a CEO is serving (Certo *et al.*, 2001; D'Aveni, 1990; Zhang, 2008).

**CEO tenure.** CEO tenure was measured as the number of years a CEO had been in office (Wu *et al.*, 2005; Zhang, 2006). Data on CEO shareholdings, CEO external directorship, and CEO tenure was collected from company proxy statements at the end of the prior year (i.e., year 2001).

*CEO and prior financial restatement.* We used the Financial Statement Restatement Database, a comprehensive listing of firms filing material financial restatements due to accounting irregularities (U.S. General Accounting Office, 2003), to identify whether a company in our sample filed a financial restatement from 1 January 1999 to mid-2002 (10 days prior to filing CEO certifications) (Arthaud-Day *et al.*, 2006). We then compared the dates of the restatement announcement (from LexisNexis) and CEO tenure. We created two dummy variables in order to ascertain the nature of the CEO's association with a firm's prior restatement. If a company filed at least one restatement during this time period, and the restatement announcement was within the CEO's tenure, the CEO is viewed as being 'associated' with the restatement and the variable 'CEO associated with the firm's prior restatement' was coded as '1.' Firms that had no financial restatements, as well as firms with restatements that preceded the CEO's tenure, were coded as '0.' If a company filed at least one restatement during this time period and the CEO was appointed after the restatement, the CEO is viewed as being 'not associated' with the restatement and the variable 'CEO not associated with the firm's prior restatement' was coded as '1.' Firms that had no financial restatements, as well as firms with restatements that occurred within the CEO's tenure were coded as '0.'

#### *Control variables*

To rule out alternative explanations for abnormal stock returns, the following control variables were included in our model.

*Filing on deadline.* When a company filed its CEO certification—on the deadline of 14 August 2002 or prior to the deadline—is an important signal that is under the CEO's control. This signal may affect the stock market's reaction to CEO certification. In order to control for this alternative explanation, we created a dummy variable, 'filing on deadline,' which was coded as '1' if a company's CEO certification was filed on the deadline of 14 August 2002 and '0' if the filing was prior to the deadline. As an alternative, we also measured filing time by counting the number of days that CEO certification was filed ahead of 14 August

2002. The results of our analysis using this alternative measure of the days until the deadline are consistent with those reported in this study.

*Firm size.* Firm size was measured as the natural log of firm sales in the year prior to the filing of CEO certification (Zhang, 2006). This data was collected from Compustat Fundamentals Annual.

*Firm performance.* Firm performance was measured as the industry adjusted return on assets (ROA) in the year prior to filing by subtracting the median ROA of all firms (excluding the focal firm) in the SEC's list that shared the focal firm's primary two-digit Standard Industrial Classification (SIC) code (Westphal and Khanna, 2004; Zhang, 2006, 2008). Data were obtained from Compustat Fundamentals Annual.

*CEO age.* The market may react differently to a firm with an older CEO since prior studies suggest that older executives can signal higher credibility (Cohen and Dean, 2005). CEO age was measured as of 2002.

*Board structure.* Board structure may signal differences in credibility (e.g., Certo *et al.*, 2001), which in turn may impact the stock market response to CEO certification. This study controlled for three board structural variables (Zajac and Westphal, 1996; Zhang, 2006). CEO duality was coded as '1' if the CEO was also the board chair and as '0' otherwise. Proportion of outside directors was measured as the proportion of outside directors on the board. Outside director shareholdings was measured as the proportion of the firm's outstanding shares owned by the outside directors. Data on these variables were obtained from company proxy statements at the end of the prior year (i.e., year 2001).

*Firm with prior restatement.* Hypotheses 4a and 4b propose that the stock market reaction to CEO certification will differ depending on whether the CEO is associated or not associated with the firm's prior financial restatement. To test these hypotheses, it is crucial to separate the effect of a previous restatement at the firm from the effect of the characteristics of the current CEO of the firm. More specifically, in order to assess the effect of the CEO's association or nonassociation with a

firm's prior restatement, it is important to control for the market response to a firm that had a prior financial restatement in our model. To separate the effect of the CEO from the effect of a prior restatement at the firm, we created a dummy variable focused solely on prior financial restatements: 'firm with prior restatement.' 'Firm with prior restatement' was coded as '1' if a company filed at least one restatement from 1 January 1999 to mid-2002 (10 days prior to filing CEO certifications) and '0' otherwise.

**Industry.** The industry in which a company is operating may influence the stock market response to CEO certification. For example, companies operating in the same industry as that of one of the scandal companies may be perceived as being tainted. To control for this alternative explanation, we identified each firm's primary two-digit SIC code industry and included 50 two-digit SIC code dummies in our model. On average, 90 percent of a firm's sales occur in its primary two-digit SIC code industry.

