1-1-2012

Board structure and survival of New Economy IPO firms

Nongnit Chancharat
Khon Kaen University, nc610@uow.edu.au

Chandrasekhar Krishnamurti
University of Southern Queensland

Gary G. Tian
University of Wollongong, gtian@uow.edu.au

Follow this and additional works at: <https://ro.uow.edu.au/commpapers>

Part of the [Business Commons](#), and the [Social and Behavioral Sciences Commons](#)

Recommended Citation

Chancharat, Nongnit; Krishnamurti, Chandrasekhar; and Tian, Gary G.: Board structure and survival of New Economy IPO firms 2012, 144-163.
<https://ro.uow.edu.au/commpapers/1943>

Board structure and survival of New Economy IPO firms

Abstract

Research Question/Issue: This study examines the relevance of currently accepted best practice recommendations regarding board structure on the survival likelihood of new economy initial public offering companies. We argue that industry context determines governance outcomes. **Research Findings/Insights:** We study 125 Australian new economy firms listed between 1994 and 2002. Each firm is tracked until the end of 2007 for monitoring their survival. We find that board independence is associated with an increase in the likelihood of corporate survival. We also find that the benefits of board independence increase at a decreasing rate. **Theoretical/Academic Implications:** The standard best practice recommendation of board independence stems from the monitoring role of directors and is based on agency theory. The results from our study suggest that the recommendation regarding board independence does not work well for new economy firms. While the agency theory based model implies a monotonic relation between board independence and performance, our research suggests that the relationship is nonlinear. This variation occurs because of increased monitoring costs faced by outsiders due to higher information asymmetry and complexity of new economy firms. Our empirical results suggest that inside directors play a complementary role to outsiders in mitigating firm failure. **Practitioner/Policy Implications:** Our research offers insights to policy makers who are interested in setting best practice standards regarding board structure. Our research suggests that firm/industry characteristics play a crucial role in determining the optimal board structure. In firms/industries where outsiders face significantly higher information processing costs, insiders can play a valuable complementary role to outsiders in enhancing the effectiveness of the board. Thus future hard or soft regulations related to board structure should consider industry context.

Keywords

Board, structure, survival, Economy, IPO, firms

Disciplines

Business | Social and Behavioral Sciences

Publication Details

Chancharat, N., Krishnamurti, C. & Tian, G. (2012). Board structure and survival of New Economy IPO firms. *Corporate Governance: An International Review*, 20 (2), 144-163.

Board Structure and Survival of New Economy IPO Firms[★]

Nongnit Chancharat^a, Chandrasekhar Krishnamurti^{b1} and Gary Tian^c,

a - Faculty of Management Science, Khon Kaen University, Thailand

*b – School of Accounting, Economics and Finance, University of Southern Queensland,
Toowoomba, Australia*

c - School of Accounting and Finance, University of Wollongong, Australia

Manuscript Type: Empirical

Research Question/Issue: This study examines the relevance of currently accepted best practice recommendations regarding board structure on the survival likelihood of new economy Initial Public Offering companies. We argue that industry context determines governance outcomes.

Research Findings / Insights: We study 125 Australian new economy firms listed between 1994 and 2002. Each firm is tracked until end of 2007 for monitoring their survival. We find that board independence is associated with an increase in the likelihood of corporate survival. We also find that the benefits of board independence increase at a decreasing rate.

Theoretical / Academic Implications: The standard best practice recommendation of board independence stems from the monitoring role of directors and is based on agency theory. The results from our study suggest that the recommendation regarding board independence does not work well for new economy firms. While the agency theory based model implies a monotonic relation between board independence and performance, our research suggests that the relationship is nonlinear. This variation occurs because of increased monitoring costs faced by outsiders due to higher information asymmetry and complexity of new economy firms. Our empirical results suggest that inside directors play a complementary role to outsiders in mitigating firm failure.

Practitioner / Policy Implications: Our research offers insights to policy makers who are interested in setting best practice standards regarding board structure. Our research suggests that firm/industry characteristics play a crucial role in determining the optimal board structure. In firms/industries where outsiders face significantly higher information processing costs, insiders can play a valuable complementary role to outsiders in enhancing the effectiveness of the board. Thus future hard or soft regulations related to board structure should consider industry context.

Keywords: Corporate Governance, Board Structure, Survival Analysis, New Economy Firms, Informational Asymmetry

INTRODUCTION

One consequence of the high profile corporate collapse of firms such as Enron and WorldCom due to corporate governance failures is the move by regulators to converge to a single model of corporate governance. Recent regulations, such as the Sarbanes-Oxley Act of 2002 (SOX) and rules promulgated by Securities and Exchange Commission, New York Stock Exchange (NYSE), and National Association of Securities Dealers (NASD), contained at its core the independence of a majority of directors on the board. Furthermore, calls for the separation of CEO and chairperson positions became louder following the spate of recent corporate scandals. Implicit in this convergence to a single optimal structure for the board is the assumption that one board structure should fit all firms.

Financial economists, such as Hermalin and Weisbach (2003), Linck, Netter, and Yang (2008) and Coles, Daniel, and Naveen (2008), have questioned the optimality of a single board structure for all firms. For instance, Faleye (2007) suggests that a unified leadership structure is not appropriate for all firms because of differences in the specific circumstances of individual organizations. Duchin, Matsusaka and Ozbas (2010) provide empirical support for the view that outside directors are less effective in monitoring and providing advice when the cost of acquiring information is high. Romano (2005) believes that undue haste in imposing corporate governance convergence may lead to “quack governance”.² In a study of the post-IPO performance of young entrepreneurial firms, Kroll, Walters & Le (2007) recommend that a majority of board members be insiders.

Another feature of the board that has attracted the attention of corporate governance scholars is the size of the board. Lipton and Lorsch (1992) and Jensen (1993) suggest that large boards could be less effective than small boards due to coordination problems and director free-riding. Coles et al., (2008) argue that complex firms have greater advising requirements. Since large boards potentially bring more knowledge and experience and can therefore offer better advice,

they posit that complex firms should have larger and more independent boards. Conversely, they posit that firms, for which firm-specific knowledge of insiders is comparatively more critical, such as knowledge intensive new economy firms, are likely to gain from greater representation of insiders on the board.

Our contribution to this literature is based on two innovative aspects of our study. First, we examine the board structure of new economy firms. By focussing on new economy Initial Public Offering (IPO) companies we are able to incorporate the role of firm and industry specific characteristics on the board structure. These firms have characteristics that are different from other firms in several respects. They tend to employ recently developed technology which is often not well-proven. They tend to be small firms with high growth opportunities. A number of researchers (Gaver and Gaver, 1993; Myers, 1977; Carlson, Fisher, and Giammarino (2006) posit that firms with high growth opportunities have more information asymmetry than firms whose value is mostly comprised of assets in place. Faleye (2007) characterizes organizational complexity on the basis of size, asset tangibility, and growth opportunities. Based on asset tangibility and growth opportunities new economy IPO firms can be considered as complex firms. Therefore, information acquisition costs are likely to be higher in new economy firms. Since the ability of directors to govern the firm well is contingent on having access to timely information and the ability to process such information, we believe that the board structure of new economy IPO firms should take organizational complexity and informational asymmetry into account.

Second, our performance metric is survival likelihood rather than traditional measures such as return on assets and Tobin's Q used by prior researchers. We focus on survival rather than measures of performance such as Tobin's Q due to the following two reasons. First, survival is the primary goal of the firm. As such, the relevance of appropriate board structure is more crucial in the context of survival as opposed to the performance of a firm in a stable state. The second reason for choosing survival is that it is an unambiguous measure of performance.

We develop testable hypotheses regarding optimal board structure taking into account three unique characteristics of new economy IPO firms. These are a) high information processing costs of outsiders, b) volatile business environment and c) organizational complexity. We posit the following hypotheses: (i) The impact of board independence on the survival likelihood of new economy firms will increase at a decreasing rate; (ii) CEO duality will increase the survival likelihood of new economy firms; (iii) A board led by an executive chairperson will have a higher likelihood of survival; and (iv) firms with either small boards or large boards will have a higher likelihood of survival as opposed to firms medium-sized boards.

Our research adds further weight to the strand of literature that argues that industry context is a critical determinant of governance outcomes (see for instance, Lin, Yeh, and Li (2011)). Our key insight, from this paper, is that currently accepted best practice recommendations, which are derived principally from an agency theory perspective, must be modified in the context of new economy firms in high velocity environments. Boards typically perform several key roles such as monitoring, advising, resource provision, and contracting. Currently advocated best practice recommendations stem from the monitoring role derived from an agency theory perspective. We argue that in a specific industry context, such as new economy firms in the post-IPO stage, some of the other roles besides monitoring are crucial in ensuring survival.

We conduct our empirical tests on new economy IPO firms listed in Australia. Australia is chosen for the reason that it follows the English common law tradition that is prevalent in the US and UK. Also, Australia follows free market policies like the US. Furthermore, Australia is the third largest in the world in terms of investment flows – capital raised by IPOs and secondary market issues – US\$ 86.2 billion in 2009.³ The Australian Stock Exchange (ASX, March 2003) released in 2003 the Principles of Good Corporate Governance and Best Practice Recommendations that deals directly with board structure. The core recommendation of ASX is that a majority of the board should be independent directors. In order to avoid the impact of this

exogenous event on board composition, we restrict our sample to new economy companies listed on the Australian Stock Exchange between 1994 and 2002.

Sample firms are tracked until 31 December 2007 to categorize them into companies that are currently trading, and those that are delisted. The Cox proportional hazards model is then employed to identify the likelihood of survival of a company after IPOs. We conduct further analysis to see if the same factors influence the different reasons for delisting – takeovers and financial distress by applying competing risks Cox proportional hazards model. Our results show that the survival time of new economy IPOs companies is positively related to board independence. But the benefits of board independence increase at a decreasing rate. We also find weak evidence indicating that companies with either small board size or large board size are more likely to survive than companies with medium-sized boards. In addition, company size and leverage are found to be negatively related to new economy IPO firms' survival. We find that CEO duality and independence of chairperson have no impact on survival likelihood of new economy IPO firms.

The remainder of the paper is organized as follows. First, we review previous studies relating to corporate governance structure and IPO firms' survival and provide the theoretical background for the development of hypotheses and identification of control variables. Second, we present the details of our data and the methodology. Third, we present our empirical results and discuss their implications. Finally, we offer our conclusions and discuss potential future extensions.

LITERATURE REVIEW AND THEORETICAL DEVELOPMENT

In this section we review the literature with respect to corporate governance attributes and relate them to survival of new economy IPOs. Furthermore, we summarize the literature regarding offer characteristics and firm specific variables which have a bearing on the survival of IPOs.

Governance and Corporate Survival

In this study, we consider three major recommendations that are at the core of good governance practices enshrined in the Principles of Good Corporate Governance and Best Practice Recommendations issued by the Australian Stock Exchange and consistent with international best practices such as the Cadbury Code of Best Practice and the recent recommendations of NYSE and Nasdaq. First, a majority of the board should be independent directors. Second, the chairperson should be an independent director. Finally, the roles of chairperson and chief executive officer should not be exercised by the same individual. In addition to these recommendations, we also consider board size which has received a lot of research attention. We develop our testable hypotheses taking into account specific characteristics of new economy IPO firms such as high information processing costs of outsiders, volatile business environment, and organizational complexity.

Board Independence. Researchers outline four roles for the board of directors of a public firm (Johnson, Daily, and Ellstrand, 1996; Kumar and Sivaramakrishnan, 2008). First, the board monitors top management on behalf of the shareholders in order to reduce managerial rent-seeking behaviour (Jensen, 1986; Johnson et al., 1996). Second, the board facilitates the formulation of strategy via an advisory role. The third role of the board is to provide resources to top management and the CEO. Finally, the board performs a contracting role (Kumar and Sivaramakrishnan, 2008). The effectiveness of the board is determined by its ability to monitor, advise, contract, and provide resources to the top management. One of the key characteristics of effective boards is independence. While the independence of a director is an essential prerequisite for monitoring the managers effectively, it is not clear if independence facilitates the performance of the other three roles.

