When the Going Gets Tough: Board Capital and Survival of New Economy IPO Firms[☆]

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Abstract

The high profile corporate collapse of Enron and WorldCom has been attributed to corporate governance failures. This implicit linkage between governance failures and corporate failures raises the important question of whether good governance will mitigate the probability of failure of a firm faced with extreme financial duress. Additionally, recent studies question the assumption that a single board structure will be optimal for all firms. We empirically address this issue in the context of survival of new economy Australian IPOs. We characterize governance by board structure and leadership. Our results show that one of the key principles of the Cadbury Code of Best Practice, that firms should have independence boards is useful in mitigating the likelihood of corporate failure. Also, firms with either small boards or large boards are more likely to survive compared to firms with medium size boards.

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1. Introduction

One consequence of 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. In 2003, the SEC approved corporate governance measures suggested by NYSE and Nasdaq that contained at its core the independence of a majority of directors on the board. Implicit in this convergence to a single optimal structure for the board is the assumption that one board structure should fit all firms. Recent empirical studies, 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. Duchin, Matsusaka and Ozbas (2009) provide empirical support for the view that outside directors are less effective at monitoring and providing advice when the cost of acquiring information is high.[1] Romano (2005) believes that undue haste in imposing corporate governance convergence may lead to "quack governance".[2]

We contribute to this debate by examining the validity of this one-size-fits-all approach in a non-US setting by studying the influence of corporate governance attributes on the survival of new economy IPO companies 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. 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. Our choice of new economy firms is based on the fact that firm-specific knowledge of insiders is critical to success. Coles, Daniel, and Naveen (2008) posit that companies, for which firm-specific knowledge of insiders is relatively crucial, are likely to derive greater benefits from insider representation on the board. Furthermore, the cost of acquiring information by outside directors is likely to be higher for new economy firms. Therefore, the debate regarding board independence is much more critical for new economy firms than other firms.

Another feature of the board that has attracted the attention of corporate governance scholars is the size of the board. Conventional wisdom is now converging to the view that small boards are more effective than large boards. 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, Daniel, and Naveen (2008) question this "one-size fits all" approach. They put forward the argument that complex firms have greater advising requirements. Since large boards potentially bring more knowledge and experience and can therefore offer better advice, they argue that complex firms should

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[1] Information acquisition costs are likely to be higher in new economy firms.

[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.

have larger boards. Therefore, in addition to board independence, we also examine board size. In addition to board size and board independence we also consider CEO-Chairperson duality. Furthermore, we include ownership concentration, offering characteristics, financial ratios and company specific variables as control variables.

We examine new economy companies listed on the Australian Stock Exchange (ASX) between 1994 and 2002. Sample firms are tracked until 31 December 2007 to categorise 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. Interestingly, 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.

The remainder of the paper is organized as follows. Section 2 reviews previous studies relating to corporate governance structure and IPOs' survival and provides the theoretical background for the construction of variables. Section 3 presents the details on our data and the methodology, the Cox proportional hazards model, which has been employed in the paper. The empirical results are then presented and discussed in Section 4. Finally, our conclusion and possible future extensions are discussed in the last section.

2. Literature Review and Theoretical Development

Based on past research we identify three types of factors that influence the survival of new economy IPO firms. These are: 1) corporate governance attributes; 2) offering characteristics; 3) financial ratios and other company specific variables. We expand on these below.

2.1 Corporate Survival and Governance

Agency theory suggests that there is a link between corporate governance and firm performance (Audretsch and Lehmann, 2004). If corporate governance influences corporate performance, then it should have some effect on corporate survival (Goktan, Kieschnick and Moussawi, 2006). Johnson et al. (2000) show that firms with weak corporate governance are vulnerable to economic downturns and increases the probability of falling into financial distress.

Daily and Dalton (1994a) used a matched pair of bankrupt and surviving firms to examine the relationship between board capital and corporate survival. Their results show that bankrupt firms are more likely to have CEOs serving simultaneously as chairpersons. Bankrupt firms also have more affiliated directors than control firms, ceteris paribus. They also found a strong interactive effect between CEO-board chairperson structure and the proportion of affiliated directors on the survival likelihood.

Dowell, Shackell and Stuart (2007) in their study of internet firms examine firms that conducted their IPOs between 1996 and 1999. They find that board independence does not have an effect on the lifespan of the firm. However, they report that independent boards interact with founder-CEOs to hasten the firm's failure. Another interesting finding reported by Dowell et al. pertains to the non-linear relationship between board size and

corporate survival. They find that firms with either smaller or larger boards survive longer than those with intermediate-sized boards. Lamberto and Rath (2008) examine survival of Australian IPOs that made public issues during the 1995-1997 period. They do not find any evidence indicating that corporate governance variables have a significant impact on a firm's likelihood of survival.

In this study, we explore three areas of corporate governance - board size, board independence, and CEO influence. It is interesting to note that in Australia, the Principles of Good Corporate Governance and Best Practice Recommendations issued by the Australian Stock Exchange deals directly with board structure and states that a company should structure the board to add value. In this regard, an independent director is 'independent of management and free of any business or other relationship that could reasonably be perceived to materially interfere with the exercise of their unfettered and independent judgment' (ASX, March 2003).

Three of the ASX recommendations under Principle 2 are considered in this study. Recommendation 2.1 states that a majority of the board should be independent directors. Recommendation 2.2 is that the chairperson should be an independent director. Finally, the point of Recommendation 2.3 is that the roles of chairperson and chief executive officer should not be exercised by the same individual.

Board Size

There are two major schools of thought 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. Extant studies demonstrate that smaller boards are more likely to eliminate poorly performing CEOs (Certo, Daily and Dalton, 2001). 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 et al. (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. More recent work by Coles, Daniel, and Naveen (2008) advocates that larger boards are optimal for complex firms since they are better able to provide advice.

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, Gautam and Boeker, 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. 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.

Another strand of research based on key tenets of social psychology and group-decision making provides the basis for a relationship between board size and the variability of firm performance. For instance, the pioneering work of Sah and Stiglitz (1986, 1991) suggest that group decision-making generally gives rise to divergent opinions since individual judgement generates errors, communication tends to be costly, and individuals differ in their information processing ability. Thus a group's final decision is a compromise that incorporates the different opinions held by the group members. Consequently, larger groups are more likely to reject risky projects since a project has to be considered good by several group members before gaining acceptance of the group. Sah and Stiglitz (1991) confirm that the decision quality of larger group has less variability.

