DIRECTOR INTERLOCKS AND SPILLOVER EFFECTS OF REPUTATIONAL PENALTIES FROM FINANCIAL REPORTING FRAUD

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I examined the spillover of reputational penalties between firms in the context of financial reporting fraud. Drawing from signaling and attribution theories, I used financial event study methodology and found significant reputational penalties in 45 (18.4%) out of 244 firms with director interlocks to 30 firms accused of financial reporting fraud in the United States. Furthermore, logistic regression analysis suggested that firms thus associated with accused firms were more likely to experience significant reputational penalties when the interlocking directors held audit or governance chair positions in them. This likelihood decreased when these firms’ observable governance structures signaled effective corporate governance.

One of the most widely studied forms of interorganizational networks is the director interlock. Two firms are said to be connected by a director interlock when a person affiliated with one firm sits on the corporate board of the other firm (Mizruchi, 1996). Prior research has furnished compelling arguments for positive effects of interlocks, which include acting as a source of information about organizational practices (Davis, 1991), conferring legitimacy to firms seeking initial public offerings (IPOs; Certo, 2003), and reducing dependencies on resource providers (Pfeffer & Salancik, 1978). Although extant research has shed much light on the positive consequences of director interlocks on organizational actions and outcomes, little is known about unintended negative consequences for interlocked firms. In fact, the broader interorganizational network literature has largely examined the positive effects of interorganizational ties (Stuart, Hoang, & Hybels, 1999; Zaheer & Bell, 2005). For instance, Stuart et al. (1999) found evidence that positive reputation may spill over between interorganizational networks of exchange partners.

The purpose of this study was to examine whether director interlocks act as channels whereby reputational penalties experienced by one firm spill over to other firms. Negative spillovers between firms have been documented in different settings (Beatty, Bunsis, & Hand, 1998; Jordan, Peek, & Rosengren, 2000). For instance, Beatty et al. (1998) found indirect economic penalties via Securities and Exchange Commission (SEC) investigations of underwriters in the United States. The study reported that prior clients of underwriters under SEC investigation experienced a significant average decline in market value of 3.1 percent over a three-day window around the investigation announcement date. Beatty and colleagues suggested that the “reputation of a client is positively related to that of its underwriter” (1998: 160) because a deterioration of the underwriter’s assurance-based reputation capital increases uncertainty about the truthfulness of the client’s projection of cash flows. Other studies have also demonstrated evidence of negative spillovers between firms (Jensen, 2006; Uzzi, 1997), yet these studies, like Beatty et al. (1998), only examine economic (or exchange) ties between firms.

The question of whether reputational penalties spill over between firms connected by director interlocks is likely to interest proponents of the resource role of corporate boards. In addition to monitoring top executives, outside directors (board members who are not otherwise affiliated with the firm on whose board they serve) provide resources that improve firm performance (Hillman & Dalziel, 2003). For instance, outside directors have an important role to play in a firm’s strategic decision making process (Westphal & Fredrickson, 2001) that improves the firm’s performance (Judge & Zeithaml, 1992; Westphal, 1999). To the extent that spillovers occur through director interlocks, the benefits of appointing outside directors for their

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reputational penalties arising from allegations of fraudulent acts, spillovers, if present but left undetected, are likely to have implications for policy makers since the social costs of these acts would have been understated.

To address the research question, I examined reputational penalties arising from allegations of financial reporting fraud, which I empirically defined as decline in a firm’s market value as a result of fraud allegations. Karpoff and Lott (1993) argued that firms accused of financial reporting fraud experience reputational penalties. They reported that firms accused of financial reporting fraud experienced a significant average decline in market value of 4.66 percent over a two-day window, a decline that could not be solely explained by the potential or actual legal penalties imposed on firms accused or found guilty of fraud. Instead, the decline in market value could be largely attributed to lost reputation, in the form of higher expected cost of capital as investors revise upward their expectations of future fraudulent acts.

I extend Karpoff and Lott’s work by suggesting that financial reporting fraud allegations create uncertainties in the accounting practices and effectiveness of board monitoring in an accused firm, causing an increase in investors’ expectations of future fraudulent acts and the firm’s cost of capital. Next, I draw upon signaling and attribution theories to explain why these uncertainties may carry over to other firms connected to the accused firm by director interlocks (henceforth, “associated firms”), resulting in the spillover of reputational penalties to these firms. Given that interlocks between firms are formed by individual directors, the theory underlying the proposed spillover focuses primarily on the individual level of analysis. Finally, I suggest that spillover effects, if any, are likely to be information-based (Jordan et al., 2000). I draw upon signaling theory to develop several hypotheses that discriminate between associated firms that experience significant spillover effects and those that do not.

I tested for the spillover of reputational penalties using financial event study methodology on a sample of 244 associated firms with director interlocks to 30 firms accused of financial reporting fraud in the United States between 1998 and 2002. Furthermore, I used logistic regression analysis to examine whether the board positions of interlocking directors and the quality of observable governance structures in associated firms affect the likelihood that these firms experience significant spillovers. The results provide evidence that reputational penalties do spill over from accused to associated firms, but these spillovers are not uniform.

### FINANCIAL REPORTING FRAUD AND REPUTATIONAL PENALTIES

Financial reporting frauds are misrepresentations by agents of a publicly listed firm of the firm’s financial condition (Karpoff & Lott, 1993). Fraudulent misrepresentations violate “generally accepted accounting principles” (GAAP), often to the end of achieving a desired level of reported earnings (Rosner, 2003). According to the SEC’s Annual Reports, enforcement actions have almost doubled in recent years, going from 477 cases in 1998 to 947 cases in 2005. Furthermore, a record annual amount of over three billion dollars in disgorgement and penalties was ordered in SEC enforcement cases for the consecutive years 2004 and 2005. This represents more than a threefold increase over the 1999 amount of 841 million dollars. Not surprisingly, the increasing significance of financial reporting fraud has captured the attention of organizational scholars.

Three studies have an important bearing on the concept of reputational penalties arising from financial reporting fraud. Feroz, Park, and Pastena (1991) reported that the first press disclosures of financial reporting violations are associated with average two-day “abnormal returns” of −13 percent for accused firms. Feroz and colleagues suggested that the negative market returns indicated that investors lowered their expectations of future earnings of the accused firms because information on the disputed accounting has implications for these firms’ future economic prospects.

Shortly thereafter, Karpoff and Lott (1993) observed that formal court sanctions on firms that committed fraud often represent a small fraction of the damage produced by the fraud. Instead of suggesting that criminal penalties for corporate fraud are insufficient, they argued that the optimal criminal penalties should be lower than the social cost of the fraud because the reputational penalties for corporate fraud have been overlooked. A firm’s lost reputation, defined as the present value of lower output prices or higher input prices, is captured by a decrease in the market value of the firm’s common stock. In the context of financial reporting fraud, Karpoff and Lott argued that such fraud can increase a firm’s cost of obtaining new funds, as
investors increase their expectations that the firm will act fraudulently in the future.

More recently, Palmrose, Richardson, and Scholz (2004) documented an average abnormal return of –9.2 percent over a two-day window in response to financial restatement announcements and found that more negative returns were associated with restatements involving financial reporting fraud. Palmrose and colleagues argued that financial reporting fraud creates uncertainty about the reliability and credibility of management representations. This uncertainty increases the perceived “information asymmetry” between investors and management, which subsequently leads investors to apply a higher discount rate to future cash flows, which decreases the market values of accused firms.

Taken together, these three studies suggest that market sanctions in the form of reputational penalties accompany allegations of financial reporting fraud. These reputational penalties may be attributed to changes in investors’ expectations. Specifically, financial reporting fraud allegations increase uncertainty about the legitimacy of an accused firm’s accounting practices. Conformity with GAAP is not only a normative expectation of investors, but also a regulatory requirement with legal sanctions for noncompliance. Financial reporting fraud allegations also increase uncertainty about the effectiveness of board monitoring. The 2002 BusinessWeek ratings of the best and worst boards demonstrate such concern about fraud; firms under ongoing SEC investigation, such as Global Crossing, Xerox, Qwest, and others, were singled out as having bad board governance (Lavelle, 2002). Furthermore, recent financial reporting frauds have triggered changes in U.S. corporate governance rules that affect corporate boards, such as the Sarbanes-Oxley Act of 2002. In addition, several empirical studies have established a negative association between the quality of a firm’s board and the incidence of financial reporting fraud or material earnings misstatements (Beasley, 1996; DeChow, Sloan, & Sweeney, 1996).