Byrd and Hickman (1992) contend that the results of their empirical work are not consistent with the view that shareholders will be best served by a board comprised entirely of independent directors. They find a non-linear relationship between abnormal stock returns of

bidding firms and the proportion of independent directors on the board. They find that return performance increases when the proportion of independent directors increases up to 60% and thereafter declines. Since the advisory role is most relevant in strategic decisions such as acquisitions, an implication of this finding is that board independence is not unambiguously beneficial for effectively executing the advisory role.

Further evidence on the interaction between the monitoring and advising roles of directors is provided by Faleye, Hoitash, and Hoitash (2011) who show empirically that firms with boards that monitor intensely exhibit worse acquisition performance and diminished corporate innovation. This evidence suggests that the benefits of intense monitoring are more than offset by the weakening of the strategic advising role of the board. Holmstrom (2005) contends that intense monitoring destroys the trust essential for the chief executive officer (CEO) to share important strategic information with directors. Similarly, Adams and Ferreira (2007) put forward a model in which the CEO does not communicate with a board that monitors excessively, while Adams (2009) offers survey evidence suggesting that independent directors receive less strategic information from management when they monitor intensely. As information provided by the CEO (Song and Thakor, 2006; Adams and Ferreira, 2007) is crucial to independent directors' advisory role, intense monitoring can result in poor advising. A board composed entirely by independent directors may result in excessive monitoring and consequently perform poorly in advising. Kroll et al., (2007) posit that traditional agency issues such as monitoring may be less critical for young firms at the entrepreneurial stage as compared to later stages in the evolution of the firm. In fact, they prescribe an insider-controlled board comprised of the top management team. They argue that, since insiders possess considerable tacit knowledge and commitment to a shared vision that outsiders don't have, they will be more effective on the board of young entrepreneurial firms.

In the context of new economy IPO firms it is not clear that independence is necessarily a virtue. Daily and Dalton (1994a) argue that an outsider-dominated board could effectively

counter CEO resistance to adopting aggressive strategies in the face of continuing organizational decline. Furthermore, boards dominated by outsiders are more likely to remove the CEO of a poorly-performing firm (Finkelstein and D'Aveni, 1994). A stream of theoretical research shows that effectiveness of outside directors depends on the information environment (Hermalin and Weisbach, 1998; Raheja, 2005; Harris and Raviv, 2008). Duchin et al. (2010) find that firm performance increases when outsiders are added to the board only when the cost of information acquisition is low. They find that performance worsens when outsiders are added to the board if the cost of information is high.

Thus information asymmetry may be the crucial differentiating factor between new economy firms and established firms in traditional industries. Kroll et al., (2007) reiterate their view that insiders may “more accurately assess the subtleties of entrepreneurial endeavours” while outsiders are forced to depend upon coarse financial metrics based on past data. Our setup is similar to theirs. They study young entrepreneurial firms while we focus on new economy firms. The distinguishing aspect is that they study all industries while our focus is on new economy firms. As such, information asymmetry is expected to be greater in new economy firms as compared to firms in established industries (Sanders and Boivie, 2004).

We weighed in the implications of the two divergent viewpoints regarding board independence – insider-controlled board is optimal versus outsider-controlled board is best. Our view is that in the context of a new economy firm in a high velocity environment, an outsider controlled board is best – but not one that is packed entirely with outsiders. The board should contain a few knowledgeable insiders who provide firm-specific information to the largely independent board. Thus insiders serve as ‘side mirrors’ and avert potential blindsiding arising from a board that is composed solely of outsiders. We do not recommend an insider-controlled board as in Kroll et al., (2007). Their view is based on “tacit knowledge and commitment to a shared vision”. It is possible that the desire to maintain group cohesion may trump the exercise of critical judgment. In the context of a new economy firm in a high velocity environment, group

think engendered by insider controlled boards would be deleterious. On the hand, an outsider controlled board with some insiders is more likely to consider alternate points of view. We believe that diversity of viewpoints is essential in high velocity environments to avoid potential failure.

Kumar and Sivaramakrishnan (2008) suggest that the relationship between independence of directors and performance is ambiguous. Using the information generated by monitoring, the board contracts with the manager on behalf of shareholders. The terms of the contract determine the manager's effort, capital investment decisions, and compensation. Given the twin roles of monitoring and contracting, a representative director's contribution to shareholder value depends on the extent of monitoring effort exerted and the optimality of the chosen contract. More independent directors will choose contracts that maximize shareholder value, but they may expend less effort in monitoring the manager. Thus delegating governance to the board creates a new agency problem due to directors' effort-aversion. Thus it is not clear that increasing directors' independence bestows unambiguous improvements in the performance of the firm.

Bhagat and Black (2002) conduct a large-sample, long-horizon study of the relationship between degree of board independence and long-term performance of large U.S. firms. They find no evidence indicating that greater board independence leads to improved firm performance. They propose that including inside directors to the board could add value. They suggest that inside directors may be valuable due to the firm-specific skills, knowledge and information that they bring to the board. Inside directors are conflicted but well informed. Independent directors are not conflicted but are comparatively ignorant about the company. Therefore, an optimal board should contain a mix of inside and independent directors.

From a theoretical standpoint, our view is that crucial elements of agency theory, stewardship theory, and resource dependence theory work in a complementary fashion to determine the optimal board composition for new economy firms. While the monitoring role

enshrined in agency cost theory is emphasized by Finkelstein and D'Aveni (1994), Adams and Ferreira (2007) implicitly stress resource dependence theory when they focus on the advisory role of the board. Furthermore, in their study of young entrepreneurial firms, Kroll et al., (2007) invoke stewardship theory. For our setup, no one theory clearly dominates the others in determining governance outcomes.

Summing up, for a board to be effective it should perform all four roles: monitoring, advising, resource provision and contracting. While board independence is essential for effective monitoring, it is not as useful in fulfilling other roles. We favour an outsider controlled board that includes a few insiders. Therefore, all things considered, we expect a non-linear relationship between board independence and the likelihood of survival of new economy firms. This is because insiders and outsiders play complementary roles in enhancing the effectiveness of a board. Therefore, we expect that board independence will improve survival odds but there are decreasing returns to independence. We formally state this as:

Hypothesis 1: There is a non-linear relationship between board independence and survival likelihood of new economy firms. The survival likelihood of new economy IPO firms initially increases with board independence. At very high levels of board independence a further increase in board independence is associated with a decrease in survival likelihood.

Leadership Structure. One of the most fiercely contested issues in corporate governance is whether the chief executive officer (CEO) should also serve as the chairperson of the board of directors. The CEO is a firm's chief strategist, who is in charge of initiating and implementing company-wide plans and policies, while the role of the chairperson is to ensure that the board works effectively in counselling and monitoring the CEO. Since the chairperson performs important control functions, it is often recommended that a separate person distinct from CEO should serve in that role. Fama and Jensen (1983) suggest that CEO duality (same person serving the dual roles of CEO and chairperson) is detrimental to the board's ability to perform its monitoring functions. A similar view is espoused by Jensen (1993).

A contrasting view is provided by Anderson and Anthony (1986) and Stoeberl and Sherony (1985) who posit that vesting the two positions in one person provides clear-cut leadership and focus in conducting a firm's business operations. Brickley, Coles and Jarrell (1997) argue that there are costs and benefits to separating the CEO and chairperson roles. Finkelstein and D'Aveni (1994) postulate that the choice of leadership structure reflects the board's effort to balance entrenchment avoidance with unity of command. Empirical evidence is however mixed on the relation between leadership structure and firm performance (Rechner and Dalton, 1991; Brickley et al., 1997; Dahya, 2004). In spite of this inconclusive evidence, shareholder activists, institutional investors, and regulators hold the view that the CEO should not serve in the role of board chairperson. Bach and Smith (2007) also hypothesise that CEO duality provides structural power and enhances the survival likelihood of high technology firms.

Faleye (2007) adopts a novel approach and examines the effects of organizational complexity, and CEO reputation on the relative costs and benefits of CEO duality. He hypothesizes that complex firms are more likely to vest the two positions in the same individual. This is because in complex organizations, the cost of vesting the chairperson and CEO roles in separate individuals outweighs the marginal benefit of non-duality. The cost of sharing information between the CEO and chairperson increases with organizational complexity. Furthermore, CEO flexibility becomes more valuable to organizations as their complexity increases. He finds evidence supporting the view that complex organizations practice duality. Moreover, evidence is also consistent with the view that firm performance improves for complex firms practicing duality, *ceteris paribus*.

In the context of new economy IPO firms, we invoke the approach of Faleye (2007). New economy firms can be considered as complex organizations since they satisfy two of the three proxies suggested by him – asset intangibility, size and growth opportunities. On average, new economy IPO firms tend to have high growth opportunities and possess more intangible assets but are less likely to be large.

We therefore posit the following hypothesis:

Hypothesis 2: CEO duality will increase the survival likelihood of new economy IPO firms.

Another aspect of leadership structure that is relevant is the independence of the chairperson. As such, during times of financial decline, the resource provision role of the board becomes paramount. The traditional view posits that a non-executive chairman can effectively bring in outside resources much more effectively than an insider. However, based on the work of Coles et al., (2008), it appears that having an executive chairperson leverages on the firm-specific knowledge of insiders and may be associated with an increased likelihood of survival of IPO firms. For new economy firms, firm-specific knowledge of insiders is critical, especially during turbulent times. We therefore posit the following hypothesis:

Hypothesis 3: For new economy IPO firms, a board led by an executive chairperson will have a higher likelihood of survival.

Board Size. There are two major schools of thought regarding the relationship between board size and firm performance. One school suggests that small boards are more likely to monitor management better since their members are less able to hide in a large group (Fischer and Pollock, 2004). Furthermore, small groups are able to arrive at decisions more quickly than larger ones.⁴ Smaller boards are arguably more able to fulfil the monitoring role and have the advantage of speed in decision-making in their advising role. Lipton and Lorsch (1992) recommend a small board to enhance effectiveness of the board. They suggest that a smaller board is most likely to allow directors to get better acquainted with each other and to have more effective discussions resulting in a true consensus on key decisions. Finally, Judge and Zeithaml (1992) find that smaller boards are more likely to be involved in strategy formation. They ascribe this result to a reduction in commitment and motivation of directors who are members of larger boards. Smaller boards are arguably more able to fulfil the monitoring role and have the advantage of speed in decision-making in their advising role.

On the other hand, larger boards, however, have a potential advantage in their advising role and are more capable of accomplishing the resource-provision role of the board of directors. They have a greater potential for multiple perspectives, which can facilitate their advisory role. Furthermore, they may enjoy superior access to key resources (Goodstein, Gautam and Boeker, 1994). These advantages of larger boards may be particularly valuable to young, IPO firms (Fischer and Pollock, 2004). Dalton, Daily, Johnson, and Ellstrand (1999) conduct a meta-analysis of studies of board size and performance and conclude that there is a positive relationship between board size and financial performance. This implies that the advantages of access to additional resources due to the large board prevail over the additional agency costs and slower decision-making. Using key tenets of social psychology and group decision making Sah and Stiglitz (1986, 1991) confirm empirically that decisions of large groups are less likely to be extreme. That is, they tend to be neither very good nor very bad. In the context of board structure, large boards are likely to be associated with less variable corporate performance. In corroboration with this line of argument, Cheng (2008), using a sample of US firms, shows that firms with larger boards have lower variability of corporate performance. During turbulent economic circumstances, such as those faced by new economy IPO firms, large boards will be more effective since they are expected to avoid making risky decisions.

The choice of board size is thus governed by the trade-off between aggregate information that large boards possess and the increased costs of decision-making associated with large boards. Lehn, Patro, and Zhao (2003) suggest that the trade-off is likely to vary across firms and industries in systematic ways that result in different optimal board sizes across firms and industries. They propose that firm size and growth opportunities are two attributes that are likely to affect the trade-off. They posit a direct relationship between firm size and the size of its board. Large firms are engaged in a greater variety of activities and are typically large volume players. As such, large firms have more demand for information than do small firms. Thus large boards are in a position to effectively provide this than small boards.