In the context of a large board of a company, the coordination/communication problems alluded to by Sah and Stiglitz (1991) will not only slow the decision-making process but also moderate the extremity of board decisions. Therefore, large boards' decisions are less likely to be extreme. That is, they tend to be neither very good nor very bad. As a result, larger 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, we expect large boards to avoid making risky decisions. Based on these arguments we predict that firms with either small boards or large boards should have a higher likelihood of survival as opposed to medium-sized boards. We measure board size (BD_SIZE) by the number of directors on the board including the chairperson.

CEO Influence

We believe that IPO firms facing economic turbulence are better served by a strong and independent board. Board independence defined as the percentage on non-executive directors serving on the board is taken to represent "Board Power". Ostensibly, the extent to which a strong and independent board is able to implement its monitoring, advising, and resource provision roles effectively depends on the power held by the firm's CEO. We think that if the CEO and Board are equally powerful then the IPO firm's best interests are ill-served especially during tumultuous economic circumstances. There is near consensus among financial economists regarding the leadership structure of the board. The view is that the same person should not simultaneously hold the positions of CEO and chairperson of the board. Dual leadership structure or CEO duality exists when a firm's CEO also serves as a chairperson of the board of directors.

A minority posit the notion that a combined CEO chairperson structure provides a "focal point" for leadership and precludes ambiguity regarding responsibility. However, the unifying power provided by duality of the leadership structure may be less beneficial when an IPO firm faces a period of decline prior to bankruptcy. Thus CEO power could be measured by the existence of duality in the leadership structure. We measure CEO power

by the dummy variable CM_DUAL which takes the value of one if chairperson and CEO are different persons.

Chairperson Independence

The chairperson is responsible for leading the board, for efficient organization and the conduct of the board's function, and for briefing the directors in relation to issues arising at board meetings (ASX, March 2003). The board of directors is an economic institution that may help to reduce agency problems between managers and shareholders. The board provides management with contractual incentives and ensure the contracts are fulfilled by management (Audretsch and Lehmann, 2004). Of particular interest during times of financial decline is the resource provision role of the board. We therefore posit that a non-executive chairperson increases the survival likelihood of IPO firms.

The evidence on the effect of CEO duality on corporate performance is mixed (Arthur et al., 1993; Pi and Timme, 1993). While some studies e.g. Jensen (1993), Rechner and Dalton (1991) and Daily and Dalton (1994b) argued that boards in which the chairperson and CEO are same person leads to ineffective boards, Elsayed (2007) found that CEO duality has no impact on corporate performance. However, CEO duality attracts a positive and significant coefficient only when corporate performance is low.

Furthermore, Brickley, Coles and Jarrell (1997) claimed that proponents of the dual leadership structure base their arguments on a mix of anecdotal evidence and an intuitive appeal to common sense. They suggested that there are both costs and benefits to a dual leadership structure. This structure may create a potential for rivalry between the CEO and the chairperson, making it difficult to pinpoint blame for poor performance[3].

Therefore, we test the proposition that a board led by an independent leader will better ensure the survival of the IPO firm during declining economic circumstances. We signify leadership independence by the variable CM_NEXC if the chairperson is a non-executive director as stated in the IPO prospectus.

Board Independence

Conventional wisdom suggests that a greater level of board independence allows for more effective monitoring and improves firm performance. Companies in which firm-specific knowledge of insiders is more important will benefit from greater representation of insiders on the board (Coles, Daniel, and Naveen, 2008). In the words of Bhagat and Black (2001) "inside and affiliated directors play valuable roles that may be lost in the single-minded pursuit for greater board independence". McConnell (2002) likewise urges caution in forcing conformity to a single model of board structure. New economy firms are characterised by considerable firm-specific knowledge resident in the insiders. Thus it remains an empirical issue as to whether higher board independence is necessarily beneficial to new economy firms.

While the importance of board independence has been generally acknowledged, there is no common consensus regarding the definition of 'independence' (Brennan and

[3] In Australia, Recommendation 2.3 of the Principle of Good Corporate Governance and Best Practice advocates the separation of the positions of CEO and chairperson.

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). For the purpose of this study, all non-executive directors are classified as 'independent directors' following Lamberto and Rath (2008). We measure board independence (BD_INDP) as the percentage of independent directors as listed in the IPO prospectus.

Ownership Concentration

The tenets of agency theory, suggests that a firm is more likely to survive if ownership concentration is high. 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). Prior evidence on this issue is mixed. Woo, Jeffrey and Lange (1995) found that low ownership concentration is related to corporate longevity and argued that their result is inconsistent with agency theory which linked firm performance to higher levels of owner retention. Kang, Cheng and Gray (2007) also found that ownership concentration is significantly negatively associated with an independent board of directors. This may imply that lower ownership concentration leads to a higher probability of firm survival. However, Demsetz and Lehn (1985) found that corporate ownership concentration is not related to accounting profitability.

Based on theoretical arguments we predict that firms with higher ownership concentration should have positive impact on firm survival. In this study, ownership concentration is measured by the proportion of common stock held by the top 20 shareholders (TOP20). This measurement is consistent with the studies discussed above.

2.2 Offering Characteristics

Existing literature employed offering characteristics of IPOs in examining IPOs post listing performance (Bhabra and Pettway, 2003), explaining initial return, long run return and the relationship between initial and seasoned offerings (Murgulov, 2006). This study uses offering characteristics data for investigating new economy Australian IPOs company survival. The variables details are follows.

Offer Price: Ho et al.(2001) indicated that IPOs are typically underpriced, that is, an investor who purchases new issues at the offering price can, on average, make relatively large returns. To compensate investors for the greater uncertainty, higher risk IPOs have higher initial returns. Therefore, IPOs with a higher ex ante uncertainty are more underpriced than those with lower ex ante uncertainty. This hypothesis is consistent with Lamberto and Rath (2008). Thus, we expect a positive relationship between offer price and IPOs survival. Offer price is measured by the price (OF_PRICE) listed in the prospectus or the mid-point of the price range.

Offer Size: 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) and good prospects (Jain and Kini, 2000). Ritter (1991) suggested that smaller offers tend to have the worst aftermarket performance. Furthermore, previous studies of American IPOs e.g. Hensler, Rutherford and Springer (1997) and Jain and Kini (1999) found that the size of offering is positively related to firm survival**.** Offer size (OF_SIZE) is measured by the amount listed on the prospectus or the minimum subscription amount.