Increased uncertainties over a firm’s accounting practices and the effectiveness of board monitoring widen the perceived information asymmetry between investors and management. Investors not only lack reliable and credible information on the state of an accused firm’s financial condition, but also question the effectiveness of the firm’s board to detect and prevent fraudulent acts. As a result of these risks, investors are likely to demand higher returns for their investments, hence increasing the cost of capital for an accused firm. Furthermore, investors may lower the expected future cash flows of the firm in anticipation of costly management and governance changes going forward.

**REPUTATIONAL PENALTIES AND SPILLOVER EFFECTS**

A theory on the spillover of reputational penalties between interlocked firms must address two key questions: (1) Why do investors direct their attention toward associated firms? and (2) Why does the existence of an interlocking director increase the uncertainties about the accounting practices and the effectiveness of board monitoring in associated firms?

**Signaling Theory**

Signaling theory explains why investors are likely to focus their attention on associated firms. Signaling theory is relevant for investment decisions under information asymmetry. According to Spence (1973), hiring decisions are fraught with uncertainty, given that potential employers cannot directly observe the marginal contributions of potential employees. As a result, potential employees have an incentive to invest in credible and observable indicators that signal their worth. Similarly, Weiss (1995) suggested that prospective employers may actively screen potential employees on the basis of observable characteristics when the desired attribute cannot be observed. One such characteristic is an employee’s education level, a signal that is both observable to the employer and costly for other potential employees to imitate (Certo, 2003).

In the context of equity investments, signaling theory suggests that each firm possesses observable attributes that reduce investors’ uncertainty about its value. One of the most frequent applications of signaling theory by management researchers has been to IPO listings. Recent studies have shown that uncertainty in valuing IPO firms owing to information asymmetry increase investors’ reliance on observable and credible signals from these firms (Cohen & Dean, 2005; Sanders & Boivie, 2004). Similarly, the uncertainty created by allegations of financial reporting fraud about the occurrence of similar fraud in other firms (Browning & Weil, 2002) could cause investors to screen publicly listed firms using observable characteristics that might correlate with the adoption of misleading accounting practices. I argue that one salient observable characteristic is the director interlocks that accused firms have with other firms.

Financial reporting fraud allegations are likely to direct investors’ attention to the corporate leaders of the accused firms since negative corporate out-
comes may be attributed to these leaders (Meindl, Ehrlich, & Dukerich, 1985). Investors are likely to focus on the other board appointments of these leaders to the extent that the investors are screening publicly listed firms for the plausible adoption of misleading accounting practices. Furthermore, director interlocks may have negative implications for shareholder wealth (Useem, 1982; Vogus & Davis, 2005). For instance, Davis (1991) documented how director interlocks act as a channel for the diffusion of poison pill takeover defenses, a practice that is potentially harmful for investors. Given that director interlocks act as conduits for information flows between boards (Mizruchi, 1996), investors’ attention on director interlocks may also be warranted on the basis of suspicion that misleading accounting practices may have diffused from accused to associated firms.

**Attribution Theory**

Attribution theory explains why the existence of an interlocking director increases the uncertainty about the accounting practices and board monitoring in associated firms. Attribution theory examines the perception of causation and the consequences of such perception (Kelly & Michela, 1980). The theory is relevant since unexpected negative outcomes (such as corporate fraud) are likely to initiate “attributional search” (Weiner, 1986). Investors are likely to attribute responsibility for alleged financial reporting fraud to an accused firm’s corporate leaders (Meindl et al., 1985). I argue that investors are likely to hold the outside directors of accused firms responsible for failing to detect misleading accounting practices and to hold the inside directors (or top executives) of these firms responsible for the adoption of these practices.

Attribution research has established a the existence of a bias, known as “fundamental attribution bias,” whereby observers overestimate internal causes and underestimate external causes when explaining an outcome, especially negative outcomes for others (Ross, 1977). Some researchers have suggested that the bias exists because of a social norm that favors internal attributions (Jellison & Green, 1981). Cognitive efficiencies may also contribute to the bias (Gilbert & Malone, 1995), in that observers first assume that actions are the result of an individual’s disposition and only subsequently—if at all—adjust for situational pressures (Quattrone, 1982).

Fundamental attribution bias affects the perceived effectiveness of outside directors as monitors of top executives. Effective monitoring of top executives is an important component of board control (Walsh & Seward, 1990). The frequent occurrence of financial reporting fraud has challenged the effectiveness of outside directors in discharging their control roles (Farrell & O’Donnell, 2002). Although situational constraints, such as power imbalances in favor of top executives (Westphal & Zajac, 1995), may reduce effective monitoring, consideration of the fundamental attribution bias suggests that investors are more likely to attribute ineffective monitoring to directors rather than to situational constraints. For instance, investors may perceive outside directors as lacking requisite competencies, a precondition for effective monitoring (Hillman & Dalziel, 2003). In addition, Srinivasan (2005) found that outside directors bear personal responsibility in the form of significant labor market penalties for financial reporting failure.

Whether investors attribute ineffective monitoring to situational constraints or to outside directors has important implications for the spillover of reputational penalties through director interlocks. If an outside director is attributed responsibility for alleged financial reporting fraud, then his or her effectiveness as a monitor of top executives in associated firms is likely to be suspect. This suspicion not only generates uncertainty about the accounting practices of the associated firms, but also raises the possibility of board failure to detect other executive actions that erode investors’ wealth, thus increasing the likelihood of spillover effects. However, if investors attribute ineffective board monitoring to situational constraints that are specific to the accused firms, then investors have less reason to perceive outside directors as ineffective monitors of top executives in associated firms, and reputational penalties from alleged scandals are less likely to spill over to associated firms.

Similarly, inside directors of accused firms are likely to be attributed responsibility for adopting misleading accounting practices. Several studies have highlighted the personal responsibility of top executives for GAAP violations. For instance, Livingston (1997) and Beneish (1999) reported a high turnover of top executives in firms that violated GAAP, with the majority of the exiting executives subsequently failing to find comparable employment. Investors have little reason to view top executives responsible for adopting misleading accounting practices as effective monitors of other top executives in associated firms. Indeed, the concept of social exchange reciprocity suggests that top executives experiencing weak board vigilance in their own firms are likely to be weak monitors of executives in associated firms (Westphal & Zajac,
1997). Hence, inside directors of accused firms with board positions in associated firms are likely to create uncertainty about the accounting practices and effectiveness of board monitoring in associated firms, thus increasing the likelihood of spillover effects.

The attributions of responsibility to an interlocking director may also spill over to other directors in an associated firm. Social inference theories have established shortcomings in social judgments (Hastie, 1983) that apply to investors (Daniel, Hirshleifer, & Teoh, 2002). Empirical results suggest that observers generalize from an individual’s behavior and inferred dispositions to other members of the individual’s group (Doosje, Spears, & Koomen, 1995; Henderson-King & Nisbett, 1996; Quattrone & Jones, 1980). Hence, investors’ perception that an interlocking director is an ineffective monitor may spill over to other board members.

The above arguments suggest that reputational penalties may spill over from accused firms to associated firms through networks of director interlocks. These reputational penalties are evidenced by significant declines in the market value of associated firms when financial reporting fraud allegations are made public (Karpoff & Lott, 1993). Hence:

Hypothesis 1. Firms with director interlocks to other firms accused of financial reporting fraud experience a decline in market value on those dates when the market values of the accused firms decline as a result of the allegations.

INFORMATION-BASED SPILLOVER EFFECTS

Signaling and attribution theories’ suggestion that reputational penalties may spill over to associated firms does not imply that all associated firms experience significant spillovers. The theory behind spillover effects is that financial reporting fraud allegations not only create uncertainty about the accounting practices and the effectiveness of board monitoring in accused firms, but also create similar uncertainty about associated firms. Hence, the likelihood that associated firms will experience significant spillover effects should be positively correlated with factors that exacerbate these uncertainties. Given that director interlocks are theorized to act as channels for the spillover effects, the characteristics of interlocking directors at the individual level of analysis are important for theory testing. I draw upon signaling theory to argue that the observable board positions of the interlocking directors in accused and associated firms are important discriminants of spillover effects experienced by the associated firms.