**Weight.** To prevent companies with high variance in daily stock returns from weighing more heavily in the analysis than companies with low variance in daily stock returns (Arthur, 2003), we also included a control variable to account for these differences. Weight is measured as the inverse of the variance of a company's daily stock returns over the 255-trading-day estimation period. Data for this measure was collected from the CRSP tapes.<sup>11</sup>

## RESULTS

Table 1 presents the means, standard deviations, and correlations for the variables for the 419 firms (except the 50 industry dummies and weight) in this study. Over the three-day event window ( $-1, +1$ ), there are, on average, positive abnormal returns for firms whose CEOs certified financial

<sup>11</sup> In supplementary analyses, we also controlled for four additional variables: (1) founder CEO; (2) independent audit committee (all members of the board's audit committee were outside directors); (3) presence of a formally designated CFO; and (4) firm with a later deadline than 14 August 2002, but filed certification by 14 August 2002. These controls are not significantly associated with the abnormal stock returns of CEO certification and do not affect our other results.

statements by the deadline of 14 August 2002. This is consistent with Chang *et al.*'s (2006) finding.

Table 2 presents multiple regression results of abnormal stock returns on the explanatory and control variables with the cumulative abnormal returns over the three-day event window (days  $-1, +1$ ) as the dependent variable. In Table 2, Model 1 includes only the control variables and Models 2a and 2b include the predictor variables.<sup>12</sup> These models are significant and explain 21.4 percent–24.4 percent of the variation of the abnormal stock returns associated with CEO certification.<sup>13</sup>

As predicted, a CEO's shareholdings are significant and positively associated with abnormal stock returns ( $b = 0.049, p < 0.05$ ). The significant and positive coefficient corresponds to an average stock price gain of \$2.81 million for one additional percent of CEO shareholdings over the three-day event window. These results support Hypothesis 1 that a CEO's shareholdings will be positively related to the firm's abnormal stock returns associated with CEO certification.

Hypothesis 2 predicts that a CEO's external directorships will be positively related to the firm's abnormal stock returns associated with CEO certification. The coefficient for CEO external directorships is positive and significant ( $b = 0.004, p < 0.05$ ). The significant and positive coefficient corresponds to an average stock price gain of \$22.91 million for one additional external directorship for the CEO over the three-day event window. Hence, the stock market responds more favorably to CEO certification when the CEO holds more external directorships, supporting Hypothesis 2.

Hypothesis 3 predicts that a CEO's tenure will be positively related to the firm's abnormal stock returns associated with CEO certification. The

<sup>12</sup> Note that firms without prior restatement (this information is captured in the dummy variable of 'firm with prior restatement'), firms in which the CEO is associated with the firm's prior restatement, and firms in which the CEO is not associated with the firm's prior restatement are mutually exclusive and collectively exhaustive. Thus the three dummy variables ('firm with prior restatement,' 'CEO associated with the firm's prior restatement,' and 'CEO not associated with the firm's prior restatement') cannot be included simultaneously in one model.

<sup>13</sup> Since a large proportion of variance in a firm's stock performance has been captured by the 'expected returns' of the stock, studies using an event study have typically reported low r-squares. Appendix II compares this study's r-squares with the r-squares of other studies recently published in *Strategic Management Journal* that also used an event study method. The variance explained in our study is comparable to these studies.

Table 1. Descriptive statistics and correlations<sup>a</sup>

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Abnormal returns (-1,+1)	0.005	0.06	—												
2. CEO shareholdings	0.06	0.14	.10	—											
3. CEO external directorships	1.17	1.39	.12	.02	—										
4. CEO tenure	6.55	7.05	.08	.28	—.11										
5. CEO associated with the firm's prior restatement	0.07	0.25	-.10	-.06	.00	—.06									
6. CEO not associated with the firm's prior restatement	0.03	0.16	.08	-.06	-.02	-.11	—.04								
7. Filing on deadline	0.31	0.46	.03	.04	.01	.02	.04	—.02							
8. Firm size	8.11	0.83	.08	-.06	.03	-.01	-.08	-.04	—.01						
9. Firm performance	-0.01	0.06	.10	-.08	.02	-.15	.00	.00	-.13	—.05					
10. CEO age	55.53	7.39	.15	.18	.14	.40	.01	-.06	.07	-.01	—.10				
11. CEO duality	0.71	0.45	-.02	.16	.15	.26	-.05	-.06	.09	-.03	-.06	—.23			
12. Proportion of outside directors	0.81	0.14	-.10	-.24	.06	-.18	.05	-.02	-.01	-.03	-.01	-.07	—.13		
13. Outside director shareholdings	0.04	0.09	-.01	.31	-.06	-.03	-.02	.04	-.04	-.03	.03	-.02	-.07	—	
14. Firm with prior restatement	0.10	0.29	-.05	-.09	-.01	-.01	.83	.50	.04	.05	-.01	-.03	-.08	.04	.01