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

Retained Ownership: Leland and Pyle (1977) argued that firm owners can signal quality in equity markets by retaining equity. Consistent with signal theory, a high percentage of insider ownership retention at IPOs serves as a certification that managerial decisions will coincide with the outside shareholder's interest, which results in less agency costs and better firm performance after the offering (Jensen and Meckling, 1976).

However, the empirical results are mixed. While Hensler, Rutherford and Springer (1997) suggested that IPOs firm with higher percentage of retained ownership have a longer survival period, Lamberto and Rath (2008) found that ownership retention is not significantly related to IPOs firm survival. We expect that the percentage of stock retained by pre-IPO shareholders (RETAIN) is positively related to IPOs company survival.

Underwriter Backing: It is in the best interest of the underwriter to endorse companies with sound prospects and it is a fact that most underwriters invest in the offers they underwrite (Lamberto and Rath, 2008). Therefore, it is expected that companies with underwriter backing should be more likely to survive than those without. Underwriter backing is measured as a dummy variable (BACK) that takes the value one if the IPO was backed by an underwriter.

Auditor Reputation: Auditor reputation (BIG5) is included as indicator variables 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). Extant literature suggests that reputable auditors tend to lessen the amount of underpricing achieved by an IPO candidate since they are construed as providing a signal of the quality of information to potential investors (How and Yeo, 2000).

Therefore, we expect that companies with an auditor from one of the Big 5 companies should have a higher likelihood of survival than those with an auditor from a smaller auditor firms.

Risk: Risk can be proxied directly using the number of risk factors listed in the prospectus (Bhabra and Pettway, 2003). Assuming full disclosure, the number of risk factors listed in the prospectus should be negatively related to survival (Lamberto and Rath, 2008). Firms with more risk factors listed in the prospectus suggest a riskier firm and hence an increased

likelihood of failure. The informational value of the number of risk factors was found to be significant negatively related to the likelihood of survival of American IPOs by Hensler, Rutherford and Springer (1997) and Bhabra and Pettway (2003). We expect that the number of risk factors listed in the prospectus is negatively related to the survival likelihood of IPOs (NUM_RISK).

2.3 Financial Ratios and Company Specific Variables

Four categories of financial ratios are used in this study. The details are as follows.

Liquidity Ratio: The liquidity ratios measure a firm's ability to meet its current obligations as they become due. Liquidity ratios also have been used to measure short term solvency. Higher levels of liquidity provide a strong barrier against financial failure. In this study, the current ratio (CUR) is a measure of a firm's liquidity.

Profitability Ratio: It is expected that companies with a high profitability ratio will have more likelihood of survival. This study utilizes return on asset (ROA) as a measure of profitability ratio. The profitability ratios measure the firm's ability to generate earnings. Many firms face financial distress when their earning is negative. Therefore profit is often used as a predictor of financial distress events.

Leverage Ratio: Financial risk show the firm's ability to find the sources of external funds provided for in the benefit of their shareholder. 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. Debt ratio (DET) is used as a measure of leverage in this study.

Activity Ratio: The activity ratios measure the efficiency of a firm's asset utilization. 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 use the following company specific characteristics in the analysis:

Company Size: Prior literature has presented that firm survival is negatively correlated with firm size. The rationale for this relationship is that larger firms have more ability to avoid financial distress by using public equity markets (Goktan, Kieschnick and Moussawi, 2006). Schultz (1993) found an inverse relationship between the probability of delisting and firm size. Smaller firms have a higher probability of delisting and larger firms have a higher probability of survival. Therefore, it is expected that larger IPOs firms will survive longer than smaller ones. We measure company size as natural logarithm of total assets of the firm (C_SIZE).

IPO_9900: To examine the effect of IPO timing, a dummy variable is used indicating whether a company has issued stock between 1999 and April 2000. The definition of a variable is adapted from and 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 come bubble' (Ho et al., 2001).

Venture capital-backed IPOs: Barry et al. (1990) and Megginson and Weiss (1991), posit that VC-backing certifies the quality of the IPO. Their empirical evidence shows less

underpricing for VC-backed firms as compared to non-VC-backed firms. Gompers (1995) in his study of venture capitalists shows that they 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. Venture Capitalists can be an additional source of resource and advice during periods of economic duress faced by newly public firms.

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

3. Data and Methodology

3.1 Data and Sample

In this study, a new economy company is defined as an entity with business activities in any high technology production or service. In particular, IPOs in four industry sectors based on GICS[2] include information technology; media[3]; telecommunication services and health care are examined. This definition of new economy company is consistent with Murgulov (2006).

The new economy IPOs companies listed in Australia between 1994 and 2002 are included in estimating Cox proportional hazards model. 2002 is chosen as the cut off year because it allows five years of post-listing accounting information at the time of data collection. 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). Correspondingly, 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.

3.2 Methodology

[2] GICS 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).

[3] According to GICS, media is an industry group rather than an industry sector. It belongs to the consumer discretionary industry sector.

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 e.g. Kauffman and Wang (2001), Cockburn and Wagner (2007), Kauffman and Wang (2007) and Lamberto and Rath (2008). 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).

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. 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.

Survival analysis consists of two key functions called the survivor function and the hazard function. The survival function, *S(t)*, gives the probability that the time until the firm experiences the event, *T*, is greater than a given time *t*. Given that *T* is a random variable which defines the event time for some particular observation, then the survival function is defined as.

$$S(t) = \Pr(T > t) \tag{1}$$

The hazard function defines the instantaneous risk of an event occurring at time *t* given the firm survives to time *t*. The hazard function is also known as the 'hazard rate' because it can be represented as the number of events per interval of time. The hazard function is defined as:

$$h(t) = \lim_{\Delta t \to 0} \frac{\Pr(t \le T < t + \Delta t | X, T \ge t)}{\Delta t} \tag{2}$$

The most widely used Cox proportional hazards (PH) model is a semi-parametric model for survival analysis. In the Cox (1972) study, there are two significant innovations including the proportional hazards model and maximum partial likelihood. The proportional hazards model is represented as

$$h_i(t) = h_0(t)\exp(X_i\beta) \tag{3}$$

where $h_0(t)$ is an arbitrary unspecified baseline hazard rate which measures the effect of time on the hazard rate for an individual whose covariates all have values of zero. X represents the vector of covariates that influences the hazard and β is the vector of their coefficients.