Interlocking Directors

Signaling theory suggests that interlocking directors possess observable attributes that investors may rely on when forming perceptions of the accounting practices and board monitoring in associated and accused firms. I argue that interlocking directors occupying positions of influence on these firms’ audit and governance committees should have a bearing on investors’ perceptions.

Board positions in associated firms. The audit committee of an associated firm is likely to matter because the committee’s charter is to provide independent oversight over the firm’s accounting functions and assure the objectivity of the firm’s financial statements. The presence of a capable and reputable audit chair provides some assurance that financial reporting fraud will be detected. Although attribution theory suggests that the spillover effects result from investors’ perceptions of interlocking directors as ineffective monitors of top executives in associated firms, signaling theory highlights the likelihood that interlocking directors occupying the audit chair positions in these firms increase suspicion that these audit committees have not exercised due diligence. This may cause investors to perceive a greater probability of associated firms violating GAAP and increase the likelihood of these firms experiencing spillover effects.

Similarly, investors’ perceptions are likely to be strongly influenced by the corporate governance committee of an associated firm if they are concerned with the effectiveness of board monitoring. Generally, corporate governance committees are responsible for developing and recommending governance principles to corporate boards. An ineffective governance committee increases the likelihood that executive actions that reduce investors’ wealth will be overlooked. To the extent that interlocking directors are perceived as ineffective monitors of top executives in associated firms, signaling theory suggests that interlocking directors occupying the governance chair positions in these firms increases the plausibility that the governance committees have failed to protect investors’ interests. This may cause investors to perceive higher agency costs in the associated firms and increase the likelihood of these firms experiencing spillover effects. Therefore, I propose the following:

Hypothesis 2a. The likelihood of an associated firm experiencing significant reputational penalties increases if an interlocking director
Holds the position of audit committee chair in the firm.

Hypothesis 2b. The likelihood of an associated firm experiencing significant reputational penalties increases if an interlocking director holds the position of governance committee chair in the firm.

Board positions in accused firms. The board positions of interlocking directors in accused firms may also impact spillover effects. It may be that interlocking directors occupying audit chair positions in accused firms are viewed as more responsible than other directors for failing to detect the alleged financial reporting fraud. This attribution may strengthen investors’ perception of the interlocking directors as ineffective monitors in associated firms and increase the likelihood of these firms experiencing spillover effects. Likewise, interlocking directors occupying governance chair positions in accused firms may be attributed more responsibility for potential lapses in these firms’ governance practices, thus increasing investors’ perception of these directors as ineffective monitors and the likelihood of associated firms experiencing spillover effects. Hence:

Hypothesis 3a. The likelihood of associated firms experiencing significant reputational penalties increases if an interlocking director holds the position of audit committee chair in an accused firm.

Hypothesis 3b. The likelihood of associated firms experiencing significant reputational penalties increases if an interlocking director holds the position of governance committee chair in an accused firm.

Quality of Corporate Governance

Firm-level variables may also influence the likelihood of associated firms experiencing spillover effects. Signaling theory highlights the possibility that observable and normatively appropriate governance structures may assuage investors’ fear of ineffective governance in associated firms (Sanders & Boivie, 2004). Governance structures refer to the elements of a firm’s structure that monitor top executives’ actions and/or align their interests with those of investors. These governance structures include not only the board of directors, but also the compensation policies and institutional ownership of a firm (Walsh & Seward, 1990). Past research has shown that investors respond positively to the presence of good-quality governance structures that protect their interests from potentially opportunistic behaviors of top executives (Coles & Hesterly, 2000; Westphal & Zajac, 1998). In particular, Sanders and Boivie (2004) reported evidence that investors rely on observable and normatively appropriate governance structures to reduce the uncertainties inherent in valuing new firms in new industries. Similarly, uncertainty about the effectiveness of board monitoring in associated firms may prompt investors to rely on observable governance indicators when valuing these firms. The importance of normatively appropriate governance structures is also supported by recent work on the symbolic management of investors through governance reforms (Westphal & Zajac, 1998).

The above arguments suggest that the likelihood of associated firms experiencing spillover effects depends on the observable quality of governance structures in these firms. Observable governance structures not only signal qualitative differences between firms, but are also widely believed to protect investors’ wealth. Hence, good-quality governance structures that promote managerial accountability act as barriers to the spillover of reputational penalties between firms. I focus on the following governance structures that have been examined in prior studies for their effects on financial reporting fraud: independence of board chair, directors’ independence, directors’ ownership, and institutional ownership (Agrawal & Chadha, 2005; Beasley, 1996; DeChow et al., 1996; Dunn, 2004; Erickson, Hanlon, & Maydew, 2006; Farber, 2005).

Independence of board chair. Appropriate board leadership structure has generated much debate among scholars. It has been argued that when a firm’s CEO is also its board chair, board vigilance is weakened (Mace, 1971; Mizruchi, 1983) because board and top executive interdependence promote CEO entrenchment (Mallette & Fowler, 1992). However, in a meta-analysis Dalton, Daily, Ellstrand, and Johnson (1998) concluded that there is no evidence of a substantive negative relationship between board leadership structure and firm performance. In the context of fraudulent financial reporting, Dunn (2004) suggested that CEOs holding board chair positions possess structural power that facilitates such fraud. However, research linking board leadership structure with financial reporting fraud has been inconclusive. Some studies have indicated a significantly positive association (DeChow et al., 1996; Farber, 2005), but others have detected no significant association (Agrawal & Chadha, 2005; Beasley, 1996). Nonetheless, there is anecdotal evidence that the public’s normative expectations are consistent with the arguments of agency theorists. For instance, investor activism has pressured the board of Walt Disney to separate
the roles of CEO and board chair (Orwall, Steinberg, & Lublin, 2004). Hence, investors may respond less negatively if associated firms have independent chairs, thus reducing the likelihood of spillover effects experienced by these firms.

**Hypothesis 4.** The likelihood of associated firms experiencing significant reputational penalties decreases when these firms have independent board chairs.

**Proportion of independent directors.** Independent directors on corporate boards are more likely to promote actions that enhance investors’ interests (Mizruchi, 1983; Rechner, Sundaramurthy, & Dalton, 1993). Unlike independent directors, inside directors are more likely to be subservient to a CEO’s interests and endorse the CEO’s decisions (Weisbach, 1988). However, Dalton et al. (1998) did not find support for the argument that a higher proportion of independent directors significantly reduces agency costs and hence improves firm performance. In the context of fraudulent financial reporting, Beasley (1996), DeChow et al. (1996), and Farber (2005) found higher proportions of independent directors significantly reduce the likelihood of financial statement fraud, and Agrawal and Chadha (2005) as well as Gerety and Lehn (1997) did not find a significant relationship. But the public’s normative expectations appear to support the arguments of agency theorists. For instance, the Sarbanes-Oxley Act of 2002 requires all audit committee directors to be independent, and major U.S. stock exchanges require the majority of directors in listed firms to be independent. Hence, investors may view associated firms with a high proportion of independent directors favorably, and thus the likelihood that these firms will experience spillover effects decreases.

**Hypothesis 5.** The likelihood of associated firms experiencing significant reputational penalties decreases with the proportion of independent directors.

**Ownership of institutional investors.** As do corporate boards, large investors also monitor top executives to promote a firm’s long-term performance. Institutional investors can monitor top executives at a lower cost than individual investors because they have greater expertise and can better coordinate their efforts to exert control over top executives (Shleifer & Vishny, 1986). In addition, high ownership concentration of institutional investors leads to more monitoring by reducing the disincentive created from free-rider problems when monitoring is carried out by diffused owners (Demsetz & Lehn, 1985). However, extant empirical studies on the relationship between large investors’ ownership and financial statement fraud have been equivocal, with some studies suggesting a negative association (Chung, Firth, & Kim, 2002; DeChow et al., 1996) and others failing to find any significant relationship (Agrawal & Chadha, 2005; Beasley, 1996; Farber, 2005).