<sup>a</sup> Correlations larger than 0.09 are significant at the level of  $p < 0.05$ , and those larger than 0.12 are significant at the level of  $p < 0.01$ .

coefficient for CEO tenure is positive but not significant ( $b = 2.53E-4$ , n.s.). Considering the high correlation between CEO age and CEO tenure ( $r = 0.40$ ,  $p < 0.01$ ), in supplementary analyses we dropped CEO age and the results did not change. Therefore, Hypothesis 3 is not supported.

Hypothesis 4a predicts that a CEO associated with his/her company's prior financial restatement will negatively impact the firm's abnormal stock returns associated with CEO certification, and Hypothesis 4b predicts that a CEO not associated with his/her company's prior financial restatement will positively impact the firm's abnormal stock returns associated with CEO certification. Model 2a controls for 'firm with prior restatement' and examines the effect of 'CEO associated with the firm's prior restatement.' In this model specification, firms in which the CEO is associated with the firm's prior restatement are compared to firms in which the CEO is not associated with the firm's prior restatement. The coefficient for 'CEO associated with the firm's prior restatement' is significant and negative ( $b = -0.056$ ,  $p < 0.01$ ) and the coefficient corresponds to an average stock price loss of \$320.71 million over the three-day event window. This result suggests that relative to firms in which the CEO is not associated with the firm's prior restatement, firms in which the CEO is associated with the firm's prior restatement have significant negative abnormal stock returns of CEO certification.

Model 2b excludes the control variable of 'firm with prior restatement' and includes the two explanatory variables: 'CEO associated with the firm's prior restatement' and 'CEO not associated with the firm's prior restatement' simultaneously (see Footnote 12). In this model specification, firms in which the CEO is associated with the firm's prior restatement and firms in which the CEO is not associated with the firm's prior restatement are compared to the baseline group of firms that did not have a prior restatement. Results of Model 2b suggest that 'CEO associated with the firm's prior restatement' is significant and negatively related to the abnormal returns of CEO certification ( $b = -0.018$ ,  $p < 0.05$ ) and 'CEO not associated with the firm's prior restatement' is significant and positively related to the abnormal returns of CEO certification ( $b = 0.038$ ,  $p < 0.05$ ). These results thus support the predictions of Hypotheses 4a and 4b.

To test the robustness of our findings, we have done the following supplementary analyses. First,

Table 2. Results of regression analyses for predicting abnormal stock returns<sup>a</sup>

Variables	Model 1	Model 2a	Model 2b
Intercept	-0.072† (0.043)	-0.074† (0.043)	-0.074† (0.043)
<b>Control variables</b>			
50 Industry dummies	Included***	Included***	Included***
Filing on deadline	0.004 (0.006)	0.004 (0.006)	0.004 (0.006)
Firm size	0.005 (0.004)	0.005 (0.004)	0.005 (0.004)
Firm performance	0.079† (0.049)	0.085† (0.048)	0.085† (0.048)
CEO age	9.54E-4* (4.16E-4)	7.23E-4† (4.43E-4)	7.23E-4† (4.43E-4)
CEO duality	-0.004 (0.007)	-0.008 (0.007)	-0.008 (0.007)
Proportion of outside directors	-0.028 (0.021)	-0.018 (0.022)	-0.018 (0.022)
Outside director shareholdings	-0.013 (0.032)	-0.033 (0.034)	-0.033 (0.034)
Firm with prior restatement	-0.005 (0.010)	0.038* (0.018)	
Weight	2.30E-6 (1.88E-6)	2.27E-6 (1.86E-6)	2.27E-6 (1.86E-6)
<b>Explanatory variables</b>			
CEO shareholdings		0.049* (0.025)	0.049* (0.025)
CEO external directorships		0.004* (0.002)	0.004* (0.002)
CEO tenure		2.53E-4 (4.86E-4)	2.53E-4 (4.86E-4)
CEO associated with the firm's prior restatement		-0.056** (0.021)	-0.018* (0.010)
CEO not associated with the firm's prior restatement			0.038* (0.018)
F-value	1.65**	1.81***	1.81***
R-squared	0.214	0.244	0.244
Adjusted r-squared	0.084	0.109	0.109
Increase in r-square	—	0.030**	0.030**

N = 419.

Significance level: † p &lt; 0.10, \* p &lt; 0.05, \*\* p &lt; 0.01, \*\*\* p &lt; 0.001 (one-tailed test for hypothesized effects and two-tailed test for control variables).