Equivalently, the regression model is written as

$$\log h_i(t) = \alpha(t) + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_k X_{ik} \tag{4}$$

where $\alpha(t) = \log h_0(t)$ and $h_0(t)$ is an arbitrary unspecified baseline hazard rate (LeClere, 2000).

The model does not require the particular probability distribution specification of the survival times, but it possesses the property that different individuals have hazard functions that are proportional, i.e.

$$\frac{h_i(t)}{h_j(t)} = \exp[\beta_1(X_{i1} - X_{j1}) + \beta_2(X_{i2} - X_{j2}) + \ldots + \beta_k(X_{ik} - X_{jk})] \quad (5)$$

The ratio of the hazard functions for two individuals does not vary with time *t*. These special properties make the Cox's PH model robust and popular amongst researchers.

To estimate the coefficients of β, Cox (1972) proposes a partial likelihood function based on a conditional probability of failure by assuming that there are no tied values in the survival times. The function was later modified to handle ties (Efron, 1977). In this study, we use SAS PROC PHREG to conduct the estimation.

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. 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 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)).

Under competing risks model, inference is based on the cause-specific hazard rates. The Cox proportional hazards model describes the regression relationship between the cause-specific hazard rates corresponding to the competing causes of failure and various explanatory variables. The model postulates that the logarithm of the cause-specific hazard function is a linear function of the covariates,

$$h_{ri}(t) = h_{r0}(t)\exp(X_{ri(t)}\beta_r) \quad (7)$$

where $r = 1, \ldots k$ are the k competing states of financial distress, h_{r0} are the baseline hazard functions corresponding to the *r-th* state of financial distress, $X_{ri(t)}$ is the vector of covariates and β_r are the vectors of coefficients corresponding to the *r-th* state of financial distress. This is a flexible regression framework for the study of the impact of various covariates on the hazards of failure due to competing causes, as well as differences in the way different cause-specific hazards vary with changes in the explanatory variables.

We estimate the competing risks of three-state financial distress model, namely, active companies, distressed external administration companies and takeover, merger or acquisition companies using competing risks model. Two separate Cox proportional hazards models are estimated for the competing risks where other states of financial distress are considered as censored observations.

4. Empirical Results

4.1 Descriptive Statistics

Table 3 presents descriptive statistics of the data employed in the study stratified by company status. We portray three subsamples based on the trading status – active, delisted due to takeovers and acquisitions, delisted due to other reasons. 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 Kruskal-Wallis 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, OF_PRICE, BACK, C_SIZE and VC-BACKED display significant differences across the subsamples.

According to Table 4, the mean number of directors for both survivor and non-survivors new economy IPOs companies is five, which is consistent with Lamberto and Rath (2008) and Rosa, Izan and Lin (2004). Both studies 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 percentage of non-executive directors on the board were 53.41 and 61.96 for active and non-survivor IPOs companies, respectively. This figure implies that the majority of directors in the new economy Australian IPOs company board are independent directors. In addition, 64.42 and 69.59 percent of active and non-survivor new economy IPO companies, respectively, have a non-executive chairman, and 85.51 and 84.80 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 IPOs 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, 73.98 and 90.06 percent of the offerings by active and non-survivor companies are underwritten while 53.16 and 70.18 percent of the offerings by active and non-survivor companies have an auditor from the one of the Big 5 accounting firms. On average, the number of risk factors identified in the prospectus were 13 and 14 for active and non-survivor companies, respectively. The means of retained ownership by pre-IPOs owners were 62.16 and 70.48 percent for active and non-survivor IPOs 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 39.52 and 35.67 percent of active and non-survivor IPOs companies are listed during the period 1999 to April 2000.

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 DET indicates that the long term liability paying ability of non-survivor companies is less 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 Kruskal-Wallis test 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 Kruskal-Wallis test shows that, on average, the size of active and non-survivor new economy IPOs companies in our sample are statistically significantly different at the 10 percent level. Finally, the survivor and non-survivor samples significantly differ with respect to the percentage of firms backed by venture capitalists. 10.97% of survivors are backed by venture capitalists while 30.99% 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.

4.2 Cox Proportional Hazards Model Estimation Results

We employ the Cox proportional hazards model to investigate the influence of corporate governance variables on the survival 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.[4]

Table 5 presents 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 variables in order to conserve space. Our estimations include all available variables.[5] 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. Our results indicate that board size has a positive

[4] 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. The results reported in the table shows only significant covariates.

[5] Complete results are available upon request.

estimated coefficient. The square of board size has a negative coefficient. It appears that the benefits of board size decrease at an increasing rate. This result suggests small size board and to a lesser extend 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)

Taken together, this implies that firms with small boards and very large boards more likely to survive than firms with moderate size boards. This finding is visually portrayed in Figure 1. It is seen that firms with small and large board sizes are more likely to survive as compared to firms with moderate-sized boards. Board independence exhibits a negative coefficient indicating that independence has a beneficial effect on firm survival. We do observe a non-linearity in the relationship between board independence and likelihood of survival. It appears that the benefits of board independence increases at a decreasing rate. This U-shaped pattern of board independence suggests that there exists an optimal level of board independence - somewhere in the middle neither too less nor too much. The other corporate governance variables such as CM_NEXC and CM_DUAL do not significantly alter the IPO firms' chance of survival.

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. This result is contradictory to our expectations and inconsistent with the literature on venture capital-backed IPOs. Venture capital firms provide valuable certification and access to resources which should be valuable to VC-backed firms in times of distress as compared to companies without such backing. Our results resonate with that of Rosa, Velayuthen and Walter (2003) who do not find significant differences in the initial underpricing and long-run share performance between venture capital-backed and non-VC-backed Australian IPOs. It appears that mere backing by venture capitalists does not guarantee a high quality issue. An alternate explanation for the counterintuitive impact of the VC-backed variable is that firms with risky projects seek the backing of venture capitalists. Our results then imply that firms with risky projects seeking venture capital backing have lower probability of survival.[6]

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. This counterintuitive result may be explained by the possibility that risky firms seek underwriter backing.

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. 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.