One reason for the contradictory results may be the failure of prior studies to address the likely variation in institutional investors’ incentives to monitor top executives. Institutional investors that have existing or potential business relationships with firms are viewed as less effective monitors of top executives, and those without such business relationships are more likely to closely monitor and impose controls on top executives (Brickley, Lease, & Smith, 1988). Hence, mutual funds and public pension funds, collectively referred to as “pressure-resistant institutional investors,” are more effective monitors because of their independence from top executives (David, Kochhar, & Levitas, 1998). Furthermore, pressure-resistant institutional investors have been found to exhibit high levels of activism intended to influence the outcomes of corporate decisions (Tihanyi, Johnson, Hoskisson, & Hitt, 2003). Hence, associated firms with high ownership by pressure-resistant institutional investors may be less likely to experience spillover effects because these investors are more able and willing to monitor top executives.
Hypothesis 7. The likelihood of associated firms experiencing significant reputational penalties decreases with the ownership of pressure-resistant institutional investors.

Ownership of inside directors. Governance structures that align the interests of inside directors with those of investors are also important. One alignment mechanism is the adoption of contingent long-term incentive plans for top executives (Shleifer & Vishny, 1997). Top executives with contingent compensation tied to investors’ wealth through equity-based pay are more likely to act in a manner that is consistent with investors’ interests. There is some evidence that increasing the equity holdings of top executives decreases the likelihood of decisions that suboptimize investors’ wealth (Dalton & Rechner, 1989; Oswald & Jahera, 1991). Furthermore, Dalton et al. (2003) found that inside directors’ ownership is positively associated with earnings per share. However, in the context of financial reporting fraud, several studies have found no relationship between insiders’ ownership and the incidence of fraud (Agrawal & Chadha, 2005; Beasley, 1996; Farber, 2005). Nonetheless, from a governance perspective, investors may view inside directors holding equity stakes favorably since these directors are more likely to make decisions that protect investors’ wealth. Hence, associated firms with high ownership by inside directors are less likely to experience spillover effects.

Hypothesis 8a. The likelihood of associated firms experiencing significant reputational penalties decreases with the ownership of inside directors.

Insiders’ ownership may have an unintended consequence in the context of financial reporting fraud. Although moderate equity holdings may better align the interests of inside directors with those of investors, large equity holdings may concentrate ownership power in the hands of insiders and reduce board effectiveness in monitoring top executives (DeChow et al., 1996; Dunn, 2004). To the extent that investors perceive such a reduction as an unintended consequence of large equity holdings by inside directors in associated firms, these firms are more likely to experience spillover effects. Hence, the relationship between the ownership of inside directors and the likelihood of spillover effects may be curvilinear. Such a curvilinear relationship may explain why prior studies did not find evidence of a linear effect between these variables (Agrawal & Chadha, 2005; Beasley, 1996; Farber, 2005).

Hypothesis 8b. The likelihood of associated firms experiencing significant reputational penalties first decreases with the ownership of inside directors but subsequently increases when higher ownership levels confer excessive power to inside directors.

METHODS

Sampling

Data were collected on two groups of publicly listed firms. The first group consists of firms alleged to have adopted misleading accounting practices, and the second group consists of firms associated with the first group through director interlocks. I searched the Lexis-Nexis database for public announcements of firms under SEC investigation from 1998 to 2002 to generate the first group of firms. The SEC is an enforcement agency whose primary mission is to protect investors and maintain the integrity of the securities market. Financial reporting fraud allegations accompanied by SEC investigation are likely to trigger public interest and generate a response from investors. I chose the five-year period 1998–2002 so that allegations of financial reporting fraud from before and after the failure of the Enron Corporation for accounting fraud could be included in the study. During the sample period, 143 publicly listed firms were reported as being under SEC investigation for potential accounting irregularities, including disclosure violations as well as revenue, expense, and/or earnings manipulation.

I adopted two criteria for selecting 30 accused firms from the population of 143 firms. The first criterion was that an accused firm must be listed in the CRSP database so that data would be available for computing changes in market value as a result of the allegation. The other criterion was that an accused firm must have experienced reputational penalties from the allegation so that spillover effects to associated firms could be examined (see below for the measurement of reputational penalties). I adopted a random sampling procedure in which firms randomly selected but failing to meet both criteria were removed from further analysis. After finalizing the sample of 30 firms, I searched the proxy statements of these firms to generate a second group of associated firms with director interlocks to the 30 firms. In total, there were 251 associated firms. Of these, 7 were also subjects of SEC investigations during the study period. These firms were dropped from the sample because any reputational penalties they experienced might be the direct consequence of SEC investigation rather
than spillover effects from accused firms. The remaining 244 associated firms were used to test the hypotheses.

The Measurement of Reputational Penalties

I used cumulative abnormal returns (CARs), a measure developed for financial event study analysis, to assess imputation of reputational penalties by investors. Past studies have used financial event techniques to examine reputational penalties proceeding from corporate crime and spillovers between firms from the perspective of investors (Beatty et al., 1998; Karpoff & Lott, 1993). Central to a financial event study is the measurement of abnormal stock returns (ARs):

$$AR_{it} = R_{it} - E(R_{it}),$$

where $AR_{it}$ is the abnormal return on the share price for firm $i$ on event date $t$, $R_{it}$ is the actual ex post return on the share price for firm $i$ on event date $t$, and $E(R_{it})$ is the normal return on the share price for firm $i$ on event date $t$. The normal return, $E(R_{it})$, is defined as the expected return if the event of interest (i.e., the allegation of financial reporting fraud) had not taken place. The computation of the normal return requires an estimation window that is typically prior to and does not overlap with the event window (McWilliams & Siegel, 1997). I set the estimation window at 300 to 100 trading days prior to the event window. The normal return is computed using a market model of the normal share price behavior. The market model is a statistical model that relates the return of any given share to the return of a specified market portfolio:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where $\alpha_i$ is the intercept term, $\beta_i$ is the systematic risk of firm $i$, $R_{mt}$ is the rate of return on a market portfolio of shares on event date $t$, and $\varepsilon_{it}$ is the error term, with $E(\varepsilon_{it}) = 0$ and $\text{var}(\varepsilon_{it}) = \sigma^2_{it}$. I used the value-weighted CRSP index as the market portfolio to derive terms $\alpha_i$ and $\beta_i$ of the market model. The abnormal stock return ($AR_{it}$) is computed after determining the normal return, $E(R_{it})$, from the market model. The abnormal stock returns for each day in the event window are then summed to arrive at the cumulative abnormal return over the event window:

$$CAR_{[t1, t2]} = \sum_{t = t1}^{t2} AR_{it},$$

where $CAR_{[t1, t2]}$ is the cumulative abnormal return for firm $i$ over the specified event window, day $t1$ (i.e., one day prior to an allegation) to day 0 (i.e., the day of the allegation). A short two-day event window of $(-1, 0)$ was used because financial event studies rely on the assumption that markets are efficient and that financially relevant information is quickly incorporated into stock prices (McWilliams & Siegel, 1997). The CAR for each firm over the two-day event window measures the amount of reputational penalties experienced by the firm.

I obtained the event dates by searching the Lexis-Nexis database for articles that alleged a financial reporting fraud for each of the 30 firms up to three months from the date of the first article. I extended the search beyond the date of the first article because initial reports on alleged financial reporting fraud are often sketchy. With the passage of time, these sketchy accounts are replaced by more detailed reports on how accounting records were manipulated, the estimated amounts misstated, and the identity of the potential perpetrators. In addition, investors have been found to react to additional information that unfolds over time (Feroz et al., 1991). Hence, investors’ impressions of alleged financial reporting fraud appear to form over time, justifying the need for search period extended beyond initial articles alleging wrongdoing. I carried out the financial event analysis described above for the 30 firms using the allegation date for each firm extracted from the Lexis-Nexis database. A statistically significant, negative CAR over the two-day event window for each allegation date suggested that a firm experienced reputational penalties as a result of the alleged financial reporting fraud.