<sup>a</sup> In supplementary analyses, we dropped CEO age, and the results did not change. We also controlled for founder CEO, independent audit committee, presence of a CFO, and firm with a later deadline (for measurements of these additional controls, see Footnote 11) and the results did not change.

we added the squared term of CEO tenure and the squared term of CEO stock holdings, respectively. Our result indicates that these squared terms are not significantly related to the abnormal returns and did not change our other results. Second, since both the CEO and CFO (or treasurer and controller in the absence of CFO) were required to file certifications, the stock market reaction may differ when the CEO and CFO filed certifications

on different dates from when they filed on the same date. We tracked the dates when the CEO and CFO filed their certifications. In our sample, only two companies filed CEO and CFO certifications on different days. In both firms, the CEO filed certification before the corresponding CFO did. Thus we are able to rule out the possibility that CFO certification could leak information on CEO certification, and thus affect the stock market reaction

to CEO certification. In supplementary analysis, we included a dummy variable, which was coded as '1' if the CEO and CFO filed certification on different dates and as '0' otherwise. Our analysis indicates that this dummy variable is not significantly related to the stock market reaction to CEO certification and did not change our overall results.

Third, in our sample, two companies filed more than one financial restatement (each of them filed two restatements) during the study period. We included a dummy variable coded as '1' if a company filed more than one restatement and as '0' otherwise. Our analysis indicates that this dummy variable is not significantly related to the abnormal returns and did not change our overall results. Fourth, since CEO certifications were filed in 2002, restatements filed in the same year of CEO certifications (i.e., 2002) may have a different effect, compared to restatements filed in other years. We created a dummy variable coded as '1' if a company filed a restatement in 2002 and as '0' otherwise. Our analysis indicates that it was not significantly related to the abnormal returns of CEO certification and did not change our overall results. Fifth, if a company filed a restatement during a CEO's tenure, it is possible that the restated period (and the problems that necessitate the restatement) may be prior to the CEO's tenure. In our sample, only one company had this situation. We created a dummy variable for this company. Our analysis indicates that this variable was not significantly related to the abnormal returns of CEO certification and did not change our overall results.

## DISCUSSION AND CONCLUSION

Utilizing market signaling theory, and building off prior studies that have examined how director and top management characteristics influence investor valuation of the firm, we examined the impact of CEO characteristics on how the stock market responded to CEO certification. Since it is not possible to fully ascertain the truthfulness of the firm's financial statements from the act of CEO certification, investors utilize observable attributes of the CEO as proxies by which to determine the credibility of CEO certification. Consistent with prior research that has found that investors utilize attributes of the firm's top management team to differentiate the quality of IPOs (Cohen and Dean, 2005; Higgins and Gulati, 2003; 2006), there was a

significant and positive response by the stock market to CEO certification for firms where the CEO had larger shareholdings and held a greater number of external directorships. As a CEO's shareholdings increase, agency costs diminish and thus investors lend more credence to their certification. Similarly, as in the case of IPOs, a CEO with more external directorships may signal greater social and human capital (Certo, 2003; Lester *et al.*, 2006) and thus be perceived as being more credible and trustworthy.

Results of this study also show there was a significant and negative response by the stock market to CEO certification for firms where the CEO was associated with his/her company's prior financial restatements (i.e., restatements were filed during the CEO's tenure). This finding suggests that if a CEO was associated with his/her company's prior financial restatement, the CEO's certification of his/her company's financial statements was less trustworthy to investors. As a result, the stock market reacted negatively to the CEO's certification. Further, our results show there was a significant and positive response by the stock market to CEO certification for firms where the CEO came in after his/her company's financial restatement. This result provides evidence to support the key assumption implicit in prior studies (e.g., Arthaud-Day *et al.*, 2006; Desai *et al.*, 2006), that a change in the firm's CEO after the firm has had a financial restatement can help restore investor confidence in the firm's financial statements. Overall, our results suggest that the stock market's assessment of CEO certification credibility (or the CEO's general reputation) is closely linked to whether or not the CEO is associated with the firm's prior restatement, if any.

However, we did not find significant evidence to support the hypothesis that a CEO's tenure affects the stock market's reaction to CEO certification. This result suggests that a CEO's tenure did not signal differences in CEO certification credibility. Instead, we found some evidence suggesting that a CEO's age has a positive impact on the abnormal returns of CEO certification. This finding is consistent with Cohen and Dean's (2005) findings that top management team age is negatively related to IPO underpricing (run-up). As Cohen and Dean argued, old managers would bring legitimacy to the firm 'as age often implies knowledge, experience, wisdom, and established networks' (Cohen and Dean, 2005: 686).

