CORPORATE GOVERNANCE AND CORPORATE FAILURE: EVIDENCE FROM LISTED UK FIRMS

BY

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DEDICATION

To the one I love Ophelia and cherished daughters, Abena and Akosua

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“***As I express our gratitude, I must never forget that the highest appreciation is not to utter words, but to live by them” by John F. Kennedy***

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ABSTRACT

This study is motivated by the numerous reforms to strengthen the efficacy of corporate boards and their oversight committees, in the wake of high profile corporate failures. The empirical question, however, is whether recent proposals would enhance board and their committee effectiveness and in this way, reduce the likelihood of firm's failure. This study examines whether the composition, structure and functions of corporate boards and their interactions are related to the probability of corporate failure. Prior studies employ agency and resource dependency theories in isolation as theoretical lenses. This study, however, employs these aforementioned theories as theoretical lenses and argues that the board control and resource function affects the relationship between corporate board attributes and corporate failure.

This study examines a sample of 358 UK listed firms, consisting of 95 failed firms and 263 non-failed firms during the period 1999-2011. This study also uses a unique hand-collected data set that measures the corporate governance attributes and functions of these 358 firms over a period of five years preceding failure or otherwise, resulting in 1748 firm-years observations.

This study reveals that the probability of failure is lower in firms with large board size, former government officials, independent remuneration committee chairman and greater proportion of outside directors as well as effective audit and remuneration committees. This study also finds that the prospect of corporate failure is higher in firms with less than three independent NEDs on both the audit and nomination committees, without audit committee and where audit committee has no one with financial expertise. The results, however, suggest that the possibility of corporate failure is higher in firms whose boards have a female director and where the nomination committee meets often or where its membership is exclusively preserved for independent NEDs.

On the interaction effects, the results show that frequency of board meetings as well as its interactions with presence of female directors, audit and remuneration committees

effectiveness are positively related to the probability of corporate failure. The results also indicate that a number of interactions between corporate board attributes and functions are unrelated to the likelihood of corporate failure. These include the interactions between board composition measures (i.e. proportion of outside directors, presence of female directors and board size) and the board resource proxy (i.e. former government official). These associations, especially remuneration committee effectiveness, remuneration committee chairman independence, firm size and profitability, are not only statistically and economically significant but also robust to different specifications. Further, the Receiver Operating Curves indicate that the impact of corporate governance measures after controlling for firm size, liquidity, profitability, age, industry effects, and leverage is more profound in two years preceding failure. The implication of this is that corporate governance mechanisms alone are insufficient to rescue the firm on the verge of collapse.

The findings are consistent with the idea that failing firms decline in size, managerial performance, corporate board attributes as well as their board's ability to discharge it's monitoring and resource roles. This study adds to the debate on the impact of corporate governance on corporate failure by developing, analysing and testing a robust UK corporate failure prediction model which is underpinned by a multi-theoretical framework: agency and resource dependency theories. This study also offers several recommendations for policy makers and firm-level corporate governance strategies in the mix of the numerous corporate governance reforms worldwide, this in particular makes this study unique.

CHAPTER ONE
INTRODUCTION AND RESEARCH CONTEXT

1.0 OUTLINE OF THE CHAPTER

This chapter provides an overview of the study. In particular, the drivers, objectives, overall approach and significance of the research are addressed accordingly in the relevant sections. Among others, the present chapter sets the scene for the review of the relevant prior literature in the subsequent chapter. The chapter concludes with the structure of the thesis in section 1.5.

1.1 BACKGROUND OF THE STUDY

Investors and debt holders, due to the presumed loss of their investment in assets, incur significant costs when a firm fails. Evidence suggests that direct costs of corporate failure, for these stakeholders, ranges between 3.1% and 5.3% of firm's value (Warner, 1977; Weiss, 1990). Altman's (1984) findings suggest that indirect costs are more profound (17.5%).

Similarly, the Andersen-Enron debacle suggests that auditors face potential law suit, which may result in its failure, if their opinion is inappropriate on client's going concern (see Charitou, Neophytou and Charalambous, 2004). In sum, the recent high profile financial scandals and failures did not only produce significant losses to stakeholders but also partly accounted for the recent financial crisis. In this regard, there is a near consensus in the literature suggesting that a robust corporate failure prediction model is inevitable, if stakeholders seek to moderate the substantial losses associated with the corporate failure syndrome. It is argued, however, that the role of corporate governance in these unprecedented failures has kept corporate governance and corporate failure in the public eye. Platt and Platt (2012) observe that maintaining a firm's survival is the most critical responsibility of boards. They also contend that the importance of this board mandate is clear in the post 2007-08 financial crisis and in high profile failures worldwide.