A similar financial event study was then conducted on the associated firms to determine whether they experienced spillover effects. The event dates used for each associated firm were the allegation dates on which the respective accused firm experienced reputational penalties. A negative and statistically significant average CAR for the 244 associated firms provided support for Hypothesis 1. To ensure that the financial event study was only capturing investors’ reactions to alleged financial reporting fraud, I excluded confounding announcements one day before, on, and one day after the event date from the analysis (McWilliams & Siegel, 1997).

Independent Variables

With the exception of the interlocking directors’ board positions in accused firms, the independent variables were extracted from the proxy statements of associated firms. I created two dummy variables respectively indicating if an interlocking director held the position of audit committee chair or cor-
porate governance committee chair (1, yes; 0, otherwise). Similarly, two dummy variables were created to indicate if an interlocking director held the position of audit committee chair or corporate governance committee chair in an associated firm. Publicly listed firms adopt different names for their corporate governance committees (unlike audit committees, which are uniformly so named). To ensure consistency among all associated firms, I defined any board committee that dealt with governance issues, such as the compensation of executives, the nomination of directors, or any other duties that involved the formulation or implementation of corporate governance policies, as a corporate governance committee.

The proportion of independent directors was computed as the number of independent directors divided by the total number of directors in an associated firm. An outside director was classified as independent if an associated firm’s proxy statement did not identify the director as having any direct or indirect business relationship with the firm. The ownership of independent directors is the total percentage of shares held by all the independent directors in an associated firm. The ownership of pressure-resistant institutional investors in an associated firm is the total percentage of shares held by public pension funds (such as New York State Teachers’ Retirement System and CalPERS) and professional investment funds (such as FMR Corp. and Nicholas-Applegate Capital Management). Other institutional investors, such as banks, insurance companies, and private pension funds, were excluded from the analysis since they may have existing or potential business relationships with associated firms that reduce their incentive to monitor top executives. Finally, the ownership of inside directors was the total percentage of shares held by all inside directors (including the CEO) in an associated firm.

Control Variables

Several control variables might have an impact on the proposed spillover effects. First, I included the reputational penalties of accused firms because the likelihood of spillover effects may increase when accused firms experience more reputational penalties. This variable was computed from the financial event study described earlier. The CAR for each accused firm was reversed-coded (i.e., multiplied by –1) where a more positive reverse-coded CAR indicated a higher reputational penalty. Second, relative firm size, defined as the annual sales of an accused firm less those of the associated firm, was included since large firms may feature more prominently in investors’ impression formation and influence spillover. Third, the associated firm’s annual return on assets was included to control for firm performance. Both relative firm size and firm performance were the most recent fiscal year end prior to the year of an allegation and were extracted from Compustat.

Fourth, I included the year of the allegation since the vigor of SEC enforcement and the extent of media coverage on financial reporting fraud may have changed during the study period. Fifth, I controlled for industry effects by creating a dummy variable coded 1 if an associated firm was located in an industry in which a separate SEC investigation had been publicly announced in the year before of the year of an allegation and coded 0 otherwise. Two-digit SIC codes from Compustat were used to code the dummy variable. Sixth, I included the number of analysts tracking an associated firm. Given that the proposed spillover effects are dependent on investors’ awareness of director interlocks, board compositions, and so forth, associated firms tracked by a larger number of analysts are more likely to experience spillover effects since these firms receive more attention from investors. These data were extracted from the First Call Historical Database.

Seventh, I controlled for the environmental uncertainty that associated firms faced. Firms may form director interlocks with other firms as a response to environmental uncertainties, wherein an outside director’s resource role is emphasized over the monitoring role. Hence, spillover effects arising from perceptions of weak board monitoring may decrease if interlocking directors’ primarily serve a resource-dependence function. The Appendix describes the computation for environmental uncertainty and the data source. Similarly, I created a dummy variable to control for business relationships between accused and associated firms. Director interlocks between two firms in a business relationship may result from resource dependencies between firms. The dummy variable was coded as 1 if a business relationship was present and 0 otherwise. The presence (or absence) of a business relationship was extracted from the proxy statements of the accused and associated firms since interlocking directors between exchange firms are deemed to be nonindependent and must be disclosed in the proxy statements. Eighth, I included the number of interlocks between accused and associated firms as spillover effects may be more likely if associated firms have stronger ties with accused firms. This variable was obtained from the associated firms’ proxy statements.

Finally, I included two dummy variables to cap-
ture the insider status of interlocking directors in either an accused or associated firm. Spillover effects may be more likely if investors attribute more responsibility to the inside directors of accused firms, for adopting the misleading accounting practices, than to their outside directors, for failing to detect these practices. Similarly, the inside directors of associated firms are more likely to have adopted misleading accounting practices than their outside directors, whose role is one of detection. A value of 1 was assigned to each dummy variable if the interlocking director was an insider in the accused and associated firms, respectively, and a value of 0 otherwise. Data for these variables were obtained from the proxy statements of the accused and associated firms.

RESULTS

Table 1 presents the means, standard deviations, and zero-order correlations for the variables used in the study.

Financial Event Study

I used financial event study methodology to test Hypothesis 1. Table 2 presents two significance tests of the CAR. The first is a standard parametric significance test, wherein a test statistic is computed to test the null hypothesis that the CAR is equal to zero. The second reported significance test is the generalized sign test, wherein the null hypothesis for the test is that the fraction of positive (or negative) returns is the same as in the estimation period. The generalized sign test is more robust to outliers than the standard parametric test (Cowan, 1992). Both test statistics needed to be significant to support Hypothesis 1 (McWilliams & Siegel, 1997).

The results indicate that Hypothesis 1 is strongly supported. When the 30 firms experienced reputational penalties from alleged financial reporting fraud, the 244 associated firms concurrently experienced an average decline in CAR of 1.03 percent over a two-day event window. This decline is statistically significant for both tests \( (p < .001) \). Although the 244 associated firms also experienced an average decline of 0.16 percent one day after the allegation dates, the standard parametric \( t \)-test was insignificant \( (p > .1) \). In addition, neither test was significant \( (p > .1) \) for the average decline of 0.16 percent two days after the allegation dates.

I followed Karpoff and Lott (1993) to estimate the magnitude of the dollar losses involved. Each associated firm’s CAR was multiplied by the closing market value of the firm’s outstanding common stock two trading days prior to the initial allegation of financial reporting fraud. I computed the market value using price and outstanding share data from CRSP. The change in market value for all 244 associated firms was summed to determine the overall loss. Although the average decline in CAR of 1.03 percent for the 244 associated firms may appear small, the analysis revealed a decline of about 49 billion dollars in market capitalization for these firms.

Further analysis of the financial event study results revealed that not all associated firms experienced significant reputational penalties. A check revealed that the majority of the loss, about 39 billion dollars (79.6%), can be attributed to 45 associated firms that experienced significant reputational penalties—that is, experienced a significant negative CAR over the two-day event window. On average, each of these 45 associated firms registered close to 1 billion dollars of decline in market value. Hence, although Hypothesis 1 is supported on the basis of the average decline in CAR of 1.03 percent for the 244 associated firms, the spillover to these firms appears to be information-based. This finding reinforces the importance of studying the factors that discriminate associated firms experiencing significant spillover effects from those that do not.

Logistic Regression

I used logistic regression analysis to test Hypotheses 2a to 8b. The regression model has 10 independent variables, 11 control variables, and 244 observations. The financial event study indicated that 45 (18.4%) out of the 244 associated firms experienced significant reputational penalties. A dummy dependent variable was created and coded as 1 if an associated firm had a significant, negative CAR and 0 otherwise. Multicollinearity did not pose a problem, as the variance inflation factors for the full regression model with 244 observations ranged from 1.1 to 1.99, with a mean of 1.35 (Chatterjee, Hadi, & Price, 2000). I centered all the continuous variables in the model prior to running the regression analysis. The standard errors were replaced with the Huber-White robust standard errors to correct for heteroskedasticity of the residuals (White, 1980). The reported \( t \)-test results used one-tailed \( p \)-values for the independent variables and two-tailed \( p \)-values otherwise.