Overall, our results are consistent with that of Chang *et al.* (2006) that on average the stock market responded positively to the certification of the firm's financial statements by the CEO. Our study goes further, however, in finding that the positive market response was greater for firms led by a CEO who was deemed to be more credible as signaled through greater stock ownership, more external directorships, and not being associated with his/her company's prior financial restatement. In contrast, a CEO who had previously been associated with the financial restatement at his/her firm was perceived as less credible, and investors tended to discount the value of the certification—which may be called the 'liar's discount' from the market (King, 1988). These findings can significantly add to our knowledge about the impact of the SEC's new legislation and how the stock market responded to the new legislation.

This study also contributes to the emerging research stream that focuses on the signaling role of upper echelon attributes. As noted earlier, conventional upper echelon theory (Hambrick and Mason, 1984) mainly focuses on how top management team attributes can influence what executives do, which in turn can influence organizational outcomes. In comparison, studies using the signaling approach are interested in how upper echelon attributes can signal a firm's quality to external constituents, independent of what they do. Our study contributes to this line of research by examining how CEO attributes impact how investors respond to what a CEO does (i.e., CEO certification). The sudden imposition by the SEC in June of 2002 that the CEOs and CFOs of all public firms of a certain size had to attest to the truthfulness of their financial statements within a two-month period created a natural experimental setting to test this research question. In this setting, a CEO's attributes did not affect his/her actions since in our sample all CEOs filed a certification using the same format and by the same deadline as required by the SEC. But a CEO's attributes can affect how investors perceive and thus react to CEO certification. Compared to previous studies, the present research setting affords a relatively clean explanation of the market signaling role of CEO attributes.

Further, while previous studies have mainly focused on the signaling role of external ties of the upper echelon (Certo, 2003; Cohen and Dean, 2005; Higgins and Gulati, 2003, 2006), this study examined the signaling role of an array

of CEO attributes, including the CEO's shareholdings, external directorships, tenure as CEO, and whether or not the CEO was associated with his/her company's prior financial restatement. Thus, our findings can inspire future research in this area. Particularly, it is worth noting that for the first time in the literature, this study used a CEO's association and nonassociation with his/her company's prior financial restatement as a signal of the credibility of CEO action (i.e., CEO certification in this research context). Our results suggest that (1) if a CEO is associated with his/her company's prior financial restatement, the CEO becomes less trustworthy in the eyes of investors; and (2) replacing the CEO after a firm has had a financial restatement helps restore investor confidence in the firm. Therefore, our findings also contribute to the literature on financial restatements.

### **Limitations and future research directions**

Our study provided evidence that observable CEO characteristics can significantly affect how the stock market responds to CEO certification. This study, however, has some limitations that need to be acknowledged, which also offer fruitful directions for future research. First, while our study focuses on the first wave of CEO certification, it might also be interesting to compare investor reactions to these initial certifications with later compliance to other aspects of Sarbanes-Oxley (e.g., Section 404). It is possible that as firms invest in the internal audit controls to comply with the new standards of financial statement integrity, market uncertainty may diminish and as a result compliance may not draw a significant market reaction. Second, although most CEO certifications utilize the Exhibit A form (Appendix I), future research may code contents of certification letters and test for differences in abnormal returns based on contents of certifications.

Third, as our results showed that a CEO's association or nonassociation with his/her firm's prior financial restatement can have an important impact on the stock market's reaction to the CEO's certification, future research needs to further explore how attributes of these restatements may affect the stock market's reaction. Although in supplementary analyses, we found that firms with multiple restatements do not significantly differ from those with one restatement in the stock market's reaction, it is important not to draw any conclusion

on this issue. This is because in our sample, only 39 companies filed restatements during the study period. Thus, we are limited in our ability to ascertain how the attributes of prior financial restatements (such as frequency, magnitude, restatement prompter, and the initial stock market reaction to the restatement) may have impacted the stock market's response to CEO certification.

Lastly, by focusing on the first wave of CEO certification by the SEC, we were limited to studying large, publicly traded firms. Whether our findings on the signaling effect of CEO attributes can be generalizable to privately held firms or smaller, mid-cap public firms poses an interesting research question. Future research may want to compare the financial market response to large companies' CEO certification with the stock market response to smaller and foreign companies' CEO certification, which is required by the Sarbanes-Oxley Act to file at a later date.

In conclusion, utilizing a relatively rare empirical setting, we examined how observable CEO attributes may affect investor reactions to CEO actions. We proposed and found that CEO attributes can serve as market signals regarding the credibility of CEO certification, and thus affect the stock market's response to CEO certification.

