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BOARDS, CEOS, AND SURVIVING A FINANCIAL CRISIS: EVIDENCE FROM THE INTERNET SHAKEOUT

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We examine whether corporate governance matters more for firms facing financial distress. We theorize that financial crisis changes the relative costs and benefits of governance mechanisms and that more independent and smaller boards become more valuable in distressed firms. We further hypothesize that CEO power becomes increasingly beneficial as concentrated power allows the firm to respond more rapidly to the crisis. Event-history analysis of the failure of publicly traded Internet firms over the period 2000–2002 confirms our hypotheses. Our results suggest that the association between governance and survival depends on firm and environmental context and that one-size-fits-all prescriptions for governance mechanisms are therefore likely to be ineffective. Copyright © 2011 John Wiley & Sons, Ltd.

INTRODUCTION

Corporate governance is a matter of great interest to scholars, managers, investors, and regulatory agencies. Despite this interest, it is not clear that we understand exactly how, and when, governance choices affect firm performance and/or survival. Attempts to link governance mechanisms to important outcomes, such as financial performance, have met with mixed results (Kang and Sørensen, 1999; Daily, Dalton, and Cannella, 2003), even though it is clear that governance differences have important implications for firm decisions (Judge and Zeithaml, 1992). Researchers' inability to link governance to firm outcomes definitively is of more than theoretical importance, because governance research has important managerial implications. Despite equivocal empirical outcomes, authors and groups such as the Cadbury Committee continue to make universal prescriptions for governance reforms, such as separating the Chief Executive Office (CEO) and board chair roles or increasing the independence of the board of directors (Dahya, McConnell, and Travlos, 2002).

We argue that the relative benefits and costs, and thus the effectiveness, of corporate governance mechanisms are contingent upon the firm's circumstances (Boyd, 1995). We, therefore, believe that universal regulatory prescriptions for corporate governance are inappropriate, and that governance mechanisms instead need to be tailored to fit the firm's environment as well as its current financial and life cycle situations. Mechanisms for which the costs exceed the benefits under some circumstances may in fact be beneficial in other situations.

We investigate the degree to which governance mechanisms help firms survive when they are in financial distress. We argue that while governance might have only marginal effects during routine periods of a firm's existence, governance

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mechanisms can have a significant effect on a firm's survival when it is at high risk of failure. We investigate this question by first defining a sample of firms for which survival is in question: Internet firms in the period following the shakeout that began in March of 2000 (Demers and Lev, 2001). We then examine the role of governance mechanisms (board independence, board size, and CEO power) in firm survival. We find that all three governance mechanisms are associated with the likelihood of firm survival, but only for those firms in the sample that are in the greatest financial distress. Our results extend our understanding of conditions under which specific governance mechanisms significantly affect firm survival (Aguilera *et al*., 2008).

Our findings are important for several reasons. First, they confirm that regulatory prescriptions for universal 'good governance' are misguided. Second, they improve our understanding of the contingent nature of governance by providing evidence during an important state of nature for firms: severe environmental turbulence. Finally, we link governance to firm survival, which has not been well studied in the governance literature (Daily *et al*., 2002).

Our study also supplements the existing literature on the effects of board and CEO characteristics on survival. For example, prior research has demonstrated that having a founder as CEO improves survival prospects for newly public firms (Nelson, 2003; Fischer and Pollock, 2004; He, 2008). We add to the current literature on this subject by considering how other elements of CEO power (Finkelstein, 1992; Fischer and Pollack, 2004) and governance characteristics such as board size and independence affect the survival prospects for young firms that face significant financial distress. In this regard, our study supplements recent work on multiple agency, which has demonstrated that contrary to the traditional view that independent board members reduce principal-agent conflicts, there are times when the longer-term perspective of inside board members can be beneficial (see, for example, Arthurs *et al*., 2008).

In the following section, we describe the role of board independence, board size, and CEO power for firms in financial distress in a highly turbulent environment, and we develop hypotheses linking board and CEO characteristics to the survival prospects of firms in our sample. We next describe the Internet firms we study, our data sources, and our analytical methods. We then present our empirical results and conclude with a discussion of the significance of our findings for the study of corporate governance.

CORPORATE GOVERNANCE, FIRM PERFORMANCE, AND SURVIVAL

While a conclusive link between governance and firm performance has been elusive, there is substantial evidence that choices of firm governance mechanisms have implications for a variety of firm outcomes. For example, smaller boards are more likely to remove poorly performing CEOs (Certo, Daily, and Dalton, 2001) and to negotiate CEO compensation contracts that are more sensitive to performance (Boyd, 1994). In addition, boards with greater proportions of independent directors are more likely to remove the CEO of a poorly performing firm (Finkelstein and D'Aveni, 1994) and appear to make acquisition-related decisions that are more conducive to increasing shareholder value (Weisbach, 1988). A lack of board vigilance can allow CEOs who possess significant hubris to overpay for acquisitions (Hayward and Hambrick, 1997).

We suggest that there are two key issues to consider regarding why, if governance mechanisms are related to firms' actions and performance, it has been difficult to conclusively establish how governance affects firm performance. First, if we consider that there are both costs and benefits to monitoring, and that managers and board members act in a boundedly rational manner, then in equilibrium, firms' governance mechanisms will be set so that costs are equal to the expected benefits of the mechanisms (Zajac and Westphal, 1994). If this equilibrium did not exist, and firms systematically overspent on governance, then competition would, over time, bring the system back into equilibrium, as the firms with excessive governance costs either fail or become acquired by more efficient competitors.

Second, while governance mechanisms may be sticky, they do not appear to be subject to strong inertial forces. Prior research has documented, for example, that governance mechanisms change as firms go through different stages in their life cycles, so that as firms grow and become more complex, they tend to increase both the size and independence of their boards (Boone *et al*., 2007).

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Thus, under normal circumstances, managers can adapt governance mechanisms when circumstances change so that the costs of a mechanism that was previously efficient now outweigh its benefits. When governance mechanisms need to be adjusted quickly, however, or when the environment is shifting faster than governance can be changed, the opportunity exists for inefficient governance mechanisms to affect performance in a significant way.

Therefore, when we look for governance-performance links, we seek situations that exhibit at least two features. First, we seek a set of firms for which existing governance mechanisms are not in equilibrium and are no longer optimal due to internal or external changes. Such changes could include firms growing to the point that they need new governance mechanisms, or industry context changing such that the firms' current governance structures no longer fit. Second, the disequilibrium must cause difficulties severe enough that the firms' performance is affected. For a small firm that has less capital on which to draw when undergoing periods of poor performance, for example, disequilibrium in governance mechanisms may significantly influence survival prospects.

We argue that it is important to understand how governance mechanisms affect performance or survival under specific conditions, and which mechanisms are likely to be of most importance given those particular conditions. We focus on two specific conditions. First, we restrict our sample to relatively young firms in a sector characterized by high uncertainty, so that we expect that governance choices will have significant implications for the firms. Second, we test the contingent effects of the degree of financial crisis that a firm faces. We argue below that the relative costs and benefits of governance mechanisms shift during a financial crisis, magnifying the relation between governance and survival.

Board independence

One important facet of a board of directors is its degree of independence from management. Board independence is assessed by the degree to which the board comprises people who are not otherwise affiliated with the company through employment or economic exchange relationships (Gordon, 2007). Independent boards are generally considered advantageous because they are harder for top management to dominate and they may be more likely to encourage changes even in the face of management reluctance. Daily and Dalton (1994: 1606) argue, for example, that 'if there is CEO resistance to adopting aggressive strategies to counter a continuing organizational decline, we would think that an outsider-dominated board would be better positioned to encourage—if not direct—the necessary change.'