For C_SIZE, the estimated coefficient is 0.6775 and the hazard ratio is 1.969. The positive sign of 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

[6] We tried to use alternate measures to risk to explicitly capture the effect of risky projects. These attempts were not fruitful. VC_BACKED continued to be significant regardless of risk measures used.

agency theory as outlined in section 2.1. Our findings however contradict the results of Lamberto and Rath (2008).

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. 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.

Two of the three recommendations of ASX Corporate Governance Code do not help in mitigating the risk of corporate failure. These are: a) the chairperson should be an independent director (Recommendation 2.2) and b) the roles of chairperson and chief executive officer should not be exercised by the same individual (Recommendation 2.3).

4.3 Robustness Checks

We conduct two sets of robustness checks. These are based on alternate methods of classifying survivors and non-survivors. 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 competing risks model. Second, we estimate the Cox proportional hazards model excluding firms with good performance which were taken over.

We report our results from applying competing risks Cox proportional hazards model in Table 6. In Panel A of Table 6, we provide estimation results for the subsample of firms delisted due to financial distress. As in the whole sample, board size, board independence VC-BACKED and C_SIZE are statistically significant. In addition, age of the company (OF_AGE), and IPO_9900 are 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 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 (BD_INDP), proportion of ownership held by top 20 shareholders (TOP20) and leverage have statistically significant influence on the likelihood of survival. Both BD_INDP and TOP20 reduce the likelihood of delisting while leverage exacerbates the odds. Our result with respect to TOP20 is inconsistent with the findings of Woo, Jeffrey and Lange (1995) who suggested that low ownership concentration is related to corporate longevity. Our results incorporate potential non-linearity in the governance and ownership structure variables.

Our results indicate that the ownership concentration is positively related to new economy IPO firms' survival. This is consistent with the tenets of agency theory which suggests that a firm is more likely to survive if ownership concentration is high. 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).

In Table 7, we report results of the Cox proportional hazards model excluding firms which had good performance and were taken over. Ostensibly, the firms were acquired not because of distress and are therefore classified as survivors. We confirm the

significance of board size, the square of board size, board independence, the square of board independence, VC_BACKED and DET. OF_SIZE and BACK drop out (as compared to the full sample) while TOP20SQ and IPO_9900 become significant.

Overall, our results indicate that board independence plays a significant role in affecting the survival likelihood regardless of the method of classification of survivors. Board size, IPO_9900 and VC_BACKED are only significant when we consider firms delisted due to financial distress as non-survivors. Ownership concentration (Top20, Top20SQ) is significant only when takeover firms are considered as non-survivors. Excluding firms with good performance which were taken over from our group of non-survivors produces results that are qualitatively similar to our subsample of delisted for financial distress firms.

5. Discussion and Conclusion

Our study explores the relationship between corporate governance attributes and the survival likelihood of new economy Australian IPO firms utilising the Cox proportional hazards model. We focus our attention on three main areas of corporate governance deemed to be most important by regulators and other market participants. These corporate governance mechanisms include 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.

We find that firms with either smaller or larger board size have a higher probability of survival than firms with moderate-size boards. Also, more independent boards are associated with a higher chance of survival. However, other recommendations such as a) chairperson should be an independent director and b) the roles of chairperson and chief executive officer should not be exercised by the same individual have no impact on the survival of new economy IPOs.

Conventional wisdom that "smart money" is associated with superior performance does not seem to hold here. In the aftermath of the internet shakeout, sophisticated investors were as clueless as naïve investors. This is also shown by the weak evidence indicating that VC-backing is associated with higher likelihood of failure. In fact, "dumb" investors seem to have done better than their smart counterparts.

Our results also suggest that new economy IPO companies with small company size and low leverage are more likely to survive. The finding that low leverage is associated with greater survival likelihood is consistent with conventional wisdom. A possible explanation for the impact of size is that large companies are more complex and inflexible and therefore more prone to failure under turbulent situations than small firms ceteris paribus.

Further analysis on the characteristics of boards including information on the experience of directors in the particular industry sector, the number of meetings held by the boards, and board remuneration are likely to be fruitful. It is also possible that human capital attributes of the board and senior executives play a role in the survival of new economy firms. More research on this key issue is likely to enhance our knowledge of the factors influencing corporate survival.

References

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 Rosthoj, S. 2002, 'Competing risks as a multi-state model', *Statistical Methods in Medical Research*, 11(2), 203.

Arthur, N., Garvey, G., Swan, P. and Taylor, S. 1993, 'Agency theory and "management research": A comment', *Australian Journal of Management*, 18(1), 93-102.

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.

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. 2001, 'The non-correlation between board independence and long term firm performance', *Journal of Corporation Law*, 27, 231-274.

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.

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.

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.

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. 2009, When are outside directors effective?, Working Paper, Marshall School of Business, University of Southern California, Los Angeles.

Efron, B. 1977, 'The efficiency of Cox's likelihood function for censored data', *Journal of the American Statistical Association*, 72(359), 557-565.

Elsayed, K. 2007, 'Does CEO duality really affect corporate performance?' *Corporate Governance: An International Review*, 15(6), 1203-1214.

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.

Goktan, M. S., Kieschnick, R. and Moussawi, R. 2006, *Corporate governance and corporate survival*, Working Paper, University of Texas at Dallas.

Gompers, P. A. 1995, 'Optimal investment, monitoring, and the staging of venture capital', *Journal of Finance*, 50(5), 1461-1489.

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.

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. 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.

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. 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, S., Boone, P., Breach, A. and Friedman, E. 2000, 'Corporate governance in the Asian financial crisis', *Journal of Financial Economics*, 58(1-2), 141-186.

Johnston, J. and Madura, J. 2002, 'The performance of internet firms following their initial public offering', *Financial Review*, 37(4), 525-550.

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 baysian survival analysis*, Working Paper, Carlson School of Management, University of Minnesota.

Lamberto, A. P. and Rath, S. 2008, *The survival of initial public offerings in Australia*, Working Paper, Curtin University of Technology.

LeClere, M. J. 2000, 'The occurrence and timing of events: Survival analysis applied to the study of financial distress', *Journal of Accounting Literature*, 19, 158-189.

LeClere, M. J. 2005, 'Time-dependent and time-invariant covariates within a proportional hazards model: A financial distress application', *Review of Accounting and Finance*, 4(4), 91-109.

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.