## ACKNOWLEDGEMENTS

We would like to thank *SMJ* Editor Edward Zajac and the two anonymous referees for their constructive suggestions and insightful comments. The paper benefited significantly from the comments of Albert A. Cannella, Mason Carpenter, Marta Geletkanycz, Donald Hambrick, Gerry Sanders, Wei Shen, and other participants of the BYU-INSEAD Executive Leadership Conference, Salt Lake City, Utah, March 2006.

## REFERENCES

- Adler PS, Kwon SW. 2002. Social capital: prospects for a new concept. *Academy of Management Review* **27**: 17–40.
- Arthaud-Day ML, Certo ST, Dalton CM, Dalton DR. 2006. A changing of the guard: executive and director turnover following corporate financial restatements. *Academy of Management Journal* **49**: 1119–1136.
- Arthur MM. 2003. Share price reactions to work-family initiatives: an institutional perspective. *Academy of Management Journal* **46**: 497–505.
- Beckett P. 2002. SEC order forces executives to swear by their numbers. *Wall Street Journal* 5 July; A1.
- Brickley JA, Linck JS, Coles JL. 1999. What happens to CEOs after they retire? New evidence on career concerns, horizon problems, and CEO incentives. *Journal of Financial Economics* **52**: 341–377.
- Capron L, Pistre N. 2002. When do acquirers earn abnormal returns? *Strategic Management Journal* **23**(9): 781–794.
- Carpenter MA, Geletkanycz MA, Sanders WG. 2004. Upper echelons research revisited: antecedents, elements, and consequences of top management team composition. *Journal of Management* **30**: 749–778.
- Certo ST. 2003. Influencing initial public offering shareholders with prestige: signaling with board structures. *Academy of Management Review* **28**: 432–446.
- Certo ST, Daily CM, Dalton DR. 2001. Signaling firm value through board structure: an investigation of initial public offerings. *Entrepreneurship Theory & Practice* **26**: 33–50.
- Chang H, Chen J, Liao WM, Mishra B. 2006. CEOs'/ CFOs' swearing by the numbers: does it impact share price of the firm? *Accounting Review* **81**: 1–27.
- Cohen BD, Dean TJ. 2005. Information asymmetry and shareholder evaluation of IPOs: top management team legitimacy as a capital market signal. *Strategic Management Journal* **26**(7): 683–690.
- D'Aveni RA. 1990. Top management prestige and organizational bankruptcy. *Organization Science* **1**: 121–142.
- Davis GF. 1991. Agents without principles? The spread of the poison pill through the intercorporate network. *Administrative Science Quarterly* **36**: 583–613.
- Davis GF, Mizruchi MS. 1999. The money center cannot hold: commercial banks in the U.S. system of corporate governance. *Administrative Science Quarterly* **44**: 215–239.
- Dechow PM, Sloan RG, Sweeney AP. 1996. Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* **13**: 1–13.
- Desai H, Hogan C, Wilkins M. 2006. The reputational penalty for aggressive accounting: earnings restatements and management turnover. *Accounting Review* **81**: 83–112.
- Economist. 2002a. In search of honesty. August 17: 49.
- Economist. 2002b. I swear. August 17: 11.
- Feroz EH, Park K, Pastena V. 1991. The financial and market effects of the SEC's accounting and auditing enforcement release. *Journal of Accounting Research* **29**: 107–142.
- Finkelstein S, Hambrick DC. 1990. Top-management-team tenure and organizational outcomes: the moderating role of managerial discretion. *Administrative Science Quarterly* **35**: 484–503.
- Finkelstein S, Hambrick DC. 1996. *Strategic Leadership: Top Executives and Their Effects on Organizations*. West Publishing Company: Los Angeles, CA.
- Foster G. 1980. Accounting policy decisions and capital market research. *Journal of Accounting and Economics* **2**: 29–62.