The board has an important role to play in helping management make strategic decisions that will enable the firm to survive when it faces a high threat of failure. Not all boards will be equally able to help management with strategic plans, however. Independent boards are likely to be more beneficial for three reasons. First, the greater the degree to which the board comprises independent directors, the less the members of the board will be tied to the firm's current strategy and so the greater the likelihood that the board will consider new strategic directions. Second, the greater the degree of independence, the more that the board will be able to challenge the CEO and top management if there is disagreement over the correct direction to take. Consistent with this argument, prior research has found that boards with a greater proportion of independent directors are more likely to become involved in setting and evaluating a company's strategy (Judge and Zeithaml, 1992).

Third, while monitoring management is a key role of directors, they also bring access to different and varied sources of information and create alignment with the external environment (Pfeffer and Salancik, 1978; Dalton *et al*., 1998; Agrawal and Knoeber, 2001; Hillman and Dalziel, 2003). From this perspective, independent directors have advantages from both agency- (Jensen and Meckling, 1976) and resource-dependence (Pfeffer and Salancik, 1978) perspectives, and the advantages are likely to be more important for distressed firms. From an agency perspective, independent directors are more likely to challenge managers, and such challenges are particularly valuable when the firm needs to make changes in order to survive (Weisbach, 1988). Independent directors are more likely to possess the resources that distressed firms need, such as access to capital (Hillman and Dalziel, 2003).

There is also evidence that board independence is valuable for financially distressed firms. Daily and Dalton (1994) find that large publicly traded

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firms that experienced bankruptcy had less independent boards than a matched sample of non-bankrupt firms, but they question whether their results would hold in a sample of smaller firms (since the large firms they study are inherently more likely to stave off bankruptcy [Levinthal, 1991]). We argue, however, that the value of an independent board is likely to be at least as high for smaller firms. In smaller firms, which are less inert than their larger counterparts (Haveman, 1993), the actions of top management and boards are more likely to have a direct and timely effect on corporate strategy.

We suggest, therefore, that the degree of independence of a board is most helpful for those firms that are at highest risk of failure.

Hypothesis 1: The greater the level of financial distress, the more that board independence decreases the probability of failure.

Board size

There are competing theories and inconsistent empirical evidence in the literature regarding the relationship between board size and firm performance, and relatively little research on the effect of board size on survival. Part of the difficulty derives from the differential effects of board size on the three primary roles of the board: monitoring, advising, and providing access to resources. First, small boards may be more likely to monitor management since smaller boards have greater individual commitment and decisiveness (Judge and Zeithaml, 1992). These advantages are shown in studies that demonstrate that smaller boards are more likely to remove poorly performing CEOs (Certo *et al*., 2001) and to negotiate CEO compensation contracts that are more sensitive to performance (Boyd, 1994). Smaller boards, therefore, are arguably more capable of fulfilling the monitoring role of the board.

Second, smaller boards are more likely to be involved in strategy formation (Goodstein, Gautam, and Boeker, 1994; Zeithaml and Fry, 1984) and have a decision making speed advantage in the advising role of the board of directors. Larger boards, however, possess greater potential for bringing multiple perspectives to bear as they advise management on strategic decisions (Goodstein *et al*., 1994).

Finally, larger boards are more capable of fulfilling the resource-provision role of the board of directors since they possess more opportunities for relationships between board members and sources of resources important to firm success (Goodstein *et al*., 1994). This feature may be especially valuable to young, entrepreneurial firms struggling to establish themselves (Fischer and Pollock, 2004).

These arguments suggest a positive relationship between board size and effectiveness in terms of possession of expertise and acquisition of resources but a negative relationship between board size and effectiveness in terms of the board's ability to act swiftly on its expertise and to monitor management. Dalton *et al*. (1999) perform a meta-analysis of studies of board size and performance and find that there is a positive relationship with respect to financial performance. This result indicates that, for large firms in a steady state, the benefits of access to additional resources due to the large board outweigh the additional agency costs and slower decision making.

The firms we study, however, exist in a high-velocity environment in which 'changes in demand, competition, and technology are so rapid and discontinuous that information is often inaccurate, unavailable, or obsolete' (Eisenhardt, 1989: 544). For firms that are in such environments, and are also at high risk of failure, the advantages that large boards bring, namely, the ability to gather additional information and consider a greater number of options, are unlikely to be as valuable as the ability to move quickly. That is, the resources are of little help if the board cannot act quickly enough to utilize them. The environment is simply too uncertain for more time in deliberation to be as helpful, on average, as making quick decisions.

We argue, therefore, that for firms in the Internet sector over our observation period, board size will matter more for those firms in the greatest financial distress. Specifically, we expect the advantages of small boards to dominate, such that distressed firms with larger boards are at the highest risk of failure.

Hypothesis 2: The greater the level of financial distress, the more that larger boards increase the probability of failure.

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CEO power

A second central area of governance research is concerned with the degree to which CEO power affects firm outcomes. Agency theory, with its emphasis on the divergent interests of management and owners, suggests that having too much power in the hands of a CEO is unwise, as it allows the CEO to pursue an agenda that is against the best interests of shareholders (Finkelstein and D'Aveni, 1994; Dalton *et al*., 1998). Having a powerful CEO also reinforces the perception that the board is likely to be under the CEO's influence and thus be ineffective in guiding the firm and protecting shareholders (Pearce and Zahra, 1991). There is evidence that CEO power may be beneficial in particular circumstances, however. For example, in difficult environments, such as those characterized by low munificence and high uncertainty, powerful CEOs may be beneficial due to their ability to make rapid decisions without the need to build consensus (Finkelstein and D'Aveni, 1994; Boyd, 1995; Harris and Helfat, 1998).

In normal circumstances, it may be that the net effect of having a powerful CEO is insignificant. Studies that operationalize powerful CEOs as those with dual roles of CEO and board chair, for example, have found little evidence to support the idea that having a dual CEO-chair harms performance (Dalton *et al*., 1998; Harris and Helfat, 1998). For firms facing a crisis, however, the benefits of having a powerful CEO can outweigh the costs for several reasons. First, as Boyd (1995) demonstrates with regard to environmental factors, powerful CEOs can more rapidly enact necessary changes. For example, duality allows for a single, unified voice to guide the firm during the crisis (Finkelstein and D'Aveni, 1994).

Second, CEOs with high power may have an even greater incentive to find a way to save a firm from financial crisis. For example, research has demonstrated that CEOs of failed firms are stigmatized by their association with the failure (Semadeni *et al*., 2008). The stigma may be even greater for CEOs who have high power, as they may be seen as having had more responsibility for the firm's failure (Sutton and Callahan, 1987). Consistent with this, prior work has shown that firms with CEOs with high ownership stakes—the CEOs have more power through more voting authority but are at greater personal financial risk—are associated with lower failure rates (Fischer and Pollack, 2004).

The final reason that a powerful CEO can be beneficial to a firm during a crisis is that concentrated power can lead to extreme decisions (Adams, Almeida, and Ferreira, 2008). Extreme decisions can be beneficial or harmful. During relatively stable periods in an industry, extreme decisions may be undesirable (March, 1991). On the other hand, extreme decisions that drastically change the firm's strategy may be the only chance the firm has if survival is at stake.

Overall, the degree to which a CEO wields power may increase the chance that the CEO will extract rents during steady-state but may not have a significant relation with survival in equilibrium. When a firm faces a high probability of failure, however, such as when environmental turbulence has induced severe financial distress, it might be beneficial to have a powerful CEO due to the unified voice, the incentive to avoid the stigma of failure, and the potential for extreme outcomes that accompany such individuals.

Hypothesis 3: The greater the level of financial distress, the more that CEO power decreases the probability of failure.

RESEARCH METHOD

Sample

Figure 1 depicts the timeline for our sample selection procedure. Our sample consists of Internet firms founded in 1994 or later that conducted independent public offerings (IPOs) from 1996 through 1999 (inclusive). An 'Internet firm' is one that conducts business with consumers or other businesses over the Internet, or provides products and services (e.g., software or consulting) to other businesses to support their Internet operations. We begin in 1996 because there were few Internet IPOs before 1996 and because IPO Alert! (alertipo.com), which we use to identify our initial sample of Internet firms, begins coverage in 1996.[1]

We identify 333 Internet IPOs using the Securities Data Corporation (SDC) database and the IPO Alert! Web site. We eliminate 10 financial firms

[1] In an ironic twist for the current research, alertipo.com failed in late 2005. Its listings are available via the Internet Archive Wayback Machine (web.archive.org).