Furthermore, Lehn et al., (2003) conjecture that there exists an inverse relationship between growth opportunities and board size. First, it is widely held that monitoring costs increase with a firm's growth opportunities (Smith and Watts, 1992; Gaver and Gaver, 1993). As a consequence, large boards have severe free rider problems in firms with high growth opportunities. Boards must therefore be small in high growth firms for board members to have adequate private incentives to bear the high monitoring costs. Second, firms with higher growth opportunities usually require nimbler governance structures. Since these firms tend to be younger and function in more unpredictable business environments, they require governance structures that facilitate rapid decision-making. Jensen (1993) suggests that large boards seldom function effectively and are easier for the CEO to control. In an empirical study conducted on a sample of large U.S. public corporations, Yermack (1996) finds that there is an inverse relationship between firm market value and the size of the board of directors.

These arguments espouse a positive relationship between board size and effectiveness in terms of possessing expertise and accessing resources but a negative relationship between board size and effectiveness in terms of the board's capability to act rapidly in turbulent times and to monitor management (Goodstein et al., 1994). These contradictory relationships between board size and firm performance imply that the overall impact of board size on survival will depend on which of the board's roles is most essential in a given circumstance. Considering new economy firms, it appears that small boards are able to respond rapidly in turbulent economic times. Furthermore, new economy firms have high growth opportunities and therefore higher monitoring costs (Lehn et al., 2003). Members of large boards have lower incentives to expend this cost due to the free rider problem. On the other hand, large boards have more resources and can provide better advice during turbulent times.

What should be the optimal size of the board to ensure survival of new economy firms in turbulent times? One view is that medium sized boards neither have the advantage of speed that small boards have nor the benefits of additional resources that large boards have. They are thus

“stuck in the middle” and have lower chances of survival compared to other firms (Dowell et al., 2007). Another view is that mid-size boards could enjoy the “best of both worlds” and increase the probability of survival of new economy IPO firms. Medium size boards could offer a balance of speed and resource provision.

In the context of new economy firms in high velocity environments, our view is that speed of decision making is critical. Path breaking work by Eisenhardt (1989) and Judge and Miller (1991) provide evidence consistent with the view that decision speed is related to performance in specific industry settings such as biotechnology. Extant research is also of the view that small groups arrive at decisions quicker than larger groups (Bainbridge, 2002). Thus large and medium size boards are at a disadvantage compared to small boards with regard to decision speed. Another factor that impacts speed of decision making is the number of alternatives considered simultaneously. In this regard, large boards have an advantage. Large boards have the potential to bring in a diversity of viewpoints and are thus able to generate a larger number of alternatives for simultaneous consideration.

Based on these arguments, we would expect that firms with either small boards or large boards should have a higher likelihood of survival as opposed to medium-sized boards. Intermediate-sized boards have a higher likelihood of failure as compared to boards at either ends of the spectrum. The firms in our setting can profit both from the speed with which small boards can arrive at decisions and take strategic action as well as benefit from a broader range of alternatives that large boards can spawn.

We thus posit our hypothesis regarding board size as follows:

Hypothesis 4: For new economy IPO firms, small boards or large boards will have higher survival likelihood than medium sized boards.

DATA AND METHODOLOGY

Data and Sample

In this study, a new economy company is defined as an entity in a high-technology related services or manufacturing activity, including internet service provision and infrastructure development, e-commerce, digital and multi-media, telecommunications (such as satellite and broadband communications), information technology, software development, advanced medical instruments and biotechnology. Our definition follows the OECD (2001) report. In particular, IPOs in the sectors of information technology, media, telecommunication services and health care are examined. Our industry classification is based on the GICS standard (Global Industry Classification Standard) which is an enhanced industry classification system jointly developed by Standard & Poor's and Morgan Stanley Capital International (MSCI) in 1991 to meet the needs of the investment community for a classification system that reflects a company's financial performance and financial analysis (Standard and Poor's, 2002). Recent work on alternate industry classification schemes report that the GICS classification system provides a better technique for identifying industry peers as compared to other well-known schemes such as SIC (Standard Industrial Classification) codes (Bhojraj, Lee and Oler, 2003; Chan, Lakonishok, and Swaminathan, 2007).

The new economy IPO companies listed in Australia between 1994 and 2002 are included in estimating the Cox proportional hazards model. 2002 is chosen as the cut off year to avoid the impact of the exogenous event of the release of ASX Best Practice Recommendations in 2003. Each IPO company is tracked from the listing on ASX until 31 December 2007 or until it is delisted or suspended.

The sample of IPOs and their prospectuses are collected mainly from the *Annual Reports Online* database. Some of the IPO prospectuses are not available on the *Annual Reports Online* database. In those cases, the prospectuses were obtained from the *Connect 4 Company Prospectuses* database. Industry sector and financial information of the companies was obtained from the *FinAnalysis* database.

In this study, non-survivors or failed companies are simply defined as companies which have been delisted from the ASX. Survivors are companies which remain trading on the ASX. This definition is consistent with Lamberto and Rath (2008) and Welbourne and Andrews (1996). We test the robustness of our results to alternate definitions of survivors and report them in the “Robustness Checks” subsection of the “EMPIRICAL RESULTS” section.

Survival time is measured as the number of years between the year of listing and the year the company is delisted from the ASX for non-survivors IPOs companies or the year end of observation period for survivor IPOs companies. The final sample consists of 125 new economy Australian IPOs companies. Among these companies, 93 companies are survivors and 32 companies are non-survivors. The distribution of new economy IPOs companies between 1994 and 2002 by industry sector and by trading status is presented in panels A and B of Table 2 respectively.

Analytical Approach

In order to analyze the factors influencing the survival of new economy Australian IPOs companies, we employ a Cox proportional hazards model which is a semi-parametric model that uses survival analysis techniques.

Existing literature has employed Cox proportional hazards model in IPOs survival analysis [(Shumway, (2001), Kauffman and Wang, (2001), Cockburn and Wagner (2007), Kauffman and Wang (2007) and Lamberto and Rath (2008)]⁵. There exist two key advantages of survival analysis compared to the traditional methods e.g. MDA, logit and probit models. These advantages include that the ability to handle time-varying covariates and censored observations.

In this context, time varying covariates are the explanatory variables that change with time. Financial ratios used in this study are time varying covariates as their values change over time. The event being explicitly studied here is the delisting of a firm. Censored observations are the observations that have never experienced the event during the observation time. Censoring occurs when the duration of the study is limited in time. In this study, censored observations are

the IPO companies which are still trading on the ASX at the end of the observation period which is 31 December 2007.

In order to conduct analysis to see if the same factors influence the different reasons for delisting – takeovers and financial distress, i.e. multiple states of corporate financial distress, we also employ survival analysis model within the competing risks framework. Under the competing risks model, inference is based on the cause-specific hazard rates. Competing risks model is the component of survival analysis where in addition to survival time, the different causes of event are observed (Andersen, Abildstrom and Rosthoj, 2002). This model will provide evidence on whether the effects of covariates are the same or different across the multiple states of financial distress. We use the competing risks model for the three states, namely, active companies, delisted distressed companies and delisted takeover, merger or acquisition companies. Two separate Cox proportional hazards models are estimated for the competing risks where other states of financial distress are considered as censored observations.⁶ We expect this analysis to augment our understanding of the exit behaviour of new firms. The existing literature reveals that pooling exit types is a major source of misspecification (Prantl (2003)).

Variables and Measures

The dependent variable is survival time. We employ a Cox proportional hazards model to model the survival time of an IPO as a function of various firm-specific characteristics at the time of offering. Corporate governance attributes are the independent variables in this study. These variables include those measuring board size and board independence. We measure board size (BD_SIZE) by the number of directors on the board including the chairperson and board independence (BD_INDP) as the percentage of independent directors as listed in the IPO prospectus. For the purpose of this study, all non-executive directors are classified as ‘independent directors’ following Kang, Cheng and Gray (2007)⁷. We measure CEO duality by the dummy variable CM_DUAL which takes the value of one if chairperson and CEO are

different persons. We signify leadership independence by the variable CM_NEXC if the chairperson is a non-executive director as stated in the IPO prospectus.

As discussed below, a number of control variables are included based on prior literature. First, following prior work such as Woo, Jeffrey and Lange (1995), we control for ownership concentration. Ownership concentration is measured by the proportion of common stock held by the top 20 shareholders (TOP20). Second, we also control for offer characteristics. These variables include offer price, offer size, age of offering, retained ownership, underwriter backing, auditor reputation and risk.

Offer price is measured by the price (OF_PRICE) listed in the prospectus or the mid-point of the price range. High risk IPOs are underpriced more to compensate the investors for the higher ex-ante uncertainty. Since high risk firms are more likely to fail, we expect a positive relationship between offer price and IPOs survival (Ho, Taher, Lee and Fargher, 2001; Lamberto and Rath, 2008).

Offer size (OF_SIZE) is measured by the amount listed on the prospectus or the minimum subscription amount. The size of the offering is expected to be positively related to the firm's survival. It is argued that larger offerings signal market confidence, more stringent monitoring (Lamberto and Rath, 2008), good prospects and higher probability of survival (Hensler, Rutherford and Springer, 1997; Jain and Kini 1999, 2000; Ritter, 1991).

Firm age at offering (OF_AGE) has been used as a proxy for risk (Ritter, 1991; Ho et al., 2001) and older firms performed better in the after-market than younger ones. Since established firms are expected to have a more stable source of business, and be less speculative they are more likely to survive than young firms (Lamberto and Rath, 2008). Therefore, it is expected that the company age at offering should be positively related to its likelihood of survival.

Based on signaling theory, viz., a higher percentage of insider ownership retention at IPOs serves as a certification device (Leland and Pyle, 1977), we expect the percentage of stock retained by pre-IPO shareholders (RETAIN) to be positively related to the survival of the firm.⁸

Underwriter backing is measured as a dummy variable (BACK) that takes the value one if the IPO was backed by an underwriter. Since it is in the best interest of the underwriter to endorse companies with sound prospects (Lamberto and Rath, 2008) we expect that companies with underwriter backing should be more likely to survive than those without.

Auditor reputation (BIG5) is included as an indicator variable with a value of one if the auditor is from one of the Big 5 accounting firms and zero otherwise. The Big 5 companies include PricewaterhouseCoopers, KPMG, Arthur Anderson, Deloitte Touche Tohmatsu and Ernst and Young (How, Izan and Monroe, 1995; Dimovski and Brooks, 2003; Lamberto and Rath, 2008). We expect that companies with an auditor from one of the Big 5 companies should have a higher likelihood of survival than those with a non-Big 5 auditor.

Risk is proxied by the number of risk factors listed in the prospectus (Bhabra and Pettway, 2003). Firms with more risk factors listed in the prospectus (NUM_RISK) suggest a riskier firm and hence an increased likelihood of failure.⁹

Third, we also control for the following company specific variables. We use the company specific characteristics including company size, IPO_9900, and venture capital-backed IPOs in the analysis:

We measure company size as the natural logarithm of total assets of the firm (C_SIZE). Prior literature posits that firm failure is negatively correlated with firm size. The rationale for this relationship is that larger firms could avoid financial distress by using public equity markets (Goktan, Kieschnick and Moussawi, 2006)¹⁰. Therefore, it is expected that larger IPO firms will survive longer than smaller ones.

A dummy variable (IPO_9900) is used to indicate if a company went public between 1999 and April 2000 (Ho et al., 2001 and Kauffman and Wang, 2007). We expect that companies that went public between 1999 and April 2000 are more likely to fail because April 2000 is the date generally recognized by Australian financial market participants as coinciding with the ‘bursting of the dot com bubble’ (Ho et al., 2001).

We also use the dummy variable VC-Backed to denote the presence of venture capitalists. Venture Capitalists can be an additional source of resource and advice during periods of economic duress faced by newly public firms¹¹. Alternately, young venture capitalists could be “grandstanding” (Gompers, 1996). That is, they exit portfolio companies at an earlier stage in order to establish their track records. If grandstanding occurs in Australia, then venture capital backed IPOs are likely to have lower likelihood of survival. Another explanation regarding the impact of venture capital backing is provided by Fischer and Pollock (2004) and Arthurs, Hoskisson, Busenitz, and Johnson (2008). From an ownership perspective, venture capitalists can be considered as principals in the firm in which they invest. But they are agents to their investors in the venture capital fund that has invested in the IPO firm. Due to this agency role, venture capitalists have incentives to adopt a short-term focus at the IPO stage in order to show quick returns for investors. Since venture capital funds have a limited life, they face substantial pressures to show returns quickly. Fischer and Pollock (2004) posit that venture capitalists often enhance short-term performance to the detriment of long-term survival. Such an approach enhances the venture capitalists’ ability to extract a premium during the exit (IPO) but leave the new venture less viable in the future.