Consequently, the press, investors' community and politicians worldwide are calling for corporate governance reforms (Clarke, Ferris, Jayaraman and Lee, 2006; Zaman, Hudaib and Haniffa, 2011) to strengthen the effectiveness of boards and its committees, and in this manner, reduce the likelihood of firm's failure. For this reason, the Sarbanes–Oxley Act (2002) outlines fundamental corporate governance obligations to enhance firm's survival by mitigating the principal-agent conflicts (Zhang, 2007). Cadbury (1992) proposes guidance to address financial aspects of the UK's corporate governance, in response to the collapse of Maxwell Communications. Greenbury (1995) focuses on allocation of responsibility for determining executives' compensation, suggesting that proper accountability is inevitable to prevent the clamour over executives' remuneration that characterised 'The British Gas Case'. In response to the collapse of Barings Bank, Hampel (1998) approves Cadbury and Greenbury, emphasizing that 'Box ticking' is not the answer to prevent misapplication of shareholder fund and/or enhance firm's survival.

Further, the Enron-Andersen fiasco triggers reforms aiming at strengthening the role of non-executive directors (NEDs), and, in this mode, enhanced board monitoring role to prevent the occurrence of the exceptional failures worldwide (Clarke, Ferris, Jayaraman and Lee, 2006). In the UK, for example, reformers advocate board diversity (Tyson, 2003), greater proportion of NEDs on boards (Higgs, 2003) and audit committees (Smith 2003) as mechanisms necessary to enhance board effectiveness and, in turn, promotes legitimacy to access critical resources for firm's survival (Pfeffer and Salancik, 1978). The nomination, audit, and remuneration committees also reduce the likelihood of firm's failure by improving the board composition (Ruigrok, Peck, Tacheva, Greve and Hu, 2006), accountability (e.g. Turley and Zaman, 2007**;** Krishnan and Visvanathan, 2009), and the executive remuneration process (Ezzamel and Watson, 1998; Cotter and Silvester, 2003), respectively.

Prior literature on corporate failure prediction, however, focuses on financial information (e.g. Beaver 1966; Altman 1968; Jones and Hensher, 2004; and Pompe, and Bilderbeek, 2005) but not corporate governance proxies. As Argenti (1976) observes, the corporate failure syndrome becomes financial at the penultimate stage, implying that prior models neglect the question of how the firm got into financial distress in the first place (see Zavgren 1985; Argenti, 1985; Balcaen and Ooghe, 2006).

Another noteworthy feature of the existing literature is the absence of economic theoretical underpinning of financial information (Agarwal and Taffler, 2007). Put differently, prior prediction models focus on statistical significance of variables rather than economic significance (Balcaen and Ooghe, 2006). This means that existing models' predictive variables are sample specific (Becchetti and Sierra, 2003) and fundamentally unstable (Zavgren, 1985). This in part, explains the counter-intuitive signs of prior models' co-efficient (see Keasey, McGuinness and Short, 1990). In turn, these drawbacks limit existing models' robustness (Balcaen and Ooghe, 2006; Agarwal and Taffler, 2007), implying that the critical question of why firms fail is beyond the scope of the numerous existing statistical and financial-based models (Argenti, 1985).

Further, little is known about the effects of the composition and structure of corporate boards on the probability of corporate failure, despite the renewed enthusiasm in issues of corporate governance and corporate failure (Fich and Slezak, 2008; Platt and Platt, 2012). Notable exceptional studies, for example, employ the matched paired technique, resource dependency lens and document significant contribution of large board size (e.g. Chaganti, Mahajan and Sharma 1985; Gales and Kesner, 1994; Platt and Platt, 2012) and director interlocks (e.g. Sheppard, 1994; Platt and Platt, 2012) in enhancing firms' survival. Darrat, Gray and Wu's (2010) study shows that larger boards and greater proportion of inside directors, respectively, reduce complex and technically sophisticated firms' failure. Fich and Slezak's (2008) study also underlines that larger and less independent boards with a lower proportion of outside directors and larger ownership stakes of non-management shareholders are more likely to fail.

Another stream of research employs both agency and resource dependency analytical lenses and show the relevance of board leadership structures, after controlling for firm's financial and size indicators, in reducing the probability of firm's failure (Daily and Dalton 1994a). Platt and Platt's (2012) study extends this line of research and find that failed firms are characterised by lower attributes of board composition and characterises (e.g. Firm CEO age, average age of directors, number of boards held by CEO). On board committees, they find that failed firms exhibit higher gray directors' membership in their audit and remuneration committees. Platt and Platt's (2012) findings suggest that non-failed firms exhibit greater size in the audit and remuneration committees. Platt and Platt's findings, however, are based on comparison of means of a sample of 90 failed and 213 non-failed US quoted firms between the periods, 1998-07.

Overall, prior studies focus on selected features of corporate governance on corporate failure. Further, evidence on the effects of corporate governance on corporate failure in the UK is distinctively lacking. Specifically, there is no study that mirrors Cadbury (1992) and its subsequent amendments in the corporate failure context. In this respect, the findings of prior US studies may not be applicable in the UK, due in part to fundamental difference in Chapter 11