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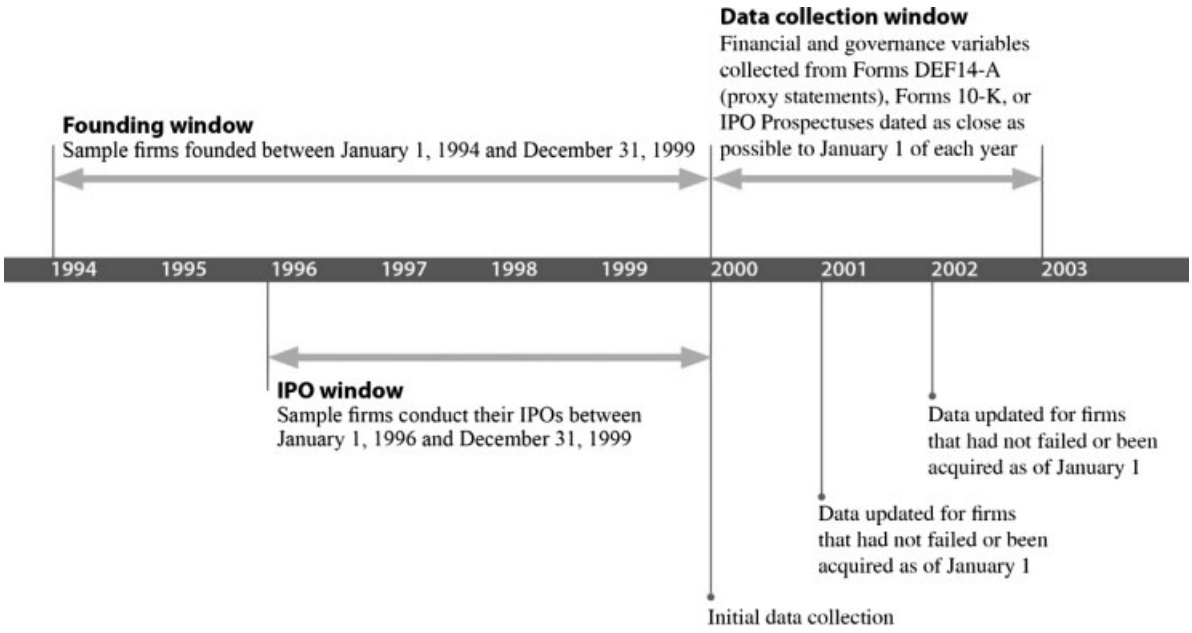

Figure 1. Timeline for sample selection and data collection

(since their financial statements are substantively different from other firms and our control variables rely on these data), 26 foreign firms (since they face a substantively different control environment than U.S. firms), and 30 firms with missing data. A number of firms went public in 1996–1999 and identified themselves as dependent upon the Internet, but were founded well prior to the Internet period. We exclude 40 firms that were founded prior to 1994 in order to focus our final sample of 227 firms on those that are relatively young and not yet well established. Our results are insensitive to minor changes in this cut-off date. We also present results using our entire sample, and these results confirm that the firms that were founded well before the Internet era are significantly different, though our core results hold for these firms as well.

We verify that a firm from SDC and/or IPO Alert! Is, in fact, an Internet firm by reading the description of the business either from Hoover's (http://www.hoovers.com) or in the firm's Form 10-K. Our data come from the firms' IPO prospectuses and/or proxy statements and from the Center for Research in Security Prices and COMPUSTAT databases. We take our first measurement of governance and financial variables just prior to the beginning of the shakeout, so they are from as close to 1 January 2000 as possible, and we update the governance and financial variables annually up to the 31 December 2002 cutoff for our analysis. Although there were Internet firm exits after that period, the majority of exits occurred by the end of 2002 (Kauffman and Wang, 2007). Our period includes the most intense period of the shakeout, when 47 firms failed. We conduct our primary analysis using 524 firm-year observations from these 227 firms over our three-year period.

Model and dependent variable

We seek to determine whether CEO and board characteristics affect the failure rate of firms following an industrywide environmental shock, namely, the Internet shakeout in March 2000. Event-history analysis is appropriate for our data structure, as it allows for both survivors and for firms that exit prior to the end of the observation by way of acquisition ('right-censored observations' in event-history terminology).[2] We use an exponential hazard rate model, which is the simplest transition rate model and does not force a functional form on the transition rate (Blossfeld,

[2] The firms that (a) survived to the end of the observation period and (b) exited by acquisition prior to the end of the observation period would lead to biased parameter estimates in an ordinary least squares regression. Logistic regression would not allow us to take the time of exit into account in the analysis.

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Golsch, and Rowher, 2007). We account for having multiple observations per firm by clustering the standard errors at the firm level.

The event-history model estimates the probability that a firm exits at time t, given that it had survived until time $t-1$. The exponential model that we test is $r(t) = exp(\boldsymbol{A}\alpha)$. The model estimates the effects of the independent and control variables in vector $\boldsymbol{A}$ on the failure rate of firms. We measure time dating from 31 March 2000, which is considered to be the beginning of the Internet shakeout (Demers and Lev, 2001). We also run models using 1 January 2000 as the start of the event history clock, and the results are unchanged.

In the analysis that follows, we code a firm as having failed if it was delisted from the stock exchange on which it was traded for reasons other than acquisition *and* we can find evidence that it has ceased conducting business. We use company descriptions from Hoover's online (www.hoovers.com) to ascertain whether the firm was still conducting business as of 31 December 2002. We code firms that are delisted but remain in operation as independent entities throughout our observation period as survivors. We code firms that are acquired over our observation period as right censored at the acquisition date. Acquisitions, therefore, are neither classified as failures nor treated the same as firms that survive to the end of the observation period. Our reading of descriptions of these acquisitions at Hoover's online indicates that a subset of the buyers paid only for operating assets (computers, for example) that they intended to use in their own businesses, and that the target firm had essentially failed as an operating entity. Since classifying such acquired firms as failures would be somewhat arbitrary and/or anecdotal, we do not do so. Since this noise in our sample biases against finding support for our hypotheses, we believe the results we report are uncompromised by this choice.

As mentioned above, we measure financial and governance variables at the beginning of the firm's fiscal year. We observe firm exit over the year that follows, so we have the proper temporal structure in our data, with the independent and control variables preceding the outcome. We update all variables for firms still in the sample as of 1 January 2001, and again as of 1 January 2002. We determine the exact exit date of firms using delisting records and the Hoover's online database. Figure 1 also depicts the timeline for our data collection.

Independent variables

We have three key independent variables: the proportion of independent directors, the size of the board, and CEO power. We collect data for these variables from prospectuses, proxy statements, and/or forms 10K.

We measure *independent director proportion* as the number of directors who are not and have never been employees of the firm, are not related to any employee of the firm, and do not work for a company with significant business relationships with the firm, divided by the total number of directors. *Board size* is the count of the members of the board of directors at the beginning of the year.

We follow Finkelstein's (1992) measure of CEO power, with two slight changes. Finkelstein (1992) described four elements of CEO power, which included structural, ownership, prestige, and expert power. We include the first three of these elements but exclude expert power. Finkelstein (1992) measures expert power using the breadth of management experience that the CEO possesses. This is difficult to obtain for many of our small, young firms. Furthermore, it is difficult to judge what constitutes the most important experience for firms in this newly emerging sector in terms of the power that would accrue to the CEO due to that experience. We therefore consider four indicators of a CEO's power: duality, founder status, shares owned as a percent of total shares outstanding, and attainment of elite education. We discuss each of these in the following paragraphs.