Last, four categories of financial ratios including liquidity ratio, profitability ratio, leverage ratio and activity ratio are used as control variables in this study.

The current ratio (CUR) is used as the measure of a firm’s liquidity. Higher levels of liquidity provide a strong defence against financial failure. This study utilizes return on asset (ROA) as a measure of profitability. It is expected that companies with a high profitability ratio will be more likely to survive. The Debt ratio (DET) is used as a measure of leverage in this study. The degree of financial risk is related to the likelihood of financial distress (Lee and Yeh, 2004). It is expected that companies with a higher leverage are more likely to go bankrupt. The activity ratios measure the efficiency of a firm’s asset utilisation. They measure the ability of a

firm to use assets to generate revenue or return. If firms can use assets efficiently, they will earn more revenue and increase liquidity. Total asset turnover ratio is employed in this study (TAT).

We list all the variables used in this study and provide detailed definitions in Table 1.

EMPIRICAL RESULTS

Descriptive Statistics

Table 3 presents descriptive statistics of the data employed in the study stratified by company status. We portray two subsamples based on the trading status – active and delisted firms¹². The descriptive statistics include the number of observations, means, medians, minimum, maximum, standard deviations, skewness and kurtosis for each subsample. It should be noted that because of the binary or dummy variables that have been used for some factors, the mean for these variables should be interpreted as the percentage of companies in the sample. The binary variables employed in this study include CM_NEXC, CM_DUAL, BACK, BIG5, IPO_9900, and VC-BACKED.

In order to prevent the influence of observations with extreme values, observations are truncated at the specified thresholds. All observations with covariate values higher than the ninety-ninth percentile of each covariate are set to that value. In the same way, all covariate values lower than the first percentile of each covariate are truncated. This procedure is similar to the one employed by Shumway(2001). The Mann Whitney U-test, a non-parametric test, is employed for testing for significant differences between the group means. Variables with significant differences in their group means will be expected to add information to a regression analysis. The variables TOP20 ($U=7.21$, $p<.05$) and VC-BACKED ($U=5.53$, $p<.05$) display significant differences across the subsamples .

According to Table 3, the median number of directors for both survivors and non-survivors is five, which is consistent with Lamberto and Rath (2008). They find that the majority of IPO

companies have less than six directors in the board which is the minimum number of directors recommended by the ASX for good governance. The mean percentages of non-executive directors on the board were 53.41 and 61.96 for active and non-survivor companies, respectively. This figure implies that the majority of directors in the new economy Australian IPO company board are independent directors. In addition, 64 and 70 percent of active and non-survivor new economy IPO companies, respectively, have a non-executive chairman, and 86 and 85 percent of these companies have the positions of CEO and chairperson held by different persons. These results suggest that the majority of new economy Australian IPO companies have boards which can be considered independent. Furthermore, the mean percentages of the top 20 shareholders for active and non-survivor companies are 65.98 and 76.77 percent, respectively.

In terms of the offering characteristics, the median offering price is A\$0.50 for the survivors and A\$1.00 for the non-survivors. The median offer sizes are A\$8 and A\$12 million and the medians of offering age are 3.04 and 4.51 years for the survivor and non-survivor companies, respectively. These results suggest that the new economy Australian IPO companies are relatively young and small, consistent with the results reported by Lamberto and Rath (2008).

Additionally, 74 and 90 percent of the offerings by survivor and non-survivor companies are underwritten while 53 and 70 percent of the offerings by active and non-survivor companies have an auditor from the one of the Big 5 accounting firms. The median number of risk factors identified in the prospectus is 13 and 14 for active and non-survivor companies, respectively. The means of retained ownership by pre-IPO owners are 62.16 and 70.48 percent for active and non-survivor IPO companies, respectively, which implies that the control of new economy IPO companies was retained by the original owners. It is also interesting to note that 40 and 36 percent of active and non-survivor IPOs companies are listed during the 1999 to April 2000 period.

The profitability ratios, which show the ability of the company to generate profit, are negative for both groups. The means of ROA for active and non-survivor companies are -0.29

and -0.35, respectively. This result suggests that non-survivor IPOs companies have lower earnings than active companies. But the difference is not statistically significant. The liquidity ratio, CUR, of non-survivor companies have higher mean as compared to the active firm subsample. The means of debt ratio, DET, indicates that the non-survivor companies have higher leverage than that of active companies. For the activity ratio, TAT, the means of non-survivor companies is higher than those of the survivors. However, the Mann Whitney U-test ($U = 0.58$, $p > .10$) suggests that there is no difference in means of these ratios between active and non-survivor new economy IPO companies.

The mean SIZE of active and non-survivor companies are 7.27 and 7.41, respectively. The Mann Whitney U-test shows that, on average, the size of active and non-survivor new economy IPO companies in our sample are marginally statistically significantly different ($U = 3.33$, $p < .10$). Finally, the survivor and non-survivor samples significantly differ with respect to the percentage of firms backed by venture capitalists. 11 % of survivors are backed by venture capitalists while 31 % of the non-survivors have VC-backing.

The Pearson correlation coefficients across the variables are shown in Table 4. The results suggest weak relationships across the variables. We do not find any large and significant coefficients that indicate serious problems of multicollinearity.

Cox Proportional Hazards Model Estimation Results

We employ the Cox proportional hazards model to investigate the influence of corporate governance variables on the survival likelihood of new economy IPO companies. In addition to corporate governance variables, we also include offering characteristics, financial ratios and company-specific variables. The estimation results are presented in Table 5.¹³

We present the coefficients, estimated standard error of this estimate, Wald chi-square tests along with the relative p -value for testing the null hypothesis that the coefficient of each covariate is equal to zero. Finally, the hazard ratio is presented in the last column. Hazard ratio is obtained by computing e^{β} , where β is the coefficient in the proportional hazards model. A

hazard ratio equal to 1 indicates that the covariate has no effect on survival. If the hazard ratio is greater (less) than 1, then this indicates a more rapid (slower) hazard timing. We only report coefficients and test statistics of significant control variables in order to conserve space. Our estimations include all available variables. We categorise survival on the basis of whether the firm continues to trade in the Australian exchange as of 31 December 2007. All delisted firms – regardless of the reason for delisting – are treated as failed firms.

Since we don't have a theory regarding a functional form of the relationship between board independence and probability of survival, we include quadratic and higher order terms. We find that board independence exhibits a negative coefficient indicating that independence has a beneficial effect on firm survival ($\beta = -0.11$, $p < .05$). The quadratic term is statistically significant at the 5% level ($\beta = 0.001$, $p < .05$). We also tried higher order terms. These are not statistically significant. Therefore in order to conserve degrees of freedom we stop with the quadratic term.

Summing up, we observe a non-linearity in the relationship between board independence and probability of survival. It appears that the benefits of board independence increases at a decreasing rate. Our evidence suggests that there exists an optimal level of board independence - somewhere in the middle neither too less nor too much. It appears that insiders and outsiders play complementary roles in preventing firm failure. We find strong support for Hypothesis 1.

The leadership structure variables such as CM_NEXC and CM_DUAL do not significantly alter the IPO firms' chance of survival. Our empirical results do not support Hypotheses 2 and 3. Our results imply that CEO duality which is deemed to be important for complex firms neither increases nor reduces the IPO firms' survival likelihood.

In order to check the robustness of our results especially in the light of non-significance of CEO duality and non-executive chairperson, we used several alternate specifications. Arguably, large firms are more complex than small firms and may have different advising requirements. To explore this possibility, we interacted our governance variables with firm size (C_SIZE). We

find that none of these additional variables are significant. Therefore, in the interests of brevity, we do not report these results.

Another possibility is that CEO duality and the presence of a non-executive chairperson may capture entrenchment effects. When the same person is both the CEO and chairperson, it increases the likelihood that the managers will resist a takeover attempt. Thus the observed coefficient captures the effects of entrenchment in addition to performance that we are essentially interested in. In our robustness checks, reported in the next section, we explicitly deal with this possibility.

Our results indicate that board size has a positive estimated coefficient ($\beta=2.58$, $p<.10$). The square of board size has a negative coefficient ($\beta=-0.25$, $p<.10$). Board size variables are marginally significant. Since there is no theory regarding the exact functional form of the relationship between board size and survival likelihood, we tried several higher order terms. These are not statistically significant. Therefore in the interests of conserving degrees of freedom we stop with the quadratic term. It appears that there is a nonlinear effect of board size on survival likelihood. Our empirical results suggest that a small size board and to a lesser extent large size board have longer survival times compared to a medium sized board. Our result is similar to that of Dowell, Shackell and Stuart (2007). Thus we find weak support for Hypothesis 4.

The relationship between board size and survival is graphically portrayed in Figure 1¹⁴. In Panel A, we map the survival function for firms with small, medium and large size boards. We characterize a board with less than 4 members as small, those with sizes between 4 and 6 as medium, and those with greater than 6 members as large boards. The graph shows the probability of survival over time (since listing). The graph clearly shows that firms with medium size boards have the lowest chance of survival at any given time. It is seen that firms with small and large board sizes are more likely to survive as compared to firms with moderate-sized boards. We reach a similar conclusion when we lump small and large boards into one category and medium

into the other group. This is portrayed in Panel B. We, therefore, conclude that Hypothesis 4 is supported by data. We find support for the “stuck in the middle” form of the hypothesis and reject the “best of both worlds” version.

Among the control variables, offer size, underwriter backing, venture capital backing, debt equity ratio and company size are statistically significant. The estimated hazard ratio for the variable VC_BACKED is 2.490 which indicates that the probability of financial distress for venture capital-backed IPO companies increases by about 149 percent as compared to non-venture capital-backed IPO companies ($\beta=0.91$, $p<.10$). Our finding of VC-backing being associated with higher failure likelihood could potentially be explained by a form of grandstanding that is studied in Gompers (1996). An alternate explanation is that the short-term focus displayed by venture capitalists during the IPO period is deleterious for long-term survival. Similarly, the estimated hazard ratio for the BACK variable is 3.361 signifying that firms backed by underwriters are 3.361 times as likely to fail as compared to firms which are not underwriter backed ($\beta=1.21$, $p<.10$). This counterintuitive result may be explained by the possibility that risky firms seek underwriter backing. However, both these variables only display marginal significance.

Considering financial ratios, DET is the only financial ratio which is statistically significant in explaining the survival of IPO firms. The parameter estimates are positive for DET, which means that the IPO companies with low debt ratio are less likely to fail ($\beta=0.67$, $p<.05$). The estimated hazard ratio for DET is 1.963 which indicates that for every unit increase in debt ratio, the risk of failing increases by 96.3 percent. C_SIZE is marginally significant ($\beta=0.68$, $p<.10$), with a hazard ratio of 1.969. The positive sign of C_SIZE means that the larger the size of IPO companies, the higher the likelihood of companies entering into financial distress. Our results are consistent with prior research (Lamberto and Rath (2008)) but inconsistent with our expectation as outlined in the section on literature review and theoretical development. A possible

explanation for this finding is that large firms are more complex than small firms and as such are more prone to failure, other things being equal.

Summing up, the results of our study shows that new economy IPO companies with smaller value of total assets, lower leverage and those that are not VC-backed are more likely to survive. Interestingly, the dictum that the majority of the board should be composed of independent directors proves to be useful in reducing firm failure likelihood. We would like to add that the benefit of board independence increases at a decreasing rate signifying that insiders and outsiders act in a complementary manner to enhance the effectiveness of the board. Another remarkable finding is that small boards and very large boards are associated with a lower chance of corporate failure compared to medium size boards. The commonly touted recommendations of conventional leadership structure wisdom do not help in mitigating the risk of corporate failure. These are: a) the chairperson should be an independent director and b) the roles of chairperson and chief executive officer should not be exercised by the same individual.

Robustness Checks

We conduct two sets of robustness checks. These are based on alternate methods of classifying survivors and non-survivors. Our method of classifying survivors and non-survivors on the basis of delisting is subject to criticism. One may argue that delisting may be due to poor performance or takeovers. Delisting due to takeover by another firm is not necessarily indicative of poor performance. It may be the optimal response to increase shareholder wealth in the wake of a lucrative bid from an acquiring firm.