Table 3 presents the results of the analysis. Model 1 shows the results for the control variables \( (\chi^2 = 15.29, p > .1) \); model 2 includes the variables for interlocking directors \( (\chi^2 = 31.82, p < .01) \); and model 3 is the full unrestricted model with all the control and independent variables added \( (\chi^2 = 43.26, p < .01) \). The results indicate that the contribution of the variables for interlocking directors...
## TABLE 1

Descriptive Statistics and Correlations among Study Variables

| Variable                                               | Mean  | s.d.  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|--------------------------------------------------------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1. Reputational penalty, associated firm\(^b\)          | 0.18  | 0.39  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2. Audit chair, associated firm                         | 0.21  | 0.41  | 0.11 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 3. Governance chair, associated firm                    | 0.33  | 0.47  | 0.14 | 0.09 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 4. Audit chair, accused firm                            | 0.17  | 0.37  | 0.13 | 0.25 | 0.06 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 5. Governance chair, accused firm                       | 0.06  | 0.24  | 0.05 | 0.01 | 0.22 | 0.07 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6. Independent board chair                              | 0.06  | 0.23  | 0.03 | 0.04 | 0.02 | 0.02 | 0.01 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 7. Proportion of independent directors                  | 0.61  | 0.21  | 0.01 | 0.08 | 0.17 | 0.10 | 0.07 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 8. Ownership of independent directors                   | 3.13  | 8.55  | 0.04 | 0.05 | 0.02 | 0.08 | 0.22 | 0.11 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 9. Ownership of pressure-resistant institutional investors| 8.73  | 13.48 | 0.06 | 0.05 | 0.04 | 0.00 | 0.03 | 0.15 | 0.04 | 0.05 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 10. Ownership of inside directors                       | 8.85  | 14.25 | 0.12 | 0.08 | 0.08 | 0.10 | 0.05 | 0.52 | 0.04 | 0.05 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 11. Reputational penalty, accused firm\(^c\)             | 16.49 | 12.77 | 0.01 | 0.15 | 0.04 | 0.04 | 0.10 | 0.04 | 0.11 | 0.08 | 0.02 | 0.08 |      |      |      |      |      |      |      |      |      |      |      |      |
| 12. Relative firm size                                  | 15.03 | 29.27 | 0.12 | 0.19 | 0.03 | 0.15 | 0.03 | 0.01 | 0.16 | 0.01 | 0.04 | 0.01 |      |      |      |      |      |      |      |      |      |      |      |      |
| 13. Firm performance                                   | −0.02 | 0.37  | 0.01 | 0.00 | 0.11 | 0.02 | 0.01 | 0.32 | 0.02 | 0.20 | 0.05 | 0.03 | 0.00 | 0.02 |      |      |      |      |      |      |      |      |      |      |
| 14. Year                                               | 2.000 | 1.66  | 0.11 | 0.07 | 0.00 | 0.06 | 0.11 | 0.03 | 0.17 | 0.04 | 0.04 | 0.15 | 0.01 | 0.23 | 0.12 |      |      |      |      |      |      |      |      |
| 15. Industry under SEC investigation                    | 0.82  | 0.39  | 0.11 | 0.04 | 0.13 | 0.05 | 0.06 | 0.00 | 0.09 | 0.02 | 0.03 | 0.06 | 0.09 | 0.06 | 0.00 | 0.04 | 0.11 | 0.12 | 0.02 | 0.02 | 0.01 | 0.01 |
| 16. Number of analysts                                  | 10.51 | 9.51  | 0.10 | 0.14 | 0.01 | 0.13 | 0.24 | 0.23 | 0.04 | 0.31 | 0.12 | 0.10 | 0.04 | 0.22 | 0.11 |      |      |      |      |      |      |      |      |
| 17. Environmental uncertainty                          | 1.04  | 0.04  | 0.02 | 0.07 | 0.04 | 0.06 | 0.05 | 0.06 | 0.05 | 0.03 | 0.06 | 0.04 | 0.09 | 0.02 | 0.01 | 0.12 | 0.02 | 0.01 |      |      |      |      |
| 18. Business relationships                             | 0.10  | 0.30  | 0.06 | 0.05 | 0.04 | 0.03 | 0.10 | 0.30 | 0.07 | 0.02 | 0.05 | 0.15 | 0.16 | 0.13 | 0.27 | 0.02 | 0.04 | 0.05 |      |      |      |      |
| 19. Number of interlocks                               | 1.16  | 0.45  | 0.05 | 0.02 | 0.09 | 0.09 | 0.14 | 0.01 | 0.14 | 0.08 | 0.13 | 0.03 | 0.20 | 0.07 | 0.05 | 0.08 | 0.02 | 0.09 | 0.08 | .31  |      |      |
| 20. Inside director, accused firm                      | 0.18  | 0.39  | 0.01 | 0.07 | 0.02 | 0.10 | 0.03 | 0.07 | 0.11 | 0.09 | 0.09 | 0.10 | 0.00 | 0.07 | 0.07 | 0.10 | 0.07 | 0.07 | .47  |      |      |      |
| 21. Inside director, associated firm                    | 0.14  | 0.34  | 0.00 | 0.00 | 0.12 | 0.08 | 0.05 | 0.05 | 0.27 | 0.12 | 0.03 | 0.16 | 0.11 | 0.16 | 0.08 | 0.24 | 0.06 | 0.02 | 0.02 | 0.35 | .34 | .06 |

\(^a\) \(n = 244\) firms. Correlations greater than .12 are significant at \(p < .05\); correlations greater than .16 are significant at \(p < .01\); correlations greater than .21 are significant at \(p < .001\).

\(^b\) Reputational penalty, associated firm, is a dummy variable coded 1 if an associated firm had a significant negative CAR and 0 otherwise. This dummy variable serves as the dependent variable in the logistic regression analysis.

\(^c\) Reputational penalty, accused firm, is a continuous variable that measures the amount of reputational penalties experienced by an accused firm. The CAR for each accused firm was reversed-coded (i.e., multiplied by −1); a more positive reverse-coded CAR indicated a higher reputational penalty.
TABLE 2
Results of Financial Event Study for the Associated Firms

<table>
<thead>
<tr>
<th>Event Window</th>
<th>Cumulative Abnormal Returns*</th>
<th>Negative/Positiveb</th>
<th>F</th>
<th>Generalized Sign Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1,0</td>
<td>-1.03%</td>
<td>399/214</td>
<td>-4.63***</td>
<td>-6.53***</td>
</tr>
<tr>
<td>-1</td>
<td>-0.36</td>
<td>357/256</td>
<td>-2.31*</td>
<td>-3.13***</td>
</tr>
<tr>
<td>0</td>
<td>-0.67</td>
<td>376/237</td>
<td>-4.24***</td>
<td>-4.67***</td>
</tr>
<tr>
<td>+1</td>
<td>-0.16</td>
<td>369/244</td>
<td>-0.99</td>
<td>-4.10***</td>
</tr>
<tr>
<td>+2</td>
<td>-0.16</td>
<td>330/283</td>
<td>-1.01</td>
<td>-0.95</td>
</tr>
</tbody>
</table>

a The data are for announcement dates without confounding events. n = 613 event dates for 244 associated firms. Values are percentages.

b This column highlights the ratio of negative to positive abnormal returns for the 613 event dates.

c Standard parametric tests.

* p < .05
*** p < .001

One-tailed tests.

to model significance was greater than that of the control variables in model 1 (χ² = 15.42, p < .01). Similarly, the governance variables also contributed to model significance that was greater than that of model 2 (χ² = 20.41, p < .01). Model 4 also shows the results for the full unrestricted model, but with three influential observations removed to assess the effect of outliers (χ² = 45.63, p < .01). I identified influential observations using the procedure described by Hosmer and Lemeshow (2000). The Hosmer-Lemeshow goodness-of-fit test indicates that both model 3 (χ² = 219.62, p > .1) and model 4 (χ² = 213.83, p > .1) exhibit good fit. In addition, both models showed excellent discrimination, as the area under the ROC curve is 0.8 for model 3 and 0.84 for model 4 (Hosmer & Lemeshow, 2000). Model 4 was therefore used to analyze the results for hypothesis testing.