Duality occurs when the CEO is also the chair of the board of directors. While having a dual CEO is often seen as an indicator of excess CEO power that prevents adequate monitoring, duality may add value (especially in a crisis) because it preserves unity of command and reduces confusion over who is really in charge of the organization (Anderson and Anthony, 1986; Finkelstein and D'Aveni, 1994). Duality might be especially beneficial when a firm faces financial distress, as it allows for a more rapid response to changing situations (Boyd, 1995). There is general agreement that duality corresponds to greater CEO power. The majority of conceptual and empirical work, however, predicts negative consequences of having one individual

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serve as both CEO and chair due to fewer constraints on rent-seeking behavior (Finkelstein and D'Aveni, 1994). For example, dual CEOs are less likely to be replaced after a period of poor performance (Goyal and Park, 2002).

Our second indicator of CEO power is whether the CEO is also the founder (or one of the founders) of the firm. Most company founders remain significantly involved during the firm's transformation from being privately held to being publicly traded: a majority of firms go public with a founder-CEO (Nelson, 2003). A founder-CEO holds a degree of informal power beyond that of a non-founder-CEO that may increase his or her ability to enact strategic changes in a timely manner. Fischer and Pollock (2004) note, for example, that employees tend to have strong bonds with founder-CEOs, which increases employees' trust in the CEO. Finkelstein and D'Aveni (1994: 1107) argue that informal CEO power increases with tenure, as CEOs 'gain personal mystique and the loyalty of others.' By definition, the founder is the longest-tenured member of the organization, so a founder-CEO should have higher informal power than other CEOs.

Our third indicator of CEO power is the degree of share ownership of the CEO. Ownership allows a CEO to exercise more discretion in making decisions (Finkelstein, 1992; Fischer and Pollock, 2004), and provides a legitimate claim to the right to determine how to deploy the firm's resources. To the extent that this allows a CEO to make strategic moves more rapidly, higher CEO ownership should benefit firms in distress.

Finally, following Finkelstein (1992), we consider the degree of prestige power that a CEO possesses. We measure this by using the CEO's attainment of a degree from an elite educational institution. We use Finkelstein's (1992) list of 29 elite American institutions and create two indicator variables, one for the CEO's undergraduate degree and one for the CEO's graduate degree, each taking on a value of 1 if the CEO obtained any degree from an elite institution and 0 otherwise. When the firm's SEC filings do not reveal the CEO's educational background, we use Zoominfo.com and *Business Week*'s biographical data.

Since the education data are not available for 29 percent (154 of 524) of our firm-year observations (even after consulting the secondary sources), we create two measures of CEO power, one that includes education as an indicator and one that does not. Our primary *CEO power* variable is a composite of duality, founder status, and CEO ownership percentage, while the alternate variable, *CEO power**, incorporates these three elements as well as the indicator variable for attainment of an elite education. To create each variable, we standardize each of the elements and then sum the standardized scores, weighting each indicator equally.[3]

We also have one critical contingency variable: the degree of financial distress of each firm at the beginning of each sample year. We measure *distress* using the Ohlson bankruptcy prediction index (Ohlson, 1980). Although the Altman (1968) index has been used to model financial conditions more frequently in strategic management studies, we employ the Ohlson index because accounting research has demonstrated that it is a more accurate predictor of bankruptcy (Begley, Ming, and Watts, 1996). We use the Ohlson index solely as a proxy for financial distress; the firms in our sample that fail do not actually declare bankruptcy with the intent of reorganizing, but rather cease all operations.

The Ohlson index is calculated using financial statement data and weights derived from Ohlson's (1980) analysis. The components of the index address four basic factors derived from the financial statement data (Ohlson, 1980: 110): size, financial leverage, profitability, and liquidity; a complete description appears in the Appendix. The liquidity factor includes the ratio of working capital to total assets and current liabilities to current assets, and is the least robust of the four factors. We therefore add additional control variables to address the importance of adequate cash for young and rapidly growing firms. We discuss these variables in the next subsection.

We measure *distress* at the beginning of each observation year using financial statement data from COMPUSTAT. Since higher levels of the Ohlson index indicate greater likelihood that the firm will declare bankruptcy during the upcoming year, a positive and significant coefficient on *distress* in our event-history analysis indicates

[3] We have also performed an analysis that assumes that elite education = 0 for any firm with missing educational data (see Chen, Hambrick, and Pollock, 2008). The results are unchanged. We do not utilize this assumption for our primary analysis because of the relatively high proportion of missing values.

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that traditional financial indicators of future performance are associated with firm failure in our Internet-firm sample.

Control variables

We control for other governance mechanisms that could affect the degree to which directors and other significant actors, including venture capitalists (VC) and shareholders with large holdings (Engel, Gordon, and Hayes, 2002), have incentives to act to ensure firm survival. These mechanisms relate to the degree of ownership of these entities. First, *independent director ownership* is the percentage of the firm's shares that the independent directors own collectively. Second, *large shareholder ownership* is the total percentage of shares that all large shareholders hold (a large shareholder is an entity that owns five percent or more of shares outstanding, but that does not have a direct representative on the board of directors). Finally, *VC on board* is a dichotomous variable that takes on the value 1 if there is a representative from a VC firm on the board and 0 otherwise. We also include *VC ownership,* the level of ownership of VC firms, as there may be a difference between simply having a VC representative on the board and having a VC firm with a significant ownership share.

We also control for additional firm financial characteristics that affect survival. First, since cash flow was a major concern for firms during the shakeout period (Demers and Lev, 2001), we control for the firm's rate of 'cash burn' at the time of its IPO by including the ratio of net operating cash flow to the prior year's sales (*cash flow*). Second, we control for the firm's sales growth (*sales growth*), though the effect of growth on survival for these firms is uncertain. While rapid growth can move the firm more quickly toward profitability, it can also strain the firm's operational capabilities and working capital. We set sales growth to 100 percent for the 20 firms that did not exist in 1998 and consequently had no sales against which to measure growth in 1999.

We recognize that the probability of success of Internet firms depends in part on their perceived credibility by potential exchange partners (Johnson, Daily, and Ellstrand, 1996). We control for the reputation of the lead underwriter for the firm's IPO (*underwriter reputation*) for two reasons. First, prior research in finance has demonstrated that more prestigious underwriters will only support the IPOs of firms that are more likely to succeed, so this variable may proxy for the firm's expected survival prospects (Loughran and Ritter, 2004). Second, having a relationship with a prestigious lead underwriter has symbolic value and may provide the firm with social capital on which it can draw after the IPO (Higgins and Gulati, 2003; Fischer and Pollock, 2004). We identify the lead underwriter in the firm's IPO prospectus and obtain underwriter ratings from Jay Ritter's Web site.[4] These ratings have appeared in Loughran and Ritter (2004) and are adaptations of the ratings that first appeared in Carter and Manaster (1990). The measure ranges from 1 (low quality) to 9 (high quality). We expect a negative coefficient on this variable, indicating that high quality underwriters are associated with firms with lower failure rates. We include *firm size*, the natural logarithm of the firm's total assets, since larger firms are more likely to be able to weather an extended period of poor performance (Levinthal, 1991).

We control for differences in our firms' production functions using an indicator variable that controls for the firm's line of business. We code this variable based on the firm's description of its primary business in its prospectus and/or Form 10-K disclosures. We categorize our sample firms as retailers, software producers, access providers, content providers, Internet enablers, or 'other,' as in Afuah and Tucci (2003). For parsimony, and to preserve degrees of freedom, the results we report below include only the variable *access provider*. This is the only category that had a significant effect on firm survival and no results are affected by the inclusion of the other indicator variables.

Finally, we control for the timing of the firm's IPO. We measure *time since IPO* as the number of calendar days between the initial trading date for the firm and the end of the current spell. Evidence suggests that firms rushed to go public in the height of the Internet bubble (Schultz and Zaman, 2001). If firms were going public prematurely in the latter part of our sample period, their survival prospects should be especially poor.