First, we estimate the survival likelihood for two subsets of firms – those that were delisted due to financial distress and those that were delisted due to takeovers and acquisitions by applying the competing risks model. Second, we estimate the Cox proportional hazards model excluding firms with good performance which were taken over. In the first method, we exclude all firms which were delisted due to takeovers. The resulting sample of non-survivors thus represents a clean sample of firms that performed poorly prior to delisting. In the second method,

we only exclude firms with good performance which were taken over. Since our basic motivation in this paper is to identify the board characteristics that impact a new economy firm's survival likelihood, firms delisted due to other extraneous reasons are best left out. One potential problem with our attempt to construct a "cleaner" sample of non-survivors is the loss in sample size and the consequent reduction in the power of our statistical tests.

We report the estimation results from applying competing risks Cox proportional hazards model in Table 6. For these tests, the set of firms delisted due to financial distress is categorized as non-survivors in Panel A. In panel B, non-survivors are those firms delisted due to takeovers. Our results incorporate potential non-linearity in the governance and ownership structure variables.

The results in Panel A indicate that the significance levels of the board independence ($\beta = -0.17$, $p < .05$), and board size ($\beta = 6.22$, $p < .10$) are similar to the full sample results reported in Table 5. As in the whole sample, C_SIZE is statistically significant ($\beta = 1.14$, $p < .05$). Once again, we observe non-linearity in the relation between board size (and board independence) on survival likelihood. As before, we find strong support for Hypothesis 1, weak support for Hypothesis 4 and no support for the other hypotheses. In addition, age of the company ($\beta = -0.11$, $p < .10$), and VC_BACKED ($\beta = 1.44$, $p < .10$) are marginally significant. OF_AGE has a hazard ratio of 0.897 indicating that increasing the age of the firm by one year on the offer date reduced financial distress likelihood by 10.3%. The significance of the dummy variable IPO_9900 ($\beta = 2.25$, $p < .05$) indicates that if a firm went public during the years 1999 or 2000 the chances of delisting increased by 848%.

In Panel B, we examine the subset of firms that delisted due to takeovers and acquisitions. Board Independence ($\beta = -0.12$, $p < .10$) and leverage ($\beta = 0.92$, $p < .10$) have marginally significant influence on the likelihood of survival. TOP20 is significant with a negative coefficient ($\beta = -0.24$, $p < .05$). Both BD_INDP and TOP20 reduce the likelihood of delisting while leverage exacerbates the odds. We note that the significance levels of the board independence have dropped as

compared to the full sample and financial distress subsamples. Our results from Table 5 and Panel A of Table 6 indicate that more independent boards are associated with a higher likelihood of firm survival and that the benefits of independence increase at a decreasing rate. Arguably, board independence is also associated with a higher probability of takeovers and acquisitions. Thus board independence is less of a distinguishing factor explaining new economy IPO firms' survival when delisting due to takeovers and acquisitions is considered as non-survival. Furthermore, board size is no longer significant. Our earlier results indicate that small boards, due to their speed of response, and large boards, due to their greater advising capability, are associated with a higher likelihood of firm survival. The exact same features should also be associated with the increased likelihood of being taken over. Thus board size ceases to be a distinguishing feature that explains survival likelihood when non-survival is characterized by delisting due to takeovers and acquisitions.

Our result indicates that ownership concentration is associated with higher corporate longevity or lower probability of being taken over. Our findings with respect to TOP20 is consistent with agency cost theory but inconsistent with the findings of Woo et al., (1995). This is because shareholders with significant holdings are more likely to have an influence on management's decisions and they will expend more monitoring costs as their stake in the firm increases (Jensen and Meckling, 1976). Higher ownership concentration is also likely to deter takeovers and acquisitions. Thus the observed significance of TOP20 is due to both effects – better monitoring and lower chance of takeovers. TOP20 is not significant in Panel A of Table 6 and in Table 5. We interpret this finding to imply that the takeover effect is much more significant than the monitoring effect. We find that the squared term (TOP20SQ) is significant ($\beta=0.002$, $p<.05$) indicating a non-linear relationship between ownership concentration and survival likelihood. Perhaps, this signifies the entrenchment effect if TOP20 shareholders include controlling shareholders.

We conduct further robustness using the Cox proportional hazards model excluding firms which had good performance and were taken over. Good performance is signified by non-negative earnings during the two-year preceding takeovers. Ostensibly, the acquired firms were taken over not because of distress and are therefore not classified as non-survivors. We confirm the significance of board size, the square of board size, board independence, the square of board independence, VC_BACKED and DET. Overall, our results indicate that leadership structure does not significantly affect survival likelihood of new economy IPO firms. These results are not reported for the sake of brevity.

We also considered the possibility of simultaneity affecting our estimated results. Board size, and other included control variables such as firm size (C_SIZE), offer size (OF_SIZE), and offer price (OF_PRICE) could be potentially affected by simultaneity (Lehn et al., 2003). We considered two approaches to account for potential simultaneity. First, we re-estimated our results without C_SIZE, OF_SIZE, and OF_PRICE. We obtained qualitatively similar results. Second, we used an instrumental variables approach. We regressed board size on C_SIZE, OF_SIZE, and OF_PRICE. The residual from this estimation was then added to our original model instead of C_SIZE, OF_SIZE, and OF_PRICE. The estimated results did not indicate simultaneity. These results are not reported for the sake of brevity.

DISCUSSION AND CONCLUSION

The innovative aspect of our study is that it explores the relationship between board structure and the survival likelihood of new economy firms. While prior studies focus on some measure of performance such as return on assets or Tobin's Q, we use firm survival as a metric of performance. We focus our attention on three main areas of corporate governance mechanisms - board size, board independence, and dual leadership structure. Control variables such as offering characteristics, financial ratios and company specific variables are also incorporated in the model. Our choice of new economy firms is based on the fact that firm-

specific knowledge of insiders is more relevant in the case of new economy firms as compared to other firms. Furthermore, the cost of acquiring information by outside directors is likely to be higher for new economy firms. Therefore, the relevance of board structure is much more critical for new economy firms than other firms.

Our empirical results based on a sample of Australian IPO firms utilising the Cox proportional hazards model show that independent boards are associated with a higher chance of survival. There is non-linearity in the relationship between board independence and likelihood of survival. The benefits of board independence increase at a decreasing rate. Our empirical results support the view that an outsider controlled board is best – but not one that is packed entirely with outsiders. Ideally, the board should contain a few knowledgeable insiders who provide firm-specific information to the largely independent board. Insiders serve as ‘side mirrors’ and avert potential blindsiding arising from a board that is composed solely of outsiders. We do not espouse an insider-controlled board to obviate the possibility of group think during critical decision-making contexts.

This key result informs the debate on the relevance of a single board structure for firms with widely divergent information environments. Our results lend support to the view of Coles et al., (2008), who posit that firms for which firm-specific knowledge of insiders is comparatively more important, such as new economy firms, are likely to benefit from representation of insiders on the board. Summing up, our empirical results confirm the existence of complementary effects of the expertise brought in by insiders and outsiders and their impact on firm survival.

We also find weak evidence that firms with either smaller or larger board size have a higher probability of survival than firms with moderate-size boards. The benefits of a small or a large board are relatively important and boards at either end of the spectrum outperform those in the middle. It appears that the benefits of a smaller board, such as, the lower monitoring cost and rapidity in decision-making increases the probability of survival. Likewise, the advantages of a

larger board such as more resources and diversity of viewpoints also increases the likelihood of survival.

Our work is related to the recent paper of Kroll et al., (2007) who study the impact of board composition on post-IPO performance of young entrepreneurial firms in the USA. While we uphold their insight that the presence of insiders is valuable in newly public firms, our study is different from theirs in three major aspects. First, by studying new economy firms, we emphasize the industry context. Therefore, in deriving our testable hypotheses, we rely upon information asymmetry while they base their predictions on shared vision and tacit knowledge. Second, our performance measure is survival while theirs is stock return performance. Finally, we also examine CEO duality and board size which are not examined in their study.

Our research presents useful insights to policy makers who are interested in setting best practice standards regarding board structure. Our research suggests that firm/industry characteristics play a crucial role in determining the optimal board structure. Especially crucial is the information processing costs of outsiders who serve as members of the board. In firms/industries where outsiders face significantly higher information processing costs, insiders can play a valuable role in enhancing the effectiveness of the board. Our results suggest that regulators and corporate governance advocates should not go overboard in recommending that boards should be filled exclusively by outsiders.

Our findings have relevance to researchers and data vendors in the corporate governance domain. Some researchers and database vendors (for instance, Riskmetrics) score a firm based on its corporate governance features. Typically, such measurements assume a monotonic relationship between a feature such as board independence and effectiveness. Our research suggests that industry and firm characteristics preclude such a relationship.

Our finding of VC-backing being associated with higher failure likelihood could potentially be explained by the potential agency costs implicit in venture capitalists serving their short-term interests during the IPO stage. Thus a fruitful area of future research is an examination of the

nature of the agency costs and their potential impact of future survival likelihood. It is also possible that human capital attributes of the board and senior executives play a role in the survival of new economy firms. Thus a potential avenue for future research is to incorporate the characteristics of boards such as the experience of directors in the particular industry sector (Bach and Smith, 2007; Wilbon, 2002), the number of meetings held by the boards, and board remuneration. More research on this key issue is likely to enhance our knowledge of the factors influencing corporate survival.

References

- Adams, R.B., and Ferreira, D. 2007, 'A theory of friendly boards', *Journal of Finance*, 62, 217-250.
- Adams, R.B. 2009, 'Asking directors about their dual role', Unpublished working paper, University of Queensland.
- Ajinkya, B., Bhojraj, S. and Sengupta, P. 2005, 'The association between outside directors, institutional investors and the properties of management earnings forecasts', *Journal of Accounting Research*, 43(3), 343-376.
- Andersen, P. K., Abildstrom, S. Z. and Rosthøj, S. 2002, 'Competing risks as a multi-state model', *Statistical Methods in Medical Research*, 11(2), 203.
- Anderson, C.A., and Anthony, R.N. 1986, 'The new corporate directors: Insights for board members and executives. New York: Wiley.
- Arthurs, J.D. Hoskisson, R. E., Busenitz, L. W., and Johnson, R. A. 2008, 'Managerial agents watching other agents: Multiple agency conflicts regarding underpricing in IPO firms', *Academy of Management Journal*, 51(2), 277-294.
- ASX March 2003, *Principles of good corporate governance and best practice recommendations*, ASX Corporate Governance Council.
- Audretsch, D. B. and Lehmann, E. E. 2004, *The effects of experience, ownership, and knowledge on IPO survival: Empirical evidence from Germany*, Discussion Paper, The Group Entrepreneurship, Growth and Public Policy, Jena, Germany.
- Bach, S. B. and Smith, A. B., 2007, 'Are powerful CEOs beneficial to post-IPO survival in high technology industries?: An empirical investigation', *The Journal of High Technology Management Research*, 18(1), 31-42.
- Bainbridge, S. M. (2002), 'Why a board? Group decision making in corporate governance' *Vanderbilt Law Review*, 55 (1), 1-55.
- Barry, C. B., Muscarella, C. J., Peavy, J. W. and Vetsuypens, M. R. 1990, 'The role of venture capital in the creation of public companies: Evidence from the going-public process', *Journal of Financial Economics*, 27(2), 447-471.
- Bhabra, H. S. and Pettway, R. H. 2003, 'IPO prospectus information and subsequent performance', *Financial Review*, 38(3), 369-397.
- Bhagat, S. and Black, B. 2002, 'The non-correlation between board independence and long term firm performance', *Journal of Corporation Law*, 27, 231-274.
- Bhojraj, S., Lee, C.M. C., and Oler, D. K. 2003, 'What's my line? A comparison of industry classification schemes for capital market research', *Journal of Accounting Research*, 41, 745-774.
- Brennan, N. and McDermott, M. 2004, 'Alternative perspectives on independence of directors', *Corporate Governance: An International Review*, 12(3), 325-336.
- Brickley, J. A., Coles, J. L. and Jarrell, G. 1997, 'Leadership structure: Separating the CEO and chairman of the board', *Journal of Corporate Finance*, 3(3), 189-220.
- Byrd, J. and Hickman, K. 1992, 'Do outside directors monitor managers? Evidence from tender offer bids', *Journal of Financial Economics*, 32, 195-221.
- Carlson, M. A., Fisher, A. and Giammarino, R. 2006, 'Corporate Investment and Asset Price Dynamics: Implications for SEO Event Studies and Long-run Performance', *Journal of Finance*, 61, 1009-1034.
- Certo, S. T., Daily, C. M. and Dalton, D. R. 2001, 'Signaling firm value through board structure: An investigation of initial public offerings', *Entrepreneurship: Theory & Practice*, 26(2), 33-50.
- Chan, L. K. C., Lakonishok, J., and Swaminathan, B. 2007, 'Industry classification and return comovement', *Financial Analysts Journal*, 63, 56-70.