Leland, H. E. and Pyle, D. H. 1977, 'Informational asymmetries, financial structure, and financial intermediation', *Journal of Finance*, 32(2), 371-387.

Levis, M. 1993, 'The long-run performance of initial public offerings: The UK experience 1980-1988', *Financial Management*, 22(1), 28-41.

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.

Luoma, M. and Laitinen, E. 1991, 'Survival analysis as a tool for company failure prediction', *Omega*, 19(6), 673-678.

McConnell, J. 2002, 'Outside directors', Keynote Address to Annual Meeting of Eastern Financial Association.

Megginson, W. L. and Weiss, K. A. 1991, 'Venture capitalist certification in initial public offerings', *Journal of finance*, 46(3), 879-903.

Murgulov, Z. 2006, 'New economy initial and seasoned equity offers in Australia', PhD thesis, Department of Accounting, Finance and Economics, Griffith Business School, Griffith University.

Pi, L. and Timme, S. G. 1993, 'Corporate control and bank efficiency', *Journal of Banking & Finance*, 17(2-3), 515-530.

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.

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', *The 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.

Rommer, A. D. 2004, *Firms in financial distress: An exploratory analysis*, Working paper no. 17, Danmarks Nationalbank and Centre for Applied Microeconometrics (CAM), Institute of Economics, University of Copenhagen, Copenhagen, Denmark.

Rosa, R. d. S., Izan, H. Y. and Lin, M. 2004, 'Board characteristics of Australian IPOs: An analysis in light of the ASX best practice recommendations', *Australian Accounting Review*, 14(1), 25-32.

Rosa, R. d. S., Velayuthen, G. and Walter, T. 2003, 'The sharemarket performance of Australian venture capital-backed and non-venture capital-backed IPOs', *Pacific-Basin Finance Journal*, 11, 197–218.

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.

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.

Standard and Poor's 2002, *Understanding GICS*, New York.

Van der Goot, T., Van Giersbergen, N. and Botman, M. 2008, 'What determines the survival of internet IPOs?' *Applied Economics*, 99999(1), 1 - 15.

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.

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.

Table 1: The variables used in the study

Variable Code	Variable Name	Definition of Variable
	Corporate Governance Attributes:	
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.
	Offering Characteristics:	
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.
	Financial Ratios:	
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.
	Company-Specific Variables:	
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	5.1885	53.4149	0.6442	0.8551	65.9798	0.8857	32.9512	5.7981	62.1626	0.7398	0.5316	12.7173
Median	5.0000	60.0000	1.0000	1.0000	70.0000	0.5000	8.0000	3.0493	70.0000	1.0000	1.0000	12.0000
Min	3.0000	0.0000	0.0000	0.0000	14.4000	0.2000	1.5000	0.0027	0.0000	0.0000	0.0000	0.0000
Max	10.0000	83.0000	1.0000	1.0000	94.1400	4.6000	421.0940	38.4603	96.3400	1.0000	1.0000	31.0000
Std Dev.	1.3198	19.5939	0.4791	0.3522	18.6702	0.8525	73.9985	7.1613	23.6733	0.4391	0.4994	5.3226
Skewness	0.6119	-0.6757	-0.6035	-2.0223	-0.8569	2.4452	3.7922	1.9579	-1.1423	-1.0955	-0.1271	0.8013
Kurtosis	0.9508	-0.1034	-1.6404	2.0955	0.0362	7.2115	14.4321	4.7397	0.6540	-0.8022	-1.9894	2.0205
Non-Survivor IPOs (n=32)												
Mean	5.1345	61.9591	0.6959	0.8480	76.7651	0.9282	135.0988	6.2423	70.4801	0.9006	0.7018	14.2456
Median	5.0000	67.0000	1.0000	1.0000	78.4100	1.0000	12.0000	4.5068	74.3400	1.0000	1.0000	13.0000
Min	3.0000	0.0000	0.0000	0.0000	19.9900	0.2000	1.0000	0.0082	0.0000	0.0000	0.0000	7.0000
Max	9.0000	89.0000	1.0000	1.0000	98.2800	2.0000	6652.7300	18.8301	99.5200	1.0000	1.0000	25.0000
Std Dev.	1.1270	20.0849	0.4614	0.3601	14.5248	0.4959	873.7467	5.4964	20.0611	0.3001	0.4588	3.7555
Skewness	0.8544	-0.8914	-0.8593	-1.9553	-0.6455	0.2855	7.4087	0.5869	-1.0167	-2.7013	-0.8898	0.9136
Kurtosis	1.7554	0.2530	-1.2767	1.8446	0.3556	-0.6623	53.5469	-0.9495	1.2692	5.3595	-1.2226	0.8229
Kruskal-Wallis Test	0.0864	2.5854	0.1069	0.2197	7.2061	3.6893	0.6289	0.2592	0.9395	2.8339	2.2513	1.9929
p-value	0.7688	0.1079	0.7437	0.6393	0.0073	0.0548	0.4277	0.6107	0.3324	0.0923	0.1335	0.1580

	ROA	**CUR**	**TAT**	**DET**	**C_SIZE**	**IPO_9900**	**VC_BACKED**
Survivor IPOs (n=93)							
Mean	-0.2895	7.1661	0.8726	0.4290	7.2674	0.3952	0.1097
Median	-0.0590	2.0000	0.6130	0.3106	7.2258	0.0000	0.0000
Min	-6.0955	0.0200	0.0000	0.0008	5.6139	0.0000	0.0000
Max	0.5770	331.5200	4.8237	4.1984	9.4247	1.0000	1.0000
Std Dev.	0.7464	20.6795	0.9768	0.5321	0.7685	0.4892	0.3127
Skewness	-3.9595	9.1896	1.8291	4.4175	0.5033	0.4296	2.5030
Kurtosis	21.5622	116.2732	3.6165	25.5749	0.3938	-1.8206	4.2771
Non-Survivor IPOs (n=32)							
Mean	-0.3533	7.0450	0.9472	0.5034	7.4054	0.3567	0.3099
Median	-0.0132	1.8100	0.6198	0.3418	7.3498	0.0000	0.0000
Min	-6.0955	0.0200	0.0000	0.0009	5.6139	0.0000	0.0000
Max	0.5770	567.0300	4.8237	4.1984	9.4247	1.0000	1.0000
Std Dev.	1.1682	43.3931	0.9932	0.6012	0.7292	0.4804	0.4638
Skewness	-4.2630	12.7933	1.6825	3.5528	0.1647	0.6035	0.8292
Kurtosis	18.3912	165.9545	3.4190	16.4266	0.3321	-1.6553	-1.3281
Kruskal-Wallis Test	1.0930	0.2092	0.5770	1.4612	3.3274*	0.1226	5.5339**
p-value	0.2958	0.6474	0.4475	0.2267	0.0681	0.7263	0.0187

Note: Descriptive statistics grouped by company status. Kruskal-Wallis test from a non-parametric test of equality of group means.