RESULTS

Table 1 Panel A, presents descriptive statistics for our variables. There are two noteworthy items.

[4] http://bear.cba.ufl.edu/ritter/ipodata.htm

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Table 1. Descriptive statistics

	Mean	Std. dev	Min	Max
Panel A: Test variables				
Firm failure	0.09	0.29	0.00	1.00
Independent director ownership	0.12	0.29	0.00	0.93
Large shareholder ownership	0.13	0.14	0.00	0.78
VC on board	0.69	0.46	0.00	1.00
VC ownership	0.08	0.12	0.00	0.79
Sales growth	10.21	55.55	−1.00	1062.45
Cash flow	−2.25	11.20	−188.53	1.35
Underwriter reputation	7.83	1.91	1.00	9.00
Firm size	4.76	1.53	0.08	9.86
Access provider	0.16	0.37	0.00	1.00
Time since IPO	917.5	398.8	226	2483
Distress (Ohlson index)	2.85	6.63	−6.92	59.33
Independent director proportion	0.64	0.16	0.00	1.00
Board size	6.63	1.75	3.00	13.00
CEO power	−0.17	2.02	−2.74	6.28
*CEO power**	−0.16	2.15	−3.58	5.45
Panel B: *CEO power* elements (unstandardized values)				
Duality	0.58	0.49	0	1
Founder	0.33	0.47	0	1
CEO ownership	0.08	0.12	0	0.74
Elite education	0.47	0.50	0	1

N = 524 for all variables except *CEO power** and *elite education*, for which N = 370

First, 69 percent of our sample firms have VC representatives on the board, a larger proportion than in some other datasets (Fischer and Pollock [2004] have 56 percent in their sample, for example). Second, we provide data on the individual elements of *CEO power* in Panel B. Prior studies, including Nelson (2003), have found that the majority of firms go public with a founder of the firm as CEO, but in our sample, only 33 percent of firms have founder-CEOs, even though our sample consists of relatively recent IPO firms. This discrepancy could be due to CEOs leaving between the IPO date and our sample period, or it could be related to the high degree of VC representation, as VC participation often involves bringing in new management (Lerner, 1995)

Table 2 reports the Pearson product-moment correlations among our variables. There is a significant positive correlation between *distress* and *firm failure* (recall that higher values of the Ohlson index indicate weaker financial condition), which indicates that the traditional measures of financial condition at the time of the IPO are related to Internet firms' probability of failure. This provides initial evidence that the Ohlson index is a suitable measure of the degree of financial risk the firms face. We also note that CEO power and CEO power* are significantly correlated with a number of other variables; for example, more powerful CEOs are more likely to have larger and more independent boards.[5]

Table 3 contains the results of the event-history analysis. Model 1 contains the results incorporating the control variables and the direct effect of the governance variables. *Distress*, our measure of the degree of financial crisis that a firm faces, is highly predictive of failure. This is interesting in and of itself for two reasons. First, during the time of the Internet frenzy, claims were made with respect to the difference between 'old economy' firms and 'new economy' (Internet) firms in terms of valuation criteria (Bartov, Mohanram, and Seethamraju, 2001). Second, Platt (1995) argues that traditional measures of bankruptcy risk are not necessarily applicable for recent IPOs, but rather that bankruptcy for these companies is driven mostly by cash flow and creditor demands. Our results, however, indicate that traditional measures of bankruptcy risk were highly predictive of

[5] We omit the individual elements of CEO power and CEO power* for parsimony. The duality, founder, and ownership variables are correlated at between 0.15 and 0.33, but elite education is essentially uncorrelated with the other items (correlations ranging from −0.01 to 0.015).

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Table 2. Pearson correlation coefficients

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	*Firm failure*	1.000														
(2)	*Independent director ownership*	−0.008	1.000													
(3)	*Large shareholder ownership*	0.067	−0.206*	1.000												
(4)	*VC on board*	−0.108*	0.094*	−0.030	1.000											
(5)	*VC ownership*	−0.028	−0.140*	0.014	0.394*	1.000										
(6)	*Sales growth*	−0.004	0.007	−0.013	0.002	0.097*	1.000									
(7)	*Cash flow*	−0.014	0.041	0.019	0.003	−0.091*	−0.123*	1.000								
(8)	*Underwriter reputation*	−0.028	0.079*	−0.169*	0.392*	0.236*	0.024	0.003	1.000							
(9)	*Firm size*	−0.059	−0.038	−0.080	0.272*	0.019	−0.008	0.020	0.532*	1.000						
(10)	*Access provider*	0.100*	0.129*	−0.029	−0.124*	−0.015	−0.005	−0.012	−0.092*	0.013	1.000					
(11)	*Time since IPO*	−0.048	−0.153*	0.071	−0.117*	−0.240*	−0.148*	0.064	−0.117*	0.058	0.035	1.000				
(12)	*Distress*	0.194*	0.020	0.031	−0.111*	−0.059	−0.011	−0.114*	−0.225*	−0.532*	0.088	0.187*	1.000			
(13)	*Independent director proportion*	−0.059	0.238*	−0.105*	0.161*	0.087*	−0.036	0.054	0.167*	0.129*	−0.008	−0.031	0.027	1.000		
(14)	*Board size*	0.036	0.206*	−0.121*	0.137*	0.083*	−0.056	0.072	0.202*	0.262*	−0.006	−0.058	−0.113*	0.048	1.000	
(15)	*CEO power*	−0.053	−0.112*	0.008	−0.137*	−0.086*	−0.053	0.004	−0.193*	−0.134*	−0.047	−0.020	−0.008	−0.033	−0.205*	1.000
(16)	*CEO power*[a]	−0.076	−0.175*	−0.077	0.072	0.029	0.045	0.055	0.052	−0.035	−0.104*	−0.027	−0.009	0.009	−0.209*	0.892*

N = 524 for all correlations except those with CEO power*, for which N = 370

* Indicates significant at $p < 0.05$.

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Table 3. Exponential hazard rate analysis of failure rate of Internet firms

	Model 1	Model 2	Model 3	Model 4	Model 5
0	−0.927	−0.985	−1.054	−0.879	−1.253
	(0.886)	(0.817)	(0.851)	(0.892)	(0.841)
Large shareholder ownership	1.657**	1.148	1.490**	1.781**	1.187
	(0.755)	(0.819)	(0.712)	(0.742)	(0.753)
VC on board	−0.767**	−0.777**	−0.890**	−0.731**	−0.897***
	(0.342)	(0.340)	(0.351)	(0.344)	(0.337)
VC ownership	−0.600	−0.575	−0.400	−0.541	−0.554
	(1.461)	(1.403)	(1.226)	(1.442)	(1.176)
Sales growth	−0.002	−0.003	−0.002	−0.002	−0.003
	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)
Cash flow	0.003	0.004	0.009	0.003	0.009
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Underwriter reputation	0.083	0.106	0.023	0.061	0.026
	(0.102)	(0.110)	(0.100)	(0.104)	(0.102)
Firm size	0.054	0.118	0.157	0.059	0.203
	(0.133)	(0.134)	(0.137)	(0.136)	(0.137)
Access provider	0.559	0.697**	0.630*	0.566	0.704**
	(0.371)	(0.345)	(0.359)	(0.369)	(0.346)
Time since IPO	−0.001**	−0.001***	−0.001***	−0.001**	−0.002***
	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.001)
Distress	0.069***	0.234***	−0.078*	0.063***	0.158**
	(0.016)	(0.063)	(0.046)	(0.017)	(0.074)
Independent director proportion	−0.781	0.288	−0.763	−0.866	0.744
	(0.926)	(0.987)	(0.943)	(0.957)	(1.143)
Board size	0.115	0.112	−0.018	0.126*	0.010
	(0.075)	(0.072)	(0.090)	(0.075)	(0.087)
CEO power	−0.094	−0.126	−0.113	−0.048	−0.046
	(0.073)	(0.079)	(0.075)	(0.074)	(0.080)
Distress × independent director proportion		−0.220**			−0.300***
		(0.079)			(0.077)
Distress × board size			0.027***		0.023***
			(0.008)		(0.007)
Distress × CEO power				−0.010	−0.013**
				(0.008)	(0.006)
Constant	−8.490***	−9.426***	−7.369***	−8.411***	−8.626***
	(0.955)	(1.072)	(1.007)	(0.917)	(1.044)
Observations	524	524	524	524	524
Failures	47	47	47	47	47
Log likelihood	−124.82	−121.50	−120.59	−124.24	−116.18
Degrees of freedom (with respect to Model 1)	—	1	1	1	3
χ^2	—	6.64**	8.46**	1.16	17.28***

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

which Internet firms were likely to fail during the shakeout.