- Chancharat, Nongnit, Krishnamurti, Chandrasekhar and Tian, G. G. 2008, 'When the Going Gets Tough: Board Capital and Survival of New Economy IPO Firms' 21st Australasian Finance and Banking Conference 2008 Paper. Available at SSRN: <http://ssrn.com/abstract=1253171>
- Cheng, S. 2008, 'Board size and the variability of corporate performance', *Journal of Financial Economics*, 87, 157-176.
- Cockburn, I. M. and Wagner, S. 2007, *Patents and the survival of internet-related IPOs*, Working Paper, National Bureau of Economic Research, Cambridge, MA.
- Coles, J.L., Daniel, N. D., and Naveen, L. 2008, 'Boards: Does one size fit all?', *Journal of Financial Economics*, 87, 329-356.
- Cox, D. R. 1972, 'Regression models and life-tables', *Journal of the Royal Statistical Society. Series B (Methodological)*, 34(2), 187-220.
- Dahya, J. 2004, 'One man two hats - What's all the commotion!' Working Paper, Baruch College.
- Daily, C. M. and Dalton, D. R. 1994a, 'Bankruptcy and corporate governance: The impact of board composition and structure', *Academy of Management Journal*, 37(6), 1603-1617.
- Daily, C. M. and Dalton, D. R. 1994b, 'Corporate governance and the bankrupt firm: An empirical assessment', *Strategic Management Journal*, 15(8), 643-654.
- Dalton, D. R., Daily, C. M., Johnson, J. L. and Ellstrand, A. E. 1999, 'Number of directors and financial performance: A meta-analysis', *Academy of Management Journal*, 42(6), 674-686.
- Demsetz, H. and Lehn, K. 1985, 'The structure of corporate ownership: Causes and consequences', *The Journal of Political Economy*, 93(6), 1155-1177.
- Dimovski, W. and Brooks, R. 2003, 'Financial characteristics of Australian initial public offerings from 1994 to 1999', *Applied Economics*, 35(14), 1599 - 1607.
- Dowell, G. W. S., Shackell, M. B. and Stuart, N. V. 2007, *The board of directors and firm survival: Evidence from the internet shakeout*, Working Paper, Johnson Graduate School of Business, Cornell University, New York.
- Duchin, R., Matsusaka, J. G. and Ozbas, O. 2010, *When are outside directors effective?*, *Journal of Financial Economics*, 96, 195-214.
- Eisenhardt, K. M. (1989). 'Making fast strategic decisions in high-velocity environments', *Academy of Management Journal*, 32, 543-577.
- Faleye, O. 2007, 'Does one hat fit all? The case of corporate leadership' *Journal of Management and Governance*, 11, 239-259.
- Faleye, O., Hoitash, R. and Hoitash, U. 2011, 'The costs of intense board monitoring', *Journal of Financial Economics*, forthcoming.
- Fama, E., and Jensen, M.C. 1983, 'Separation of ownership and control', *Journal of Law and Economics*, 26, 327-349.
- Finkelstein, S. and D'Aveni, R. A. 1994, 'CEO Duality as a Double-Edged Sword: how Boards of Directors Balance Entrenchment Avoidance and Unity of Command', *Academy of Management Journal*, 37(5), 1079-1108.
- Fischer, H. M. and Pollock, T. G. 2004, 'Effects of social capital and power on surviving transformational change: The case of initial public offerings', *Academy of Management Journal*, 47(4), 463-481.
- Gaver, J. J. and Gaver, K. M. 1993, 'Additional evidence on the association between the investment opportunity set and corporate financing, dividend, and compensation policies', *Journal of Accounting and Economics*, 16(1-3), 125-160.
- Goktan, M. S., Kieschnick, R. and Moussawi, R. 2006, *Corporate governance and corporate survival*, Working Paper, University of Texas at Dallas.
- Gompers, P. A. 1996, 'Grandstanding in the venture capital industry', *Journal of Financial Economics*, 42, 133-156.
- Goodstein, J., Gautam, K. and Boeker, W. 1994, 'Research notes and communications the effects of board size and diversity on strategic change', *Strategic Management Journal*, 15(3), 241-250.

- Harris, M., and Raviv, A. 2008, 'A Theory of Board Control and Size', *Review of Financial Studies*, 21(4), 1797-1832.
- Hensler, D. A., Rutherford, R. C. and Springer, T. M. 1997, 'The survival of initial public offerings in the aftermarket', *Journal of Financial Research*, 20(1), 93-110.
- Hermalin, B., and Weisbach, M. 1998, 'Endogenously chosen boards of directors and their monitoring of the CEO', *The American Economic Review*, 88, 96-118.
- Hermalin, B., and Weisbach, M. 2003, 'Board of directors as an endogenously determined institution', *Federal Reserve Bank of New York Economic Policy Review*, 9, 1-20.
- Ho, B., Taher, M., Lee, R. and Fargher, N. L. 2001, *Market sentiment, media hype and the underpricing of initial public offerings: The case of Australian technology IPOs*, Working Paper, School of Accounting, University of New South Wales.
- Holmstrom, B. 2005, 'Pay without performance and the managerial power hypothesis: a comment', *Journal of Corporation Law*, 30, 703-713.
- How, J. C. Y., Izan, H. Y. and Monroe, G. S. 1995, 'Differential information and the underpricing of initial public offerings: Australian evidence', *Accounting & Finance*, 35(1), 87-105.
- How, J. C. Y. and Yeo, J. J. L. 2000, 'The pricing of underwriting services in the Australian capital market', *Pacific-Basin Finance Journal*, 8(3-4), 347-373.
- Jain, B. A. and Kini, O. 1999, 'The life cycle of initial public offering firms', *Journal of Business Finance & Accounting*, 26(9-10), 1281-1307.
- Jain, B. A. and Kini, O. 2000, 'Does the presence of venture capitalists improve the survival profile of IPO firms?' *Journal of Business Finance & Accounting*, 27(9/10), 1139-1176.
- Jensen, M. C. 1986, 'Agency costs of free cash flow, corporate finance and takeovers', *American Economic Review*, 76, 323-329.
- Jensen, M. C. 1993, 'The modern industrial revolution, exit, and the failure of internal control systems', *The Journal of Finance*, 48(3), 831-880.
- Jensen, M. C. and Meckling, W. H. 1976, 'Theory of the firm: Managerial behavior, agency costs and ownership structure', *Journal of Financial Economics*, 3(4), 305-360.
- Johnson, J. L., Daily, C. M., and Ellstrand, A. E. 1996, 'Board of Directors: A Review and Research Agenda', *Journal of Management*, 22(3), 409.
- Judge, W. Q. and Miller (1991). 'Antecedents and outcomes of decision speed in different environmental contexts'. *Academy of Management Journal*, 34, 449-463.
- Judge, W. Q. and Zeithaml, C. P. 1992, 'Institutional and strategic choice perspectives on board involvement in the strategic decision process', *Academy of Management Journal*, 35(4), 766-794.
- Kang, H., Cheng, M. and Gray, S. J. 2007, 'Corporate governance and board composition: Diversity and independence of Australian boards', *Corporate Governance: An International Review*, 15(2), 194-207.
- Kauffman, R. J. and Wang, B. 2001, *The success and failure of dotcoms: A multi-method survival analysis*, Information and Decision Sciences, Carlson School of Management, University of Minnesota.
- Kauffman, R. J. and Wang, B. 2007, *Duration of internet firms: A semiparametric Cox and bayesian survival analysis*, Working Paper, Carlson School of Management, University of Minnesota.
- Kroll, M., Walters, B.A., and Le, S.A. 2007, *The impact of board composition and top management team ownership structure on post-IPO performance in young entrepreneurial firms*, *Academy of Management Journal*, 50(5), 1198-1216.
- Kumar, P. and Sivaramakrishnan, K. 2008, 'Who monitors the monitor? The effect of board independence on executive compensation and firm value', *Review of Financial Studies*, 21(3), 1371-1401.
- Lamberto, A. P. and Rath, S. 2008, *The survival of initial public offerings in Australia*, Working Paper, Curtin University of Technology.

- Lee, T.-S. and Yeh, Y.-H. 2004, 'Corporate governance and financial distress: Evidence from Taiwan', *Corporate Governance: An International Review*, 12(3), 378-388.
- Lehn, K., Patro, S., and Zhao, M., 2003, 'Determinants of the size and structure of corporate boards: 1935-2000', Working Paper available at SSRN: <http://ssrn.com/abstract=470675>.
- Leland, H. E. and Pyle, D. H. 1977, 'Informational asymmetries, financial structure, and financial intermediation', *Journal of Finance*, 32(2), 371-387.
- Lin, Y.C., Yeh, K.S., and Li, S. 2011, Change of governance in the organization value chain: The case of high-tech industries in Taiwan, *Corporate Governance: An International Review*, 19(2), 169-182.
- Linck, J.S., Netter, J., and Yang, T. 2008, 'The determinants of board structure', *Journal of Financial Economics*, 87, 308-328.
- Lipton, M. and Lorsch, J. 1992, 'A modest proposal for improved corporate governance', *Business Lawyer*, 1, 59-77.
- Meggison, W. L. and Weiss, K. A. 1991, 'Venture capitalist certification in initial public offerings', *Journal of finance*, 46(3), 879-903.
- OECD, 2001, 'The New Economy: Beyond the Hype', Final report on the OECD Growth Project, Organisation for the Economic Co-operation and Development, Paris.
- Myers, S. 1977, 'Determinants of Corporate Borrowing', *Journal of Financial Economics*, 5, 147-175.
- OECD 2001 'The New Economy: Beyond the Hype', Final report on the OECD Growth Project, Organisation for the Economic Co-operation and Development, Paris.
- Prantl, S. 2003, *Bankruptcy and voluntary liquidation: Evidence for new firms in East and West Germany after unification*, Discussion paper no. 03-72, ZEW, Centre for European Economic Research, London.
- Raheja, C. 2005, 'Determinants of Board Size and Composition: A Theory of Corporate Boards', *Journal of Financial and Quantitative Analysis*, 40, 283-306.
- Rechner, P. L. and Dalton, D. R. 1991, 'CEO duality and organizational performance: A longitudinal analysis', *Strategic Management Journal*, 12(2), 155-160.
- Ritter, J. R. 1991, 'The long-run performance of Initial Public Offerings', *Journal of Finance*, 46(1), 3-27.
- Romano, R. 2005, 'The Sarbanes-Oxley Act and the making of quack corporate governance', *Yale Law Review*, 114, 1521-1611.
- Sah, R.K., and Stiglitz, J. 1986, 'The architecture of economic systems: hierarchies and polyarchies', *American Economic Review* 76, 716-727.
- Sah, R.K., and Stiglitz, J. 1991, 'The quality of managers in centralized versus decentralized organizations', *Quarterly Journal of Economics*, 106, 289-295.
- Samders, W.M. and Boivie, S. 2004, Sorting things out: valuation of new firms in uncertain markets, *Strategic Management Journal* 25, 167-186.
- Schultz, P. 1993, 'Unit initial public offerings : A form of staged financing', *Journal of Financial Economics*, 34(2), 199-229.
- Shumway, T. 2001, 'Forecasting bankruptcy more accurately: A simple hazard model', *Journal of Business*, 74(1), 101-124.
- Smith, C., and Watts, R. 1992, 'The investment opportunity set and corporate financing, dividend, and compensation policies', *Journal of Financial Economics*, 32, 263-292.
- Song, F., Thakor, A., 2006, 'Information control, career concerns, and corporate governance', *Journal of Finance* 61, 1845-1896.
- Standard and Poor's 2002, *Understanding GICS*, New York.
- Stoeberl, P.A., and Sherony, B.C. 1985, 'Board efficiency and effectiveness: In E. Mattar and M. Balls (Eds.) Handbook for corporate directors (pp 12.1-12.10). New York: McGraw-Hill.
- Welbourne, T. M. and Andrews, A. O. 1996, 'Predicting the performance of initial public offerings: Should human resource management be in the equation?' *Academy of Management Journal*, 39(4), 891-919.