- Friedman SD, Singh H. 1989. CEO succession and shareholder reaction: the influence of organizational context and event content. *Academy of Management Journal* **32**: 718–744.
- Geletkanycz MA, Hambrick DC. 1997. The external ties of top executives: implications for strategic choice and performance. *Administrative Science Quarterly* **42**: 654–681.
- Gulati R, Higgins MC. 2003. Which ties matter when? The contingent effects of interorganizational partnerships on IPO success. *Strategic Management Journal* **24**(2): 127–144.
- Hambrick DC, Mason PA. 1984. Upper echelons: the organization as a reflection of its top managers. *Academy of Management Review* **9**: 193–206.
- Hambrick DC, Fukutomi GDS. 1991. The seasons of a CEO's tenure. *Academy of Management Review* **16**: 719–742.
- Han KC, Suk DY. 1998. Insider ownership and signals: evidence from stock split announcement effects. *Financial Review* **33**: 1–24.
- Harris D, Helfat CE. 1997. Specificity of CEO human capital and compensation. *Strategic Management Journal* **18**(11): 895–920.
- Haunschild P. 1993. Interorganizational imitation: the impact of interlocks on corporate acquisition. *Administrative Science Quarterly* **38**: 564–592.
- Higgins MC, Gulati R. 2003. Getting off to a good start: the effects of upper echelon affiliations on underwriter prestige. *Organization Science* **14**: 244–263.
- Higgins MC, Gulati R. 2006. Stacking the deck: the effects of top management backgrounds on shareholder decisions. *Strategic Management Journal* **27**(1): 1–25.
- Hillman AJ, Dalziel T. 2003. Boards of directors and firm performance: integrating agency and resource dependence perspectives. *Academy of Management Review* **28**: 383–396.
- Holl P, Kyriazis D. 1997. Wealth creation and bid resistance in U.K. takeover bids. *Strategic Management Journal* **18**(6): 483–498.
- Jensen M, Meckling W. 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* **3**: 305–360.
- Johnson JL, Ellstrand AE, Dalton DR, Dalton CM. 2005. The influence of the financial press on stockholder wealth: the case of corporate governance. *Strategic Management Journal* **26**(5): 461–471.
- King R. 1988. The 'liar's discount.' *Forbes* May 30: 81–82.
- Kinney WR, McDaniel LS. 1989. Characteristics of firms correcting previously reported quarterly earnings. *Journal of Accounting and Economics* **11**: 71–93.
- Kumar R, Sopariwala PR. 1992. The effect of adoption of long-term performance plans on stock prices and accounting numbers. *Journal of Finance* **67**: 561–573.
- Leland HE, Pyle DH. 1977. Informational asymmetry, financial structure, and financial intermediation. *Journal of Finance* **32**: 371–387.
- Lester RH, Certo ST, Dalton CM, Dalton DR, Cannella AA. 2006. Initial public offering investor valuations: an examination of top management team prestige and environmental uncertainty. *Journal of Small Business Management* **44**: 1–26.
- McWilliams A, Siegel D. 1997. Event studies in management research: theoretical and empirical issues. *Academy of Management Journal* **40**: 626–657.
- Miller D, Shamsie J. 2001. Learning across the life cycle: experimentation and performance among the Hollywood studio heads. *Strategic Management Journal* **22**(8): 725–745.
- Owers JE, Lin CM, Rogers RC. 2002. The information content and valuation ramifications of earnings restatements. *International Business and Economics Research Journal* **5**: 71–84.
- Palmrose ZV, Richardson VJ, Scholz SW. 2004. Determinants of markets reactions to restatement announcements. *Journal of Accounting and Economics* **37**: 58–89.
- Palmrose ZV, Scholz SW. 2004. The circumstances of legal consequences of non-GAAP reporting: evidence from restatements. *Contemporary Accounting Research* **21**: 139–190.
- Park NK, Mezias JM. 2005. Before and after the technology sector crash: the effect of environmental munificence on stock market response to alliances of e-commerce firms. *Strategic Management Journal* **26**(11): 987–1007.
- Pfeffer J, Salancik GR. 1978. *The External Control of Organizations*. Harper & Row: New York.
- Podolny JM, Baron JN. 1997. Resources and relationships: social networks and mobility in the workplace. *American Sociological Review* **62**: 673–693.
- Salinger MA. 1992. Value event studies. *Review of Economics and Statistics* **74**: 671–677.
- Schipper K. 1989. Commentary on earning management. *Accounting Horizons* **3**: 91–102.
- Shen W, Cannella AA. 2002. Revisiting the performance consequences of CEO succession: the impacts of successor type, postsuccession senior executive turnover, and departing CEO tenure. *Academy of Management Journal* **45**: 717–734.
- Shen W, Cannella AA. 2003. Will succession planning increase shareholder wealth? Evidence from investor reactions to relay CEO successions. *Strategic Management Journal* **24**: 191–198.
- Spence A. 1973. Job market signaling. *Quarterly Journal of Economics* **87**: 355–379.
- Srinivasan S. 2005. Consequences of financial reporting failure for outside directors: evidence from accounting restatements and audit committee members. *Journal of Accounting Research* **43**: 291–334.
- Suchman MC. 1995. Managing legitimacy: strategic and institutional approaches. *Academy of Management Review* **20**: 571–610.
- Sutton RI, Callahan AL. 1987. The stigma of bankruptcy: spoiled organizational image and its management. *Academy of Management Journal* **30**: 405–436.
- Tirole J. 1996. A theory of collective reputations (with applications to the persistence of corruption and to firm quality). *Review of Economic Studies* **63**: 1–22.