Hypotheses 2a and 2b suggest that interlocking directors occupying the audit or governance committee chair positions in associated firms increases the likelihood of spillover effects. Both hypotheses are supported. The coefficients for audit chair (b = 1.06, p < .05) and corporate governance chair (b = 1.19, p < .01) of associated firms are significant. Similarly, Hypotheses 3a and 3b suggest that an interlocking director occupying the audit or governance chair positions in accused firms increases the likelihood of spillover effects. Hypothesis 3a is supported, as the coefficient for audit chair of accused firm (b = 1.22, p < .05) is significant. However, Hypothesis 3b is not supported, as the coefficient for corporate governance chair (b = -0.6, p > .1) of accused firm is not significant.

Hypotheses 5, 6, 7, and 8a predict that the proportion of independent directors (H5), the ownership of independent directors (H6), the ownership of pressure-resistant institutional investors (H7), and inside directors’ ownership (H8a) in an associated firm decreases the likelihood of spillover effects. These hypotheses are supported. The coefficients for the proportion of independent directors (b = -2.39, p < .05), ownership of pressure-resistant institutional investors (b = -0.4, p < .01), and ownership of inside directors (b = -0.5, p < .001) are significant. The coefficient for the ownership of independent directors (b = -0.33, p < .1) is only marginally significant. Hypothesis 8b is not supported as the coefficient for the ownership of inside directors squared (b = 0.0, p > .1) is insignificant, suggesting the absence of a curvilinear effect. Hypothesis 4 is also not supported as the coefficient of independent board chair (b = -0.06, p > .1) is insignificant.

The results for some control variables are also of interest. The coefficient for interlocking directors who are inside directors of accused firms (b = 1.16, p < .1) is marginally significant, and the coefficient for interlocking directors who are inside directors of associated firms (b = 0.4, p > .1) is not significant. These results suggest that the likelihood of spillover effects is less dependent on whether interlocking directors are top executives of accused or associated firms and more dependent on whether these directors occupy positions of responsibility in associated firms. The coefficient for business relationships (b = -2.43, p < .01) is significant, suggesting that associated firms are less likely to experience spillover effects if there is an existing business relationship with accused firms. One possible explanation is that investors are more likely to expect a director who is on the boards of two firms with business dealings to facilitate business transactions rather than to monitor top executives on their behalf. Hence, attributions of responsibility for the alleged fraud are less likely to be directed toward these interlocking directors, thus decreasing the likelihood of spillover effects. Other than relative firm size (b = 0.02, p < .01) and year (b = -0.34, p < .05), the remaining control variables are insignificant.

1 The area under the ROC (receiver operating characteristic) curve, which ranges from zero to one, measures a model’s ability to discriminate between associated firms that experience significant negative returns and those that do not. As a general rule, ROCs with values between 0.8 and 0.9 are considered to provide excellent discrimination (Hosmer & Lemeshow, 2000).
DISCUSSION AND CONCLUSION

This study presents evidence of spillovers between firms through director interlocks. Specifically, the reputational penalties that firms incur as a result of alleged financial reporting fraud on the average induce investors to impute reputational penalties to their associated firms. However, the results also suggest that such spillover effects are not pervasive, since only 45 (18.4%) of the 244 associated firms in the sample experienced a significant drop in market value. Nonetheless, the overall decline in market value for the 244 associated firms was about 49 billion dollars, with the 45 firms accounting for close to 39 billion dollars (or 79.6%) of the overall decline. Hence, although spillover effects from financial reporting fraud through director interlocks may not be pervasive, these effects appear to have a large enough economic consequence to warrant further research and public attention.

The likelihood of associated firms experiencing spillover effects is higher when observable individual- and firm-level factors exacerbate investors’ perceptions of questionable accounting practices and ineffective board monitoring in these firms. At the individual level of analysis, an associated firm is more likely to experience spillover effects when an interlocking director occupies its audit or gov-

### TABLE 3
Results of Logistic Regression Analyses for Spillover of Reputational Penalties

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Robust</td>
<td>Robust</td>
<td>Robust</td>
<td>Robust</td>
</tr>
<tr>
<td></td>
<td>Robust</td>
<td>Robust</td>
<td>Robust</td>
<td>Robust</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.97***</td>
<td>-2.62***</td>
<td>-2.69***</td>
<td>-3.00***</td>
</tr>
<tr>
<td>Robust Robust</td>
<td>0.54***</td>
<td>0.64***</td>
<td>0.71***</td>
<td>0.70***</td>
</tr>
<tr>
<td>Reputational penalty, accused firm</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Robust Robust</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Relative firm size</td>
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<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Robust Robust</td>
<td>0.12**</td>
<td>0.13**</td>
<td>0.13**</td>
<td>0.15**</td>
</tr>
<tr>
<td>Firm performance</td>
<td>-0.31</td>
<td>-0.32</td>
<td>-0.52</td>
<td>-0.67</td>
</tr>
<tr>
<td>Robust Robust</td>
<td>0.40</td>
<td>0.38</td>
<td>0.42</td>
<td>0.43</td>
</tr>
<tr>
<td>Year</td>
<td>-0.31</td>
<td>-0.31</td>
<td>-0.32</td>
<td>-0.32</td>
</tr>
<tr>
<td>Robust Robust</td>
<td>0.12*</td>
<td>0.13*</td>
<td>0.13*</td>
<td>0.15*</td>
</tr>
<tr>
<td>Industry under SEC investigation</td>
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<td>0.30</td>
<td>-0.40</td>
<td>-0.04</td>
</tr>
<tr>
<td>Number of analysts</td>
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<td>0.01</td>
<td>0.10</td>
<td>0.01</td>
</tr>
<tr>
<td>Environmental uncertainty</td>
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<td>0.17</td>
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<td>1.00</td>
</tr>
<tr>
<td>Business relationships</td>
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<td>-0.22</td>
<td>-0.23</td>
<td>-0.55</td>
</tr>
<tr>
<td>Number of interlocks</td>
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<td>0.63</td>
<td>0.53</td>
<td>0.55</td>
</tr>
<tr>
<td>Inside director, accused firm</td>
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<td>0.05</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Number of interlocks</td>
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<td>0.02†</td>
<td>0.02†</td>
<td>0.02†</td>
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<tr>
<td>Inside director, associated firm</td>
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<td>0.00</td>
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<td>Audit chair, associated firm</td>
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<td>0.01†</td>
<td>0.02</td>
<td>0.02†</td>
</tr>
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<td>Audit chair, accused firm</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Governance chair, associated firm</td>
<td>0.76</td>
<td>0.80</td>
<td>2.97</td>
<td>1.00</td>
</tr>
<tr>
<td>Governance chair, accused firm</td>
<td>0.84</td>
<td>0.90</td>
<td>0.90</td>
<td>1.00</td>
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<tr>
<td>Governance chair, accused firm</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Independent board chair</td>
<td>-0.09</td>
<td>-0.09</td>
<td>-0.09</td>
<td>-0.09</td>
</tr>
<tr>
<td>Proportion of independent directors</td>
<td>-0.18</td>
<td>-0.19†</td>
<td>-0.23</td>
<td>-0.23†</td>
</tr>
<tr>
<td>Ownership of independent directors</td>
<td>-0.25</td>
<td>-0.24</td>
<td>-0.33</td>
<td>-0.33</td>
</tr>
<tr>
<td>Robust Robust</td>
<td>0.25</td>
<td>0.24</td>
<td>0.33</td>
<td>0.25†</td>
</tr>
<tr>
<td>Ownership of pressure-resistant</td>
<td>-0.20</td>
<td>-0.20</td>
<td>-0.40</td>
<td>-0.16**</td>
</tr>
<tr>
<td>institutional investors</td>
<td>-0.39</td>
<td>-0.15**</td>
<td>-0.50</td>
<td>-0.15***</td>
</tr>
<tr>
<td>Ownership of inside directors squared</td>
<td>0.02</td>
<td>0.03</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>Ownership of inside directors</td>
<td>0.02</td>
<td>0.03</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>n</td>
<td>244</td>
<td>244</td>
<td>244</td>
<td>241</td>
</tr>
<tr>
<td>$\chi^2(df)$</td>
<td>15.29 (11)</td>
<td>31.82 (15)**</td>
<td>43.26 (21)**</td>
<td>45.63 (21)**</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>-108.82</td>
<td>-102.71</td>
<td>-92.88</td>
<td>-83.75</td>
</tr>
<tr>
<td>Between-model likelihood ratio $\chi^2$</td>
<td>15.42**</td>
<td>20.41**</td>
<td>20.41**</td>
<td>20.41**</td>
</tr>
<tr>
<td>Overall correct classifications</td>
<td>83.2%</td>
<td>84.65%</td>
<td>84.65%</td>
<td>84.65%</td>
</tr>
</tbody>
</table>

† $p < .10$

‡ $p < .05$

*** $p < .001$

** $p < .01$
ernance committee chair. Interlocking directors who fill these positions exert greater influence on whether misleading accounting practices and other executive actions that erode investors’ wealth are detected by virtue of their leadership roles. Similarly, interlocking directors occupying the audit committee chairs in accused firms increase the likelihood of spillover effects because investors appear to attribute more blame for alleged financial reporting fraud to audit chairs than they do to those in other board positions. Surprisingly, interlocking directors in governance committee chairs did not influence the likelihood of spillover effects. However, a check on the data revealed that only 15 (about 6%) of the 244 associated firms had interlocking directors who occupied governance chairs in accused firms. Hence, the null finding may result from low statistical power to detect an effect (Hsieh, Block, & Larsen, 1998).