We also find that firms with a higher proportion of shares held by large shareholders have significantly higher failure rates,[6] while those with VC representation on the board have significantly lower failure rates. The magnitude of the VC firms' ownership stakes, however, is not significantly associated with the failure rate. These results suggest that it is the expertise that the VC brings to the board that influences firms' ability to weather a crisis, and not the monitoring incentives that come with an ownership stake.[7] Neither the other control

[6] We replace the total percentage ownership of large shareholders with the percentage ownership of the largest shareholder and find that none of our inferences is affected.

[7] Following Fisher and Pollack (2004), we also use a measure of VC ownership concentration (the sum of the squared percentage

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variables are associated with firm survival, nor are there significant direct effects of *independent director proportion, board size*, or *CEO power*.

Model 2 tests Hypothesis 1 by adding the interaction between *distress* and *independent director proportion*. The coefficient on the interaction term is negative and significant at the five percent level, supporting Hypothesis 1. This result indicates that more independent boards, typically described as a desirable governance characteristic, increase a firm's probability of survival only when the firm's level of financial distress is high.

Model 3 tests Hypothesis 2 by adding the interaction between *distress* and *board size*. The coefficient on the interaction term is positive and significant at the one percent level, supporting Hypothesis 2. This result indicates that as the level of financial distress increases, the costs of having a large board increasingly outweigh the benefits.

Model 4 tests Hypothesis 3 by adding the interaction between *distress* and *CEO power*. The coefficient on the interaction term is not significant at conventional levels. We therefore do not find support for Hypothesis 3, that the influence of CEO power on firm survival is greater when the firm is in severe financial distress. To investigate this further, we test the effects of the elements of *CEO power* separately (not tabulated; available upon request), and find that none of the elements (duality, founder status, or ownership percentage) has a significant effect on survival of firms in financial distress.

Model 5 includes all three interaction effects simultaneously. The coefficient on *distress* × *independent director proportion* (*distress* × *board size*) remains negative (positive) and significant confirming support for Hypothesis 1 (2). In Model 5, however, the coefficient on *distress* × *CEO power* becomes negative and significant at the five percent level. This indicates that in our fully specified model we obtain some support for Hypothesis 3, and that for the firms in the sample that are in financial distress, there may be benefits to having powerful CEOs.

Extensions

In Table 4, we present additional results that include the elite education component of *CEO power* and a broader sample of Internet firms. The elite education component was not included in the results in Table 3 because the data are unavailable for a significant proportion of our sample (the number of observations declines from 524 to 370 when elite education is included and the number of failure events declines from 47 to 34). The broader sample of Internet firms includes 30 firms that were founded well before the Internet era, and thus the homogeneity of the sample is reduced. In each case, we present both the baseline model with only controls and direct effects, and the fully specified model with all interactions.

In Models 1 and 2, we replicate our analysis from Table 3 using *CEO power**. We find the interaction between this measure of power and distress is not significant. There are at least three potential explanations for the difference. First, the firms missing educational data may differ in some significant manner from those in the rest of the sample, though we note that the other variables have very similar coefficients in Model 5 of Table 3 and Model 2 of Table 4. Second, the measure of educational prestige suggested by Finkelstein (1992) may not be appropriate for our Internet firms (for example, the institutions he selected do not include many top engineering schools). Finally, it is possible that our elite education element does correctly measure a dimension of CEO power, but that it is one that is of little help to distressed firms.

In Models 3 and 4, we return to the original *CEO power* variable used in Table 3 and broaden the sample to include Internet-based firms that went public in our 1996–1999 window but were founded before 1994. We find that the results are similar, but somewhat weaker, for the broader sample. For example, the effect of large shareholder ownership is significant at the five percent level in Model 1 of Table 3, but is only significant at the 10 percent level in Model 3 of Table 4. This weakening is consistent with the addition of 'noise' to the sample when we include the older firms that are not like the young, entrepreneurial, not-yet-established firms we examine in Table 3.

One important and substantive difference in Model 3 of Table 4 relative to Model 1 of Table 3 is there is a significant direct effect of *CEO power* on firm survival when we include the older firms. Specifically, greater *CEO power* reduces the firm's likelihood of failure. This finding is interesting in that it suggests that powerful CEOs may be

ownership of all VC owners). The coefficient on VC ownership switches signs but remains insignificant, and none of our other inferences is affected.

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Table 4. Extensions

	Measure of *CEO power* includes *elite education* component		Expanded sample including older firms	
	Model 1	Model 2	Model 3	Model 4
Independent director ownership	−0.964	−0.941	−1.78	−1.352*
	(1.034)	(0.930)	(0.813)	(0.769)
Large shareholder ownership	1.994**	1.506*	1.524*	1.280*
	(0.964)	(0.901)	(0.783)	(0.791)
VC on board	−0.859**	−0.583	−0.815**	−0.930***
	(0.419)	(0.442)	(0.318)	(0.314)
VC ownership	0.504	−0.147	−0.320	−0.173
	(1.788)	(1.479)	(1.403)	(1.122)
Sales growth	−0.005	−0.003	−0.000	−0.001
	(0.008)	(0.007)	(0.002)	(0.002)
Cash flow	−0.035	−0.017	0.001	0.007
	(0.033)	(0.033)	(0.005)	(0.006)
Underwriter reputation	0.066	−0.008	0.0013	−0.038
	(0.119)	(0.106)	(0.086)	(0.086)
Firm size	0.098	0.188	0.123	0.240**
	(0.181)	(0.174)	(0.109)	(0.121)
Access provider	0.311	0.478	0.579	0.676**
	(0.508)	(0.446)	(0.353)	(0.324)
Time since IPO	−0.001	−0.001*	−0.001**	−0.001***
	(0.000)	(0.0005)	(0.000)	(0.0005)
Distress	0.075***	0.260*	0.071***	0.125*
	(0.020)	(0.139)	(0.015)	(0.066)
Independent director proportion	−1.331	1.378	−0.345	0.747
	(1.207)	(1.888)	(0.899)	(0.965)
Board size	0.166*	0.017	0.086	−0.007
	(0.087)	(0.114)	(0.074)	(0.082)
*CEO power**	−0.061	−0.089		
	(0.084)	(0.095)		
Distress × independent director proportion		−0.440***		−0.230**
		(0.140)		(0.087)
Distress × board size		0.028***		0.021***
		(0.009)		(0.007)
*Distress × CEO power**		0.007		
		(0.008)		
CEO power			−0.139**	−0.099
			(0.067)	(0.070)
Distress × CEO power				−0.011*
				(0.006)
Constant	−8.958***	−9.627***	−8.534***	−8.546***
	(1.216)	(1.601)	(0.849)	(0.887)
Observations	370	370	647	647
Failures	34	34	55	55
Log likelihood	−86.46	−76.65	−145.39	−138.59
Degrees of freedom (with respect to previous model)	—	1	—	1
χ^2	—	19.62***	—	13.60***

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

of benefit for only some firms that are undergoing turbulent times. It may, in fact, indicate that the actual ability to exercise power differs even among CEOs who exhibit similar levels of power on Finkelstein's (1992) scale. Daily and Johnson (1997) suggest, for example, that not only

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does power affect performance, but performance, in turn, increases power. Thus, CEOs of older firms who have survived to our observation period may be able to exercise their power to a greater degree (Daily and Johnson, 1997: 104).