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. BD_SIZE	1.0000	0.0963a 0.0045b	0.0429 0.2071	0.1587 <.0001	0.0325 0.3399	0.4424 <.0001	0.2563 <.0001	-0.0985 0.0037	-0.0600 0.0772	-0.0771 0.0232	0.1822 <.0001	0.0458 0.1782	0.0619 0.0685	-0.0242 0.4769	-0.0268 0.4306	0.0010 0.9758	0.5231 <.0001	-0.1480 <.0001	0.2093 <.0001
2. BD_INDP		1.0000	0.3712 <.0001	0.2388 <.0001	0.1183 0.0005	-0.0052 0.8796	0.0885 0.0091	0.0032 0.9254	0.0068 0.8412	0.1163 0.0006	0.1582 <.0001	0.1442 <.0001	-0.0916 0.0070	0.0166 0.6246	-0.0330 0.3324	0.0731 0.0315	-0.0903 0.0078	0.0505 0.1373	0.2197 <.0001
3. CM_NEXC			1.0000	0.3377 <.0001	-0.1408 <.0001	0.0102 0.7633	0.0124 0.7152	0.0076 0.8239	-0.0048 0.8867	0.0276 0.4168	-0.1167 0.0006	0.0812 0.0168	-0.0867 0.0106	0.0129 0.7051	-0.0203 0.5499	-0.0455 0.1809	-0.1010 0.0029	0.0570 0.0934	0.0399 0.2409
4. CM_DUAL				1.0000	-0.0251 0.4598	0.0729 0.0319	0.0435 0.2009	-0.1459 <.0001	-0.0394 0.2469	0.1247 0.0002	0.0176 0.6041	0.1236 0.0003	-0.0299 0.3785	-0.1020 0.0026	0.0702 0.0387	0.0615 0.0702	0.0669 0.0491	0.0976 0.0040	0.0307 0.3661
5. TOP20					1.0000	0.1088 0.0013	0.0432 0.2043	0.1583 <.0001	0.3706 <.0001	0.1358 <.0001	-0.0419 0.2180	0.1312 0.0001	0.0443 0.1926	-0.0557 0.1014	0.1000 0.0032	0.0853 0.0119	0.0670 0.0486	-0.1980 <.0001	0.1094 0.0013
6. OF_PRICE						1.0000	0.1783 <.0001	-0.0362 0.2876	-0.0333 0.3272	-0.1723 <.0001	0.0865 0.0109	0.0283 0.4051	0.1535 <.0001	-0.0890 0.0088	0.0563 0.0975	0.0762 0.0249	0.5383 <.0001	-0.0180 0.5961	0.0546 0.1079
7. OF_SIZE							1.0000	-0.0071 0.8345	-0.1988 <.0001	-0.1514 <.0001	0.0643 0.0583	0.0096 0.7770	0.0444 0.1916	-0.0241 0.4791	0.0503 0.1391	0.0940 0.0056	0.2419 <.0001	-0.0421 0.2162	0.1325 <.0001
8. OF_AGE								1.0000	0.0911 0.0073	0.1495 <.0001	-0.0233 0.4940	-0.1595 <.0001	0.1297 0.0001	-0.1108 0.0011	0.1074 0.0015	0.0189 0.5782	0.0372 0.2735	0.0476 0.1617	-0.0162 0.6335
9. RETAIN									1.0000	0.1618 <.0001	0.0048 0.8887	0.2329 <.0001	-0.0817 0.0162	-0.1110 0.0011	0.0135 0.6913	0.0590 0.0824	-0.0997 0.0033	-0.0969 0.0043	0.0314 0.3558
10. BACK										1.0000	0.0187 0.5824	-0.1205 0.0004	0.0191 0.5738	-0.0500 0.1411	0.1732 <.0001	0.0811 0.0169	-0.0440 0.1954	0.0382 0.2609	0.0192 0.5722
11. BIG5											1.0000	0.0849 0.0124	0.0099 0.7701	-0.0180 0.5967	-0.1167 0.0006	0.0485 0.1534	0.1319 <.0001	0.0184 0.5883	0.1807 <.0001
12. NUM_RISK												1.0000	-0.0497 0.1434	-0.0173 0.6104	0.0060 0.8594	0.0367 0.2806	-0.0012 0.9730	0.0817 0.0161	0.1522 <.0001
13. ROA													1.0000	0.0439 0.1968	-0.0169 0.6197	-0.4827 <.0001	0.4687 <.0001	-0.0019 0.9555	-0.0148 0.6635
14. CUR														1.0000	-0.1489 <.0001	-0.1628 <.0001	-0.0813 0.0166	-0.0499 0.1423	-0.0388 0.2544
15. TAT															1.0000	0.4004 <.0001	0.0235 0.4898	0.0778 0.0221	-0.0621 0.0675
16. DET																1.0000	-0.1540 <.0001	0.0562 0.0984	-0.0236 0.4872
17. C_SIZE																	1.0000	-0.0829 0.0146	0.1044 0.0021
18. IPO_9900																		1.0000	-0.0825 0.0151
19. VC_BACKED																			1.0000

Note: a. Pearson correlation coefficients.

b. The p-value under the null hypothesis of zero correlation.