- Wilbon, A. D., 2002, 'Predicting survival of high technology initial public offering firms', *The Journal of High Technology Management Research*, 13(1), 127-141.
- Woo, L.-A. E., Jeffrey, A. M. and Lange, H. P. 1995, 'An examination of survival rates of newly listed firms in Australia', *Research in Finance*, 12, 217-229.
- Yang, C.-Y. and Sheu, H.-J. 2006, 'Managerial ownership structure and IPO survivability', *Journal of Management and Governance*, 10(1), 59-75.
- Yermack, D. 1996, 'Higher market valuation of companies with a small board of directors', *Journal of Financial Economics*, 40, 185-212.

Table 1: The variables used in the study

Variable Code	Variable Name	Definition of Variable
	<i>Corporate Governance Attributes:</i>	
BD_SIZE	Board Size	Number of directors on the board including chairperson.
	Board Independence	
BD_INDP	Percentage of Independent Directors	The ratio of the number of non-executive directors to the number of directors, as listed in the prospectus.
CM_NEXC	Non-Executive Chairperson	If the chairperson listed in the prospectus is a non-executive director then a value of 1 is recorded, 0 otherwise.
CM_DUAL	Dual Leadership Structure	If the chairperson and CEO are different people then a value of 1 is recorded, 0 otherwise.
	Ownership Concentration	
TOP20	Top 20 Shareholders	The proportion of common stock held by the top 20 shareholders.
	<i>Offering Characteristics:</i>	
OF_PRICE	Offering Price	The offer price listed in the prospectus, or the midpoint of the price range.
OF_SIZE	Offering Size	The size of the offering listed in the prospectus, or the minimum subscription amount.
OF_AGE	Offering Age	The difference between the year in which the prospectus was lodged and the year in which the company was founded.
RETAIN	Retained Ownership	The difference between the market capitalization of the company after listing and the size of the offering, divided by the market capitalization of the company after listing.
BACK	Underwriter Backing	Initial public offerings which had an underwriter recorded a value of 1, 0 otherwise.
BIG5	Auditor Reputation	Initial public offerings which had an auditor belonging to one of the Big 5 Accounting firms recorded a value of 1, 0 otherwise. The Big 5 accounting firms include PricewaterhouseCoopers, KPMG, Arthur Anderson, Deloitte Touche Tohmatsu and Ernst and Young.
NUM_RISK	Number of Risk Factors in the Prospectus	The number of risk factors listed in the prospectus. If there is no specific risk factor section, the number is 0.
	<i>Financial Ratios:</i>	
ROA	Profitability	Return on Asset (ROA): Earnings before interest/(total assets-outside equity interests).
CUR	Liquidity Ratio	Current Ratio: Current assets/current liabilities.
DET	Leverage Ratio	Debt Ratio: Total debt/total assets.
TAT	Activity Ratio	Total Asset Turnover: Operating revenue/total assets.
	<i>Company-Specific Variables:</i>	
C_SIZE	Company Size	The logarithm of total assets of the firm.
IPO_9900	IPO_9900	A dummy variable recorded a value of 1 if a company issued stock between 1999 and April 2000, 0 otherwise.
VC_BACKED	Venture Capital-Backed IPOs	A dummy variable recorded a value of 1 if a company is a venture capital-backed IPO, 0 otherwise.

Table 2: Composition of Sample**Panel A: Stratified by GICS industry sector**

GICS Industry Sector	N	Percent
Information Technology	55	44.00
Media	13	10.40
Telecommunication Services	13	10.40
Health Care	44	35.20
Total	125	100.00

Note: N is the number of companies. Percent is the number of companies in a particular industry group as a proportion of total number of companies.

Panel B: Stratified by trading status

Trading Status	N	Percent
Trading	93	74.40
Delisted due to other reasons	17	13.60
Delisted due to merger/takeover/acquisition	15	12.00
Total	125	100.00

Note: N is the number of companies. Percent is the number of companies in a particular trading status group as a proportion of total number of companies.

Table 3: Descriptive statistics of the data

	BD_SIZE	BD_INDP	CM_NEXC	CM_DUAL	TOP20	OF_PRICE	OF_SIZE	OF_AGE	RETAIN	BACK	BIG5	NUM_RISK
Survivor IPOs (n=93)												
Mean	5.19	53.41	0.64	0.86	65.98	0.89	32.95	5.80	62.16	0.74	0.53	12.72
Median	5.00	60.00	1.00	1.00	70.00	0.50	8.00	3.05	70.00	1.00	1.00	12.00
Min	3.00	0.00	0.00	0.00	14.40	0.20	1.50	0.00	0.00	0.00	0.00	0.00
Max	10.00	83.00	1.00	1.00	94.14	4.60	421.09	38.46	96.34	1.00	1.00	31.00
Std Dev.	1.32	19.59	0.48	0.35	18.67	0.85	74.00	7.16	23.67	0.44	0.50	5.32
Skewness	0.61	-0.68	-0.60	-2.02	-0.86	2.45	3.79	1.96	-1.14	-1.10	-0.13	0.80
Kurtosis	0.95	-0.10	-1.64	2.10	0.04	7.21	14.43	4.74	0.65	-0.80	-1.99	2.02
Non-Survivor IPOs (n=32)												
Mean	5.13	61.96	0.70	0.85	76.77	0.93	135.10	6.24	70.48	0.90	0.70	14.25
Median	5.00	67.00	1.00	1.00	78.41	1.00	12.00	4.51	74.34	1.00	1.00	13.00
Min	3.00	0.00	0.00	0.00	19.99	0.20	1.00	0.01	0.00	0.00	0.00	7.00
Max	9.00	89.00	1.00	1.00	98.28	2.00	6652.73	18.83	99.52	1.00	1.00	25.00
Std Dev.	1.13	20.08	0.46	0.36	14.52	0.50	873.75	5.50	20.06	0.30	0.46	3.91
Skewness	0.85	-0.89	-0.86	-1.96	-0.65	0.29	7.41	0.59	-1.02	-2.70	-0.89	0.91
Kurtosis	1.75	0.25	-1.28	1.84	0.36	-0.66	53.55	-0.95	1.27	5.36	-1.22	0.82
Mann Whitney U-Test	0.09	2.59	0.11	0.22	7.21**	3.69*	0.63	0.26	0.94	2.83†	2.25	1.99
p-value	0.77	0.11	0.74	0.64	0.01	0.05	0.43	0.61	0.33	0.09	0.13	0.16

	ROA	CUR	TAT	DET	C_SIZE	IPO_9900	VC_BACKED
Survivor IPOs (n=93)							
Mean	-0.29	7.17	0.87	0.43	7.27	0.40	0.11
Median	-0.06	2.00	0.61	0.31	7.23	0.00	0.00
Min	-6.10	0.02	0.00	0.00	5.62	0.00	0.00
Max	0.58	331.52	4.82	4.20	9.42	1.00	1.00
Std Dev.	0.75	20.68	0.98	0.53	0.77	0.49	0.31
Skewness	-3.96	9.19	1.83	4.42	0.50	0.43	2.50
Kurtosis	21.56	116.27	3.62	25.57	0.39	-1.82	4.28
Non-Survivor IPOs (n=32)							
Mean	-0.35	7.05	0.95	0.50	7.41	0.36	0.31
Median	-0.01	1.81	0.62	0.34	7.35	0.00	0.00
Min	-6.10	0.02	0.00	0.00	5.61	0.00	0.00
Max	0.58	567.03	4.82	4.20	9.42	1.00	1.00
Std Dev.	1.17	43.39	0.99	0.60	0.73	0.48	0.46
Skewness	-4.26	12.79	1.68	3.55	0.16	0.60	0.83
Kurtosis	18.39	165.95	3.42	16.43	0.33	-1.66	-1.33
Mann Whitney U-Test	1.09	0.21	0.58	1.46	3.33†	0.12	5.53**
p-value	0.30	0.65	0.45	0.23	0.07	0.73	0.02

Note: Descriptive statistics grouped by company status. Mann Whitney U-test from a non-parametric test of equality of group means. BD_SIZE is the board size calculated by number of directors on the board including chairperson. BD_INDP is percentage of independent directors measured by the ratio of the number of non-executive directors to the number of directors, as listed in the prospectus. CM_NEXC is non-executive chairperson and takes the value of 1 if the chairperson listed in the

prospectus is a non-executive director, 0 otherwise. CM_DUAL is dual leadership structure and takes the value of 1 if the chairperson and CEO are different persons, 0 otherwise. TOP20 is the proportion of common stock held by the top 20 shareholders. OF_PRICE is the offer price listed in the prospectus, or the midpoint of the price range. OF_SIZE is the size of the offering listed in the prospectus, or the minimum subscription amount. OF_AGE is the difference between the year in which the prospectus was lodged and the year in which the company was founded. RETAIN is the difference between the market capitalization of the company after listing and the size of the offering, divided by the market capitalization of the company after listing. BACK is underwriter backing, if the initial public offering had an underwriter it is coded as 1, 0 otherwise. BIG5 is dummy variable recorded a value of 1 if initial public offerings had an auditor belonging to one of the Big 5 Accounting firms, 0 otherwise. The Big 5 accounting firms include PricewaterhouseCoopers, KPMG, Arthur Anderson, Deloitte Touche Tohmatsu and Ernst and Young. NUM_RISK is the number of risk factors listed in the prospectus. If there is no specific risk factor section, the number is 0. ROA is Return on Asset (ROA) calculated by earnings before interest/(total assets-outside equity interests). CUR is current ratio measured by current assets divided by current liabilities. TAT is total asset turnover obtained by divided operating revenue by total assets. DET is debt ratio calculated by total debt/total assets. C_SIZE is company size measured by the logarithm of total assets of the firm. IPO_9900 is a dummy variable recorded a value of 1 if a company issued stock between 1999 and April 2000, 0 otherwise and VC_BACKED is venture capital-backed IPOs and takes the value of 1 if is a venture capital-backed IPO, 0 otherwise.

† Significant at a 10 percent level.

** Significant at a 5 percent level.

Table 4: Pearson correlation coefficients

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. SUR_TIME	1.00	0.03	-0.05	-0.05	-0.01	-0.27	0.03	-0.10	0.15	-0.18	-0.02	0.03	-0.31	0.04	-0.10	0.01	0.03	0.16	-0.07
2. BD_SIZE		1.00	0.10	0.04	0.16	0.03	0.44	0.26	-0.10	-0.06	-0.08	0.18	0.05	0.06	-0.02	-0.03	0.00	0.52	-0.15
3. BD_INDP			1.00	0.37	0.24	0.12	-0.01	0.09	0.00	0.01	0.12	0.162	0.14	-0.09	0.02	-0.03	0.07	-0.09	0.05
4. CM_NEXC				1.00	0.34	-0.14	0.01	0.01	0.01	-0.00	0.03	-0.12	0.08	-0.09	0.01	-0.02	-0.05	-0.10	0.06
5. CM_DUAL					1.00	-0.03	0.07	0.04	-0.15	-0.04	0.12	0.02	0.12	-0.03	-0.10	0.07	0.06	0.07	0.10
6. TOP20						1.00	0.11	0.04	0.16	0.37	0.14	-0.04	0.13	0.04	-0.06	0.10	0.09	0.07	-0.20
7. OF_PRICE							1.00	0.18	-0.04	-0.03	-0.17	0.09	0.03	0.15	-0.09	0.06	0.08	0.54	-0.02
8. OF_SIZE								1.00	-0.01	-0.20	-0.15	0.06	0.01	0.04	-0.02	0.05	0.09	0.24	-0.04
9. OF_AGE									1.00	0.09	0.15	-0.02	-0.16	0.13	-0.11	0.11	0.02	0.04	0.05
10. RETAIN										1.00	0.16	0.00	0.23	-0.08	-0.11	0.01	0.06	-0.10	-0.10
11. BACK											1.00	0.02	-0.12	0.02	-0.05	0.17	0.08	-0.04	0.04
12. BIG5												1.00	0.08	0.01	-0.02	-0.12	0.05	0.13	0.012
13. NUM_RISK													1.00	-0.05	-0.02	0.001	0.04	-0.00	0.08
14. ROA														1.00	0.04	-0.02	-0.48	0.47	-0.00
15. CUR															1.00	-0.15	-0.16	-0.08	-0.05
16. TAT																1.00	0.40	0.02	0.0
17. DET																	1.00	-0.15	0.06
18. C_SIZE																		1.00	-0.08
19. IPO_9900																			1.00
20. VC_BACKED																			