Fischer and Pollock (2004) find that the interaction of founder-CEO and CEO ownership decreased the failure rate of post-IPO firms in their sample. We replicate their analysis (not tabulated; available on request) and find no significant results. This difference may be partly explained by the significantly lower proportion of founder-CEOs in our sample (their sample had 75% founder-CEOs, ours has 33%) and by the slightly lower ownership levels of CEOs in our sample (16% in their sample, 8.9% in ours). The difference may also, however, relate to the difference between their broad setting and our focus on Internet firms during the shakeout, and to the fact that they study firms that were founded at any time and follow them for five years after the firms' IPOs, while we study firms that have been public for up to four years at the beginning of the Internet shakeout and follow them for up to three additional years. Overall, we believe that our inability to replicate the Fischer and Pollock (2004) finding lends credence to our contention that the effect of governance mechanisms differs by context, so that what is beneficial in one setting is not necessarily beneficial in another.

DISCUSSION

The results of our event-history analysis provide significant evidence that governance mechanisms affect the survival prospects of firms in crisis. We find that firms with higher levels of financial distress, as measured by Ohlson's (1980) bankruptcy prediction model, benefited from having a higher proportion of independent directors. This result is consistent with prior research that has shown that independent boards are more likely to make strategic actions such as the removal of poorly performing CEOs (Weisbach, 1988). Our results contribute to the literature on governance and performance by explicitly linking board independence to survival and demonstrating that board independence matters even more for firms as their financial distress increases.

There is a second interpretation of our results that is equally intriguing. We find that high board independence is only associated with firm survival when financial distress is high. When the degree of financial distress is low, firms with boards with relatively low independence actually have lower failure rates. This result is consistent with evidence found in recent research using the multiple agency perspective, which suggests that it is important to consider not simply whether a given party is a principal or an agent, but what that party's incentives and time horizon are. Inside board members in firms that have recently gone public may, in fact, have longer time horizons than independent board members, such as representatives of VC firms who may be more concerned about short-term returns (or cashing out) than long-run viability (Arthurs *et al*., 2008).

In Figure 2, we plot the multiplier of the hazard rate against the degree of financial distress for firms with independent director proportions of 50 percent and 75 percent. We choose these two levels because they are close to the 25th (57% independent) and 75th percentile (75% independent) levels in our sample. Higher values of the multiplier imply a greater chance for the firm to fail. At low levels of financial distress, a greater proportion of independent directors is actually associated with a slightly higher risk of failure.[8] Figure 2 shows that as the firm's level of distress increases, independent directors become increasingly beneficial for survival prospects.

We also find that firms with the highest levels of financial distress were less likely to fail with small boards. This finding contrasts with that of Dalton *et al*. (1999), who, in their meta-analysis of board size and performance research, find that large boards are associated with better performance, and that this effect is strongest for smaller firms. Most of our sample firms fall well within their definition of small firms (those with less than $300 million in sales). We attribute our different findings to the environmental context of our sample. Dalton *et al*. (1999) note that institutional investors concerned about poor monitoring of the CEO place pressure on troubled firms to reduce the size of their boards. For the firms in our sample that are experiencing severe financial distress, our results indicate that smaller boards may

[8] In graphing the multiplier of the hazard rate, the rate for a given variable is calculated relative to a baseline rate that is usually the minimum for the variable. We use a baseline rate of 12.5 percent independent directors, which is the first percentile in our sample.

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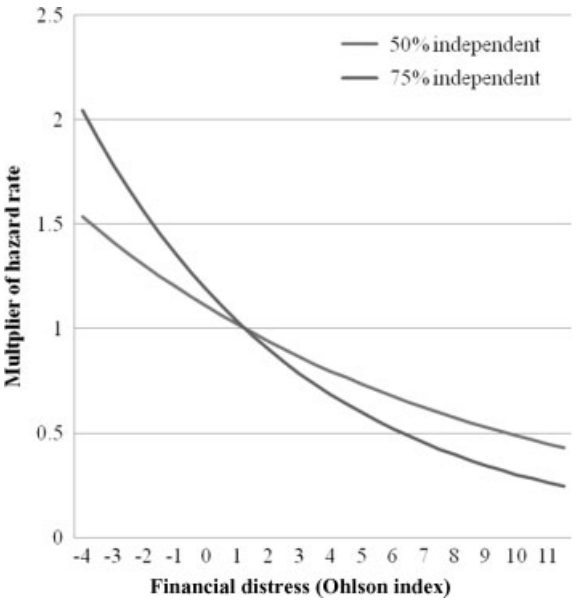

Figure 2. The effect of financial distress and board independence on the multiplier of the hazard rate

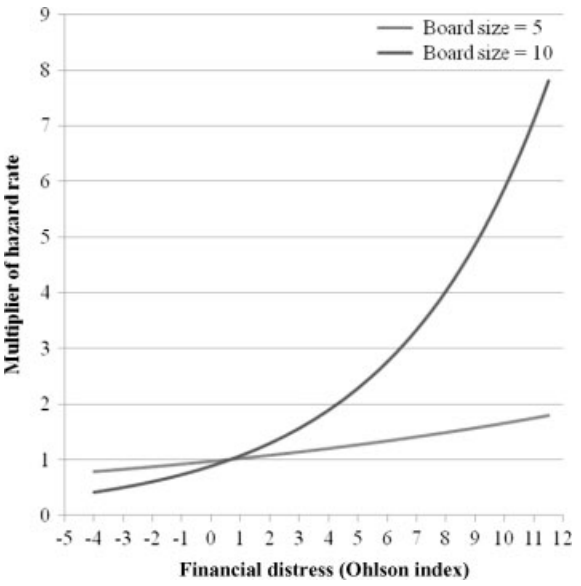

Figure 3. The effect of financial distress and board size on the multiplier of the hazard rate

also be important for the benefits of rapid decision making.

Our results add to those of Coles, Daniel, and Naveen (2008), who find that firms that can benefit more from greater monitoring effort by the board benefit from having larger boards. Here, in a situation in which monitoring is likely to have smaller benefits than rapid decision making, we find that large boards are detrimental to firm survival. In Figure 3, we plot the multiplier of the hazard rate against the degree of financial distress for firms with board sizes of five and 10 members (these values represent approximately the 25th and 75th percentile in our sample). Figure 3 shows that large boards are preferable at very low levels of financial distress. As the level of financial distress increases, however, the hazard rate increases rapidly for firms with large boards. Figure 3 also suggests that firms that are relatively healthy and have very small boards are disadvantaged, as both the five- and 10-member boards have lower hazard rates (since the multiplier is less than one) than minimally sized boards for financially healthy firms. This could indicate that very small boards are unable to handle the day-to-day operations of a healthy firm.[9]

We find inconsistent but intriguing results for the effect of CEO power in our sample. In our most homogeneous sample, which includes only the firms founded after 1994, we find some evidence that higher degrees of *CEO power* (excluding the educational component) are beneficial for firms under financial distress. For a broader sample of the Internet firms, we find that powerful CEOs are associated with lower failure rates in general, and that this effect does increase with increasing degrees of financial distress. In Figure 4, we plot the multiplier of the hazard rate against the degree of financial distress for firms with CEO power at the median and 75th percentile level for the broader sample. Figure 4 clearly shows that, as financial distress increases, the ability of a powerful CEO to enable the firm to survive increases.