At the firm level of analysis, the theoretical arguments for the impact of an associated firm’s corporate governance structures received strong support. Spillover effects are more likely when associated firms have weak governance structures that may fail to protect investors’ interests. However, it is worth noting that the presence of an independent board chair is not significant. A plausible explanation for the insignificant result is that various governance structures act as substitutes for each other (Dalton et al., 2003; Rediker & Seth, 1995). Hence, the absence of an independent board chair may be mitigated by high ownership of inside directors whose interests are better aligned with those of investors. Another reason for the insignificant result is the low number of associated firms with independent board chairs (about 6 percent of the sample), again making statistical power low (Hsieh et al., 1998). There is also no evidence of a curvilinear effect for inside directors’ ownership. Hence, investors appear to be concerned with the alignment of inside directors’ interests with their interests rather than with the abuse of ownership power in the context of financial reporting fraud allegations.

This study contributes to an understanding of why reputational penalties spill over between interlocked firms. More importantly, the results provide unambiguous evidence of unintended negative consequences for interlocked firms. Prior research suggests that director interlocks can add value by providing access to capital, suppliers, customers, and other influential actors that may help reduce environmental uncertainties (Stiles & Taylor, 2001). For instance, firms may actively manage their resource environments by forming interlock ties with firms that provide critical resources (Hillman, Cannella, & Paetzold, 2000; Pfeffer & Salancik, 1978). Interlocking ties may also reduce uncertainty from competitive (or market) and nonmarket interactions (Hillman, 2005; Lang & Lockhart, 1990). In contrast, this study suggests that the value of interlocks must factor into the plausible negative consequences from these ties. Just as director interlocks may create distrust between board members that decrease the likelihood of alliance formation between interlocked firms (Gulati & Westphal, 1999), a potentially more severe consequence is spillover of reputational penalties that decreases the market value of interlocked firms.

Implications for Practice

This study has implications for public policy makers. The results provide support for the implementation of governance reforms in response to financial reporting fraud. However, recent public opinions on the Sarbanes-Oxley Act have centered around concerns that the costs of compliance may outweigh the benefits of requiring strict corporate disclosure by publicly listed firms (Schroeder, 2006). To the extent that the costs and benefits of regulatory compliance become key issues in public debates, policy makers should be aware that the social cost of financial reporting fraud may have been underestimated, given that reputational penalties from alleged scandals may spill over to other firms. In other words, investors’ losses from alleged financial reporting fraud are not limited to accused firms but may extend to interlocking firms. The losses from spillover effects may have implications on the appropriate scope and intensity of regulatory enforcement in future policy decisions. For instance, this study extends Karpoff and Lott’s (1993) seminal work by suggesting that the optimal criminal penalties for financial reporting fraud may have to be adjusted upwards to take into account the spillover effects on associated firms, a point that was not addressed in their study.

Negative spillover effects through interlocks are also likely to interest corporate leaders. First, this study increases corporate leaders’ awareness of passive factors that influence the value of their firms. Although it is widely understood that effective strategic actions and responses create value for investors, the possibility that existing interlocks may decrease investor wealth is not obvious. Second, the results offer insights on responses that may mitigate spillover effects. For instance, increasing the quality of a firm’s corporate governance is one option. In addition, board nominating committees must carefully review the composition of corporate boards. Directors, especially those who
chair audit or governance committees, should not only be evaluated for their ability and willingness to increase investors’ wealth, but also in terms of the associations that they bring. Hence, terminating or not establishing director interlocks with firms that experience reputational penalties may be a viable means to minimize spillover effects. Another option is to replace formal interlock ties with informal friendship ties. Westphal, Boivie, and Chng (2006) found that corporate leaders may use informal friendship ties with executives of other firms as a strategic mechanism for managing resource dependencies. Given that spillovers between interlocked firms occur partly because director interlocks and the board positions of interlocking directors are visible to investors, the costs of spillover effects may be avoided by using informal social ties that do not have to be publicly disclosed.

Limitations and Future Research

The present study has its limitations. First, although a decline in associated firms’ market value over a two-day event window would interest day traders seeking to profit from short-term security price movements, a transient decline is not of major overall market interest. Hence, an important extension of the current study is to determine if spillover effects are enduring or temporal. However, a meaningful study of the persistence of spillover effects must account for the response of associated firms to these effects. For instance, Farber (2005) found that investors appeared to value various governance improvements on the parts of firms that had fraudulently manipulated their financial statements. Research on response strategies appears promising, given anecdotal evidence that firms do take actions to avoid the negative consequences of guilt by association with firms faced with discrediting predicaments (Karpovich, 2002).

Second, although the argument for spillover effects hinges upon investors perceiving uncertainties in the accounting practices and effectiveness of board monitoring in associated firms, my research methodology did not allow for directly measuring whether such perceptions exist. Instead, I relied on theoretical arguments to develop indirect proxies for investors’ perceptions. Those conducting subsequent studies might consider adopting experimental designs to strengthen the ability to infer whether spillover effects arise from investors perceiving the aforementioned uncertainties.

Third, I examined reputational penalties imputed by investors. Hence, this study understates the extent of spillover effects for associated firms if other stakeholder groups also impute reputational penalties to these firms. For instance, it is plausible that the suppliers, customers, or employees of an associated firm might disassociate themselves from the firm because of the spillover of reputational penalties. The subsequent loss in human capital and business partners as well as the impact on the market value of the associated firms would not have been captured here if the other stakeholders’ actions did not occur on the same event dates used in this study. An important extension of this study would be to examine if other stakeholder groups impute reputational penalties to associated firms and the magnitude of the penalties if they are present.

Other potential areas of research include the following. First, future research could broaden the scope of inquiry by examining the spillover of reputational penalties through other types of association, such as strategic alliances, supplier-customer relations, or common industry membership. Second, subsequent studies could examine spillover effects from other discrediting predicaments, such as corporate bankruptcy. Finally, given that the spillover of reputational penalties is a passive event that corporate leaders might overlook, another interesting research avenue would be to examine the speed of implementing response strategies.

REFERENCES


**APPENDIX**

**Environmental Uncertainty Measure**

I adopted a measure of environmental uncertainty originally developed by Dess and Beard (1984) and adapted for use by other studies (Carpenter & Fredrickson, 2001; Keats & Hitt, 1988). The environmental uncertainty for each associated firm was measured at the level of the firm’s primary industry. I regressed a variable for each year on a variable for net industry sales using the following basic regression model: $y_t = \beta_0 + \beta_1 t + \epsilon_t$, where $y_t$ is the natural log of the annual net industry sales in an associated firm’s primary industry, $t$ is the year, and $\epsilon_t$ is the residual. Five years of data were used for the regression model—that is, I used net industry sales from 1995 to 1999 to predict environmental uncertainty for an associated firm in 2000. Each associated firm’s primary industry was identified as its four-digit SIC code in Compustat, and the net industry sales of all firms in an associated firm’s primary industry was also extracted from Compustat. Environmental uncertainty was defined as the antilog of the standard error of the regression slope coefficient ($\beta_1$) from the basic regression model, with larger values indicating greater environmental uncertainty.

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