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

Covariate	Coefficient	Standard Error	χ^2 Statistic	*p*-Value	Hazard Ratio
BD_SIZE	2.5797*	1.5266	2.8553	0.0911	13.193
BD_SIZESQ	-0.2533*	0.1402	3.2657	0.0707	0.776
BD_INDP	-0.1085**	0.0441	6.0509	0.0139	0.897
BD_INDPSQ	0.0011**	0.0004	5.9019	0.0151	1.001
OF_SIZE	0.0007*	0.0004	3.8011	0.0512	1.001
BACK	1.2122*	0.6805	3.1729	0.0749	3.361
VC_BACKED	0.9123*	0.4977	3.3600	0.0668	2.490
DET	0.6747*	0.3479	3.7608	0.0525	1.963
C_SIZE	0.6775*	0.3564	3.6132	0.0573	1.969

*Note: *Significant at a 10 percent level.*
*** Significant at a 5 percent level.*

Table 6: Competing Risks Model of the Subsamples

Panel A: Subsample of Delisted Firms Due to Financial Distress

Covariate	Coefficient	Standard Error	χ^2 Statistic	*p*-Value	Hazard Ratio
BD_SIZE	6.2172*	3.5180	3.1232	0.0772	501.287
BD_SIZESQ	-0.6141*	0.3489	3.0992	0.0783	0.541
BD_INDP	-0.1737**	0.0681	6.5147	0.0107	0.841
BD_INDPSQ	0.0016**	0.0007	5.8388	0.0157	1.002
OF_AGE	-0.1088*	0.0571	3.6367	0.0565	0.897
IPO_9900	2.2493**	0.8102	7.7069	0.0055	9.481
VC_BACKED	1.4436*	0.8045	3.2197	0.0728	4.236
C_SIZE	1.1379**	0.5106	4.9663	0.0258	3.120

*Note: *Significant at a 10 percent level.*
*** Significant at a 5 percent level.*

Panel B: Subsample of Delisted Firms Due to Takeovers and Acquisitions

Covariate	Coefficient	Standard Error	χ^2 Statistic	*p*-Value	Hazard Ratio
BD_INDP	-0.1224*	0.0724	2.8543	0.0911	0.885
BD_INDPSQ	0.0013*	0.0007	3.1555	0.0757	1.001
TOP20	-0.2368**	0.1090	4.7222	0.0298	0.789
TOP20SQ	0.0021*	0.0009	5.543	0.0186	1.002
DET	0.9151*	0.5242	3.0472	0.0809	2.497

*Note: *Significant at a 10 percent level.*
*** Significant at a 5 percent level.*

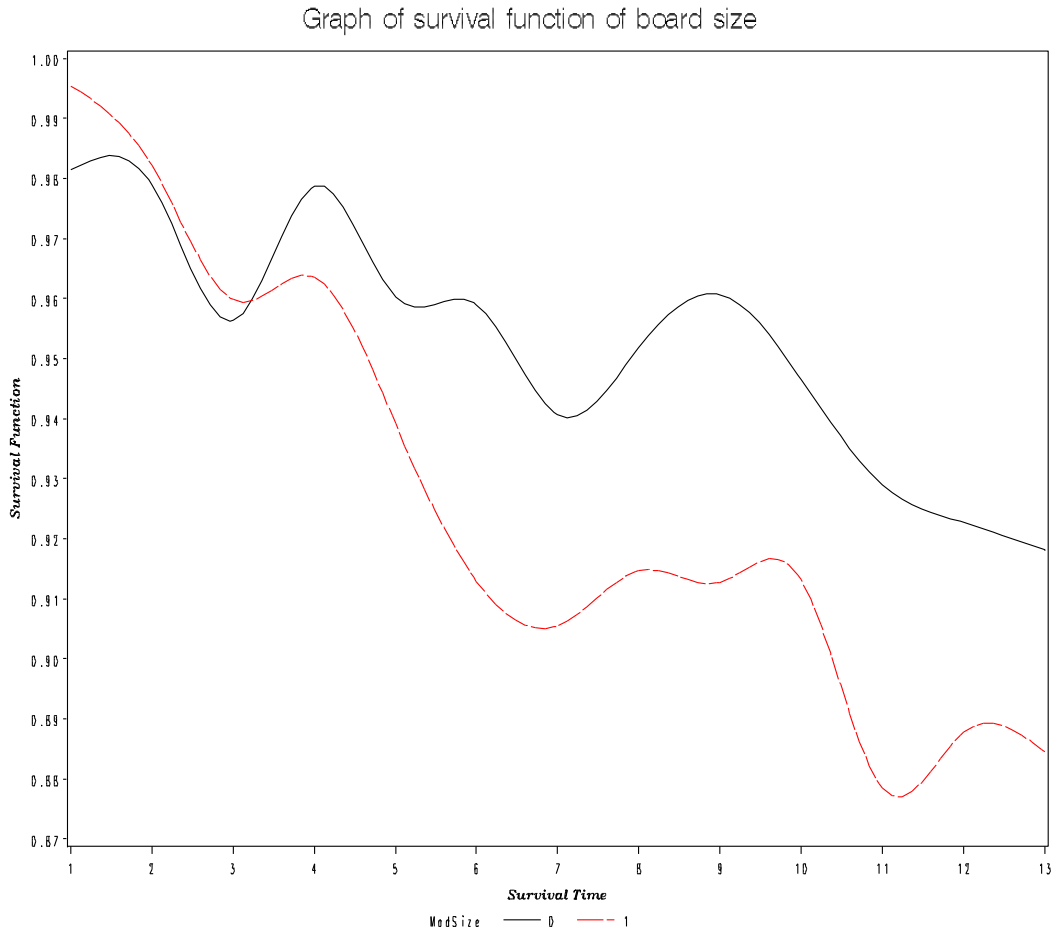
Table 7: Multivariate Cox Proportional Hazards Model Excluding Good Performance Takeover Firms

N=24

Covariate	Coefficient	Standard Error	χ^2 Statistic	*p*-Value	Hazard Ratio
BD_SIZE	5.0133*	2.8632	3.0657	0.0800	150.395
BD_SIZESQ	-0.4861*	0.2771	3.0765	0.0794	0.615
BD_INDP	-0.1218**	0.0520	5.4902	0.0191	0.885
BD_INDPSQ	0.0011**	0.0005	4.3418	0.0372	1.001
TOP20SQ	0.0012*	0.0007	3.3595	0.0668	1.001
IPO_9900	1.1003*	0.6154	3.1970	0.0738	3.005
VC_BACKED	1.2203*	0.6437	3.5942	0.0580	3.388
DET	0.7497*	0.3971	3.5649	0.0590	2.116

*Note: *Significant at a 10 percent level.*
*** Significant at a 5 percent level.*

Figure 1



Note: ModSIZE = Moderate Board Size;
ModSize = 1 if BD_SIZE is in the range 4-6, Q1 of BD_SIZE = 4 and Q3 = 6, otherwise, ModSize = 0