Referring to CEO duality specifically, Finkelstein and D'Aveni (1994) suggest that having powerful CEOs is a dual-edged sword, as powerful CEOs can become entrenched and resistant to board monitoring, but that conversely, power creates a unity of command that can facilitate decision making. Our results suggest that the benefits of powerful CEOs can indeed outweigh the

[9] We thank an anonymous reviewer for suggesting that very small boards may be overwhelmed and unable to handle the committee requirements of a public firm or to provide useful guidance to management.

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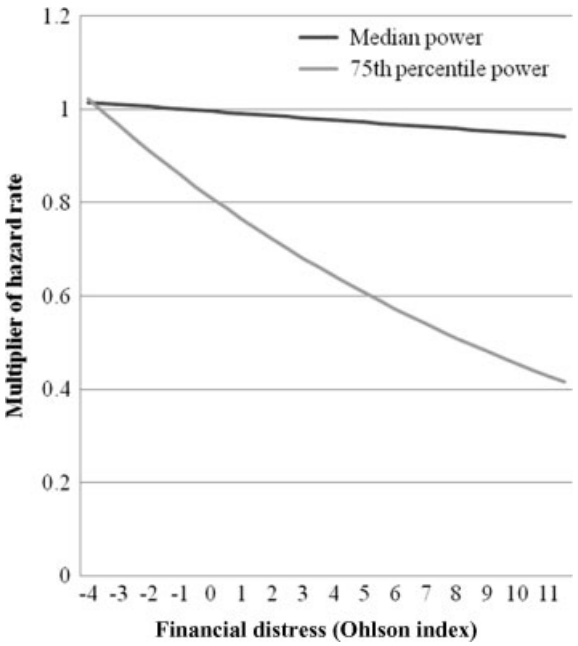

Figure 4. The effect of financial distress and CEO power on the multiplier of the hazard rate

costs when firms face financial distress and decisive action needs to be taken (see also Miller and Friesen [1977[).

CONCLUSION

Our results validate suggestions regarding how researchers might begin to obtain more consistent results regarding the governance-performance relationship. These suggestions include (1) studying entrepreneurial firms in which the actions of top management are especially likely to affect firm outcomes (Daily *et al*., 2002), and (2) examining contingent relationships (Denis, 2001). In addition, we argue that it is important to study a sample of firms in which there are theoretical reasons for specific governance mechanisms to have a significant effect. Our results confirm that future research needs to consider carefully whether a given governance mechanism is uniformly beneficial or whether the benefits depend upon the presence or absence of another mechanism or of specific environmental conditions.

Much remains to be done to build a consistent body of evidence regarding the effects of governance on firm performance and survival. Although we provide evidence of contingent effects of governance on survival, many such relationships remain unexplored. Since we examine young firms weathering a severe environmental turbulence, when the monitoring and advising roles are expected to be particularly important, our results may not generalize to all settings. Future work, therefore, can explore how the effects we find might differ under other conditions, such as when larger, more-established firms experience an industrywide crisis. Alternatively, the extent to which the results apply to young firms that are not tested by a crisis, and the extent to which these results apply to firms in lower-technology settings, are also open questions.

In addition, while we base our hypotheses on factors that affect the costs and benefits of governance mechanisms, we are not able to measure these benefits and costs directly. Our results for board size suggest that the ability of small boards to make quick decisions is beneficial for firms in financial distress, but we do not observe decision processes directly. Similarly, the results suggest that firms benefit from having powerful CEOs in times of crisis, possibly due to the greater speed of decision making that results. Our finding suggests that the benefits of this speed outweigh the costs of having a CEO who can become entrenched and resistant to board suggestions, but we do not directly measure the relative speed of decisions. We also do not measure the relative power of the board and CEO, and this would be an interesting avenue for future research. For example, we find some evidence in our sample that firms that have CEOs with greater power have increased probability of survival. It is possible that where both boards and CEOs possess elements of power such as elite education, there is a greater potential for a standoff and, therefore, action is slowed at critical times. Conversely, it is possible that in such circumstances board and CEO homophily increase communication and aids in the adoption of new strategies (Westphal and Milton 2000).

In conclusion, our results suggest that the relative value of governance mechanisms is contingent on both firm and environmental conditions, and that different governance configurations are valuable for firms facing different challenges. The monitoring role of boards of directors, for example, does not appear to be valuable for relatively young firms facing high financial distress. For firms with great complexity, however, monitoring is likely to

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be the dominant task for the board (Coles *et al*., 2008). Similarly, the value of having a CEO also serve as chair of the board of directors is likely to be different for firms in which fast decisions are less important than oversight of top management. If boards and CEOs could be easily and inexpensively changed to meet changing demands, then the mismatches would be only of minor consequence. As Coles *et al*. (2008) discuss, however, changes to governance involve significant transaction costs. This suggests that corporate governance is at least somewhat inert, and as our results suggest, mismatches at times when firms are vulnerable may have serious consequences for their survival.

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APPENDIX: THE OHLSON (1980) BANKRUPTCY PREDICTION MODEL

Ohlson (1980) develops a model using financial statement information for estimating the likelihood that a firm will declare bankruptcy in the upcoming year. Ohlson uses financial statement data (from Compustat) from 1970–1976 for 2,163 firms, 105 of which declare bankruptcy during the period studied. There is no time-clustering of bankruptcy declarations.

Ohlson estimates a logistic regression where the dependent variable is 1 for an observation for a firm that declares bankruptcy during the year following the financial statement data, and 0 otherwise. The nine independent variables are common combinations of financial statement information ('The criterion for choosing among different predictors was simplicity' [Ohlson, 1980: 118]). The first column of Table A1 indicates the name of each variable while Column 2 provides the definition of each variable.

The third column of Table A1 contains the parameter estimates from the model Ohlson estimates that exhibits the highest predictive accuracy, while the fourth column contains the t-statistics for each coefficient (the values are from Ohlson's (1980: 121) Table 4, Model 1).

Following standard practice in the measurement of financial distress, we use the parameter estimates and the Compustat values for our sample firms to calculate the Ohlson index (our *distress* variable) for each of our observations. That is, we calculate

$$\begin{aligned} Distress = &-1.32 - 0.407 \times SIZE \\ &+ 6.03 \times TLTA - 1.43 \times WCTA \\ &+ 0.08 \times CLCA - 2.37 \times NITA \\ &- 1.83 \times FUTL + 0.29 \times INTWO \\ &- 1.72 \times OENEG - 0.52 \times CHIN \end{aligned}$$

where the right-hand-side variables are defined as in Table A1.

There has not been much development of measures of financial distress beyond the data-driven multinomial logit technology of Ohlson (1980). The empirical literature in accounting and finance has continued to rely on the simpler technology of Ohlson (1980). Even though other methods have been proposed (e.g., Shumway, 2001; Jones and Hensher, 2004), they have not been adopted in the literature. Rogers and Stocken (2005), for example, use a variable called *distress* as a measure of their sample firms' financial condition, and they calculate *distress* as the predicted values from the Ohlson model that we use.

Table A1. Variables and values from the Ohlson (1980) bankruptcy prediction model

Variable	Definition	Parameter Estimate	t-statistic
CONST	Model intercept	−1.32	−0.97
SIZE	ln{(Total Assets)/(GNP Price Level Index)}	−0.41	−3.78
TLTA	(Total Liabilities)/(Total Assets)	6.03	6.61
WCTA	(Working Capital)/(Total Assets)	−1.43	−1.89
CLCA	(Current Liabilities)/(Current Assets)	0.08	0.76
NITA	(Net Income)/(Total Assets)	−2.37	−1.85
FUTL	(Operating Cash Flows)/(Total Liabilities)	−1.83	−2.36
INTWO	1 if net income was negative for the prior two years, 0 otherwise	0.29	0.81
OENEG	1 if total liabilities exceed total assets, zero otherwise	−1.72	−2.45
CHIN	Change in net income scaled by two-year cumulative magnitude of net income $(NI_t - NI_{t-1})/(\|NI_t\| + \|NI_{t-1}\|)$	−0.52	−2.21

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