Note: SUR_TIME is survival time which is the number of years from the start year to the year of financial distress for a distressed company or to the last year observed for an active company. BD_SIZE is the board size calculated by number of directors on the board including chairperson. BD_INDP is percentage of independent directors measured by the ratio of the number of non-executive directors to the number of directors, as listed in the prospectus. CM_NEXC is non-executive chairperson and takes the value of 1 if the chairperson listed in the prospectus is a non-executive director, 0 otherwise. CM_DUAL is dual leadership structure and takes the value of 1 if the chairperson and CEO are different persons, 0 otherwise. TOP20 is the proportion of common stock held by the top 20 shareholders. OF_PRICE is the offer price listed in the prospectus, or the midpoint of the price range. OF_SIZE is the size of the offering listed in the

prospectus, or the minimum subscription amount. **OF_AGE** is the difference between the year in which the prospectus was lodged and the year in which the company was founded. **RETAIN** is the difference between the market capitalization of the company after listing and the size of the offering, divided by the market capitalization of the company after listing. **BACK** is underwriter backing, if the initial public offering had an underwriter it is coded as 1, 0 otherwise. **BIG5** is dummy variable recorded a value of 1 if initial public offerings had an auditor belonging to one of the Big 5 Accounting firms, 0 otherwise. The Big 5 accounting firms include PricewaterhouseCoopers, KPMG, Arthur Anderson, Deloitte Touché Tohmatsu and Ernst and Young. **NUM_RISK** is the number of risk factors listed in the prospectus. If there is no specific risk factor section, the number is 0. **ROA** is Return on Asset (ROA) calculated by earnings before interest/(total assets-outside equity interests). **CUR** is current ratio measured by current assets divided by current liabilities. **TAT** is total asset turnover obtained by divided operating revenue by total assets. **DET** is debt ratio calculated by total debt/total assets. **C_SIZE** is company size measured by the logarithm of total assets of the firm. **IPO_9900** is a dummy variable recorded a value of 1 if a company issued stock between 1999 and April 2000, 0 otherwise and **VC_BACKED** is venture capital-backed IPOs and takes the value of 1 if is a venture capital-backed IPO, 0 otherwise.

TABLE 5
Estimation Results of Multivariate Cox Proportional Hazards Model of the Entire Sample

Covariate	Coefficient	Standard Error	χ^2 Statistic	<i>p</i> -Value	Hazard Ratio
BD_SIZE	2.58 [†]	1.53	2.86	0.09	13.19
BD_SIZESQ	-0.25 [†]	0.14	3.27	0.07	0.78
BD_INDP	-0.11*	0.04	6.05	0.01	0.90
BD_INDPSQ	0.001*	0.00	5.90	0.02	1.00
CM_DUAL	0.47	0.87	0.29	0.59	1.60
CM_NEXC	0.07	0.50	0.02	0.88	1.08
TOP20	-0.06	0.08	0.66	0.42	0.94
TOP20SQ	0.001	0.00	1.64	0.20	1.00
OF_SIZE	0.001 [†]	0.00	3.80	0.05	1.00
BACK	1.21 [†]	0.68	3.17	0.07	3.36
VC_BACKED	0.91 [†]	0.50	3.36	0.07	2.49
DET	0.67 [†]	0.35	3.76	0.05	1.96
C_SIZE	0.68 [†]	0.36	3.61	0.06	1.97

Notes: The dependent variable is the survival time, SUR_TIME. Independent variable definitions are provided in Table 1. BD_SIZE is the board size calculated by number of directors on the board including chairperson. BD_SIZESQ is the square of board size. BD_INDP is percentage of independent directors measured by the ratio of the number of non-executive directors to the number of directors, as listed in the prospectus. BD_INDPSQ is the square of the percentage of independent directors. CM_DUAL is dual leadership structure and takes the value of 1 if the chairperson and CEO are different persons, 0 otherwise. CM_NEXC is non-executive chairperson and takes the value of 1 if the chairperson listed in the prospectus is a non-executive director, 0 otherwise. TOP20 is the proportion of common stock held by the top 20 shareholders. OF_SIZE is the size of the offering listed in the prospectus, or the minimum subscription amount. BACK is underwriter backing, if the initial public offering had an underwriter it is coded as 1, 0 otherwise. VC_BACKED is venture capital-backed IPOs and takes the value of 1 if is a venture capital-backed IPO, 0 otherwise. DET is debt ratio calculated by total debt/total assets and C_SIZE is company size measured by the logarithm of total assets of the firm.

* and † denote significant at the .05 and .10 levels, respectively.

TABLE 6
Competing Risks Model of the Subsamples

Covariate	Coefficient	Standard Error	χ^2 Statistic	<i>p</i> -Value	Hazard Ratio
Panel A: Subsample of Delisted Firms Due to Financial Distress					
BD_SIZE	6.22 [†]	3.52	3.12	0.08	501.29
BD_SIZESQ	-0.61 [†]	0.35	3.10	0.08	0.54
BD_INDP	-0.17*	0.07	6.51	0.01	0.84
BD_INDPSQ	0.002*	0.00	5.84	0.02	1.00
CM_DUAL	-0.87	1.01	0.74	0.39	0.42
CM_NEXC	-0.13	0.74	0.03	0.86	0.87
TOP20	0.14	0.22	0.42	0.52	1.15
TOP20SQ	-0.001	0.00	0.20	0.66	1.00
OF_AGE	-0.11 [†]	0.06	3.64	0.06	0.90
IPO_9900	2.25*	0.81	7.71	0.01	9.48
VC_BACKED	1.44 [†]	0.80	3.22	0.07	4.24
C_SIZE	1.14*	0.51	4.97	0.03	3.12
Panel B: Subsample of Delisted Firms Due to Takeovers and Acquisitions					
BD_SIZE	1.51	2.00	0.57	0.45	4.512
BD_SIZESQ	-0.14	0.18	0.65	0.42	0.87
BD_INDP	-0.12 [†]	0.07	2.85	0.09	0.89
BD_INDPSQ	0.001 [†]	0.00	3.16	0.08	1.00
CM_DUAL	16.90	2154	0.00	0.99	21887627
CM_NEXC	0.58	0.84	0.48	0.49	1.79
TOP20	-0.24*	0.11	4.72	0.03	0.79
TOP20SQ	0.002*	0.00	5.54	0.02	1.00
DET	0.92 [†]	0.52	3.05	0.08	2.50

Notes: The dependent variable is the survival time, SUR_TIME. Independent variable definitions are provided in Table 1. BD_SIZE is the board size calculated by number of directors on the board including chairperson. BD_SIZESQ is the square of board size. BD_INDP is percentage of independent directors measured by the ratio of the number of non-executive directors to the number of directors, as listed in the prospectus. BD_INDPSQ is the square of the percentage of independent directors. CM_DUAL is dual leadership structure and takes the value of 1 if the chairperson and CEO are different persons, 0 otherwise. CM_NEXC is non-executive chairperson and takes the value of 1 if the chairperson listed in the prospectus is a non-executive director, 0 otherwise. TOP20 is the proportion of common stock held by the top 20 shareholders. TOP20SQ is the square of the proportion of common stock held by the top 20 shareholders. OF_AGE is offering age calculated by the difference between the year in which the prospectus was lodged and the year in which the company was founded. IPO_9900 is a dummy variable recorded a value of 1 if a company issued stock between 1999 and April 2000, 0 otherwise. OF_SIZE is the size of the offering listed in the prospectus, or the minimum subscription amount. BACK is underwriter backing, if the initial public offering had an underwriter it is coded as 1, 0 otherwise. VC_BACKED is venture capital-backed IPOs and takes the value of 1 if is a venture capital-backed IPO, 0 otherwise. DET is debt ratio calculated by total debt/total assets and C_SIZE is company size measured by the logarithm of total assets of the firm.

* and [†] denote significance at the .05 and .10 levels, respectively.

FIGURE 1

Graph of Survival Function for Boards of Different Size

Panel A: Small versus Medium versus Large Boards

Note: Small Board (<4), Medium size board (4-6), Large Board (>6)

Panel B: Small or large board versus medium size board.

Note: Small Board (<4), Medium size board (4-6), Large Board (>6)

End Notes

★ We would like to thank William Judge (the editor), the associate editor, and three anonymous referees for their insightful comments and suggestions. The authors are grateful to the comments by participants at the 21st Australasian Finance and Banking Conference, Sydney, 15-18 December 2008; the 13th New Zealand Finance Colloquium, Wellington 13-14 February 2009; and seminars at the School of Accounting and Finance, University of Wollongong 8 May 2009, the School of Investment and Finance at Sun Yat-Set University in China in 29 December 2008, and South China University of Technology in 4 January 2009. We would also like to thank Pam Davy, Michael McCrae, and Ping Zhou for their comments on the earlier draft of this paper. The authors remain responsible for all errors.

¹ Corresponding author. Tel: +61 7 4631 2941; E-mail address: Chandrasekhar.Krishnamurti@usq.edu.au

² This is because managers could choose directors who are independent according to regulatory definitions but are not strictly independent due to reasons such as social ties.

³ Source: World Federation of Exchanges 2009 Market Highlights.

⁴ Extant studies demonstrate that smaller boards are more likely to eliminate poorly performing CEOs (Certo, Daily and Dalton, 2001).

⁵ Other IPO survival studies used other techniques in survival analysis e.g. Weibull model (Woo, Jeffrey and Lange, 1995; Audretsch and Lehmann, 2004), log-normal model (Woo, Jeffrey and Lange, 1995), log-logistic (Hensler, Rutherford and Springer, 1997) and piecewise exponential model (Yang and Sheu, 2006).

⁶ For the sake of brevity, the exact details of Cox proportional hazards model are not presented. These are available in basic text books and in prior work. The interested reader may also refer to Chancharat et al. (2008).

⁷ There is no consensus regarding the definition of 'independence' (Brennan and McDermott, 2004; Kang, Cheng and Gray, 2007). Previous studies have used the word 'outside directors' instead of 'independence' to describe directors who are presumed to be independent from management (Ajinkya, Bhojraj and Sengupta, 2005). Some existing studies simply consider the differences between 'executive' and 'non-executive' directors (Kang, Cheng and Gray, 2007; Lamberto and Rath, 2008).

⁸ However, the empirical results are mixed. Hensler, Rutherford and Springer (1997) find that IPOs with higher percentage of retained ownership have a longer survival period, while Lamberto and Rath (2008) found no relationship between ownership retention and IPO firm survival.

⁹ The informational value of the number of risk factors was found to be significant negatively related to the likelihood of survival of US IPOs by Hensler, Rutherford and Springer (1997) and Bhabra and Pettway (2003).

¹⁰ Schultz (1993) found an inverse relationship between the probability of delisting and firm size.

¹¹ Barry et al. (1990) and Megginson and Weiss (1991), posit that VC-backing certifies the quality of the IPO. Venture capitalists specialize in collecting and evaluating information of start-up and growth companies. Furthermore, they tend to take substantial stakes in the IPO firms and frequently sit on the boards. Jain and Kini (2000), show that the presence of venture capitalists improves the survival chances of IPO firms.

¹² Active companies are labelled as survivors. Delisted companies are non-survivors. We use alternate definitions to categorize non-survivors in the robustness subsection.

¹³ We use the default specification for selecting the variables method in PROC PHREG procedure in SAS. The SAS PROC PHREG fits the complete model as specified in the MODEL statement. The covariates are selected from the full model (all variables are included in the model), instead of backward, forward or stepwise selection procedures.

¹⁴ Since we use survival function in the graph as opposed to hazard function in the tables, the sign of the relationship is opposite.