- Uhlenbruck K, Hitt MA, Semadeni M. 2006. Market value effects of acquisitions involving Internet firms: a resource-based analysis. *Strategic Management Journal* **27**(10): 899–914.
- U. S. General Accounting Office (GAO). 2003. Financial statement restatement database. Available at: <http://www.gao.gov/new.items/d03395r.pdf>.
- Westphal JD, Zajac EJ. 1998. The symbolic management of stockholders: corporate governance reforms and shareholder reactions. *Administrative Science Quarterly* **43**: 127–153.
- Westphal JD, Khanna P. 2004. Keeping directors in line: social distancing as a control mechanism in the corporate elite. *Administrative Science Quarterly* **48**: 361–398.
- Wiersema MF, Bantel KA. 1992. Top management team demography and corporate strategic change. *Academy of Management Journal* **35**: 91–121.
- Worrell DL, Nemec C, Davidson WN III. 1997. One hat too many: key executive plurality and shareholder wealth. *Strategic Management Journal* **18**(6): 499–507.
- Wu S, Levitas E, Priem RL. 2005. CEO tenure and company invention under differing levels of technology dynamism. *Academy of Management Journal* **48**: 859–873.
- Yu T, Lester RH, Sengul M. 2002. Reputational spillover: how a reputational crisis affects competitive action. *Best Paper Proceedings of the Academy of Management*.
- Zajac EJ, Westphal JD. 1996. Who shall succeed? How CEO/board preferences and power affect the choice of new CEOs. *Academy of Management Journal* **39**: 64–90.
- Zajac EJ, Westphal JD. 2004. The social construction of market value: institutionalization and learning perspectives on stock market reactions. *American Sociology Review* **69**: 433–457.
- Zhang Y. 2006. The presence of a separate COO/president and its impact on strategic Change and CEO dismissal. *Strategic Management Journal* **27**(3): 283–300.
- Zhang Y. 2008. Information asymmetry and the dismissal of newly appointed CEOs: an empirical investigation. *Strategic Management Journal* **29**(8): 859–872.
- Zhang Y, Rajagopalan N. 2004. When the known devil is better than an unknown god: an empirical study of the antecedents and consequences of relay CEO successions. *Academy of Management Journal* **47**: 483–500.
- (1) To the best of my knowledge, based upon a review of the covered reports of [company name], and, except as corrected or supplemented in a subsequent covered report:
- no covered report contained an untrue statement of a material fact as of the end of the period covered by such report (or in the case of a report on Form 8-K or definitive proxy materials, as of the date on which it was filed); and
  - no covered report omitted to state a material fact necessary to make the statements in the covered report, in light of the circumstances under which they were made, not misleading as of the end of the period covered by such report (or in the case of a report on Form 8-K or definitive proxy materials, as of the date on which it was filed).
- (2) I [have/have not] reviewed the contents of this statement with [the Company's audit committee] [*in the absence of an audit committee*, the independent members of the Company's board of directors].
- (3) In this statement under oath, each of the following, if filed on or before the date of this statement, is a 'covered report':
- [identify most recent Annual Report on Form 10-K filed with the Commission] of [company name];
  - all reports on Form 10-Q, all reports on Form 8-K and all definitive proxy materials of [company name] filed with the Commission subsequent to the filing of the Form 10-K identified above; and
  - any amendments to any of the foregoing.
- [Signature\*] Subscribed and sworn to before me  
 [Name] this \_\_\_\_\_ day of \_\_\_\_\_ 2002.  
 [Date]  
 /S/ \_\_\_\_\_  
 Notary Public  
 My Commission Expires:  
 [\* Separate statements to be signed by each of the Principal Executive Officer and the Principal Financial Officer.]

## APPENDIX I

### Exhibit A (The SEC File No. 4-460) Statement Under Oath of Principal Executive Officer and Principal Financial Officer Regarding Facts and Circumstances Relating to Exchange Act Filings

I, [Name of principal executive officer or principal financial officer], state and attest that:

## APPENDIX II: COMPARISON OF R-SQUARE OF EVENT STUDIES

Studies	Length of event window	R-square of full models	Adjusted r-square of full models	R-square explained by explanatory variables
This study	3 days	0.244	0.109	0.030
Holl and Kyriazis (1997)	6 months	0.23–0.33	N.A.	N.A.
Worrell, Nemec, and Davidson (1997)	7 days	0–0.025	0–0.025	0–0.025
Capron and Pistre (2002)	22 days	0.13–0.33	N.A.	0.06–0.20
Shen and Cannella (2003)	3 days	0.001–0.262	0.000–0.209	N.A.
Johnson <i>et al.</i> (2005)	3 days	0.13	N.A.	0.05–0.07
Park and Mezias (2005)	3 days	0.07–0.12	N.A.	0.04
Uhlenbruck, Hitt, and Semadeni (2006)	1 day	N.A.	0.01–0.04	0.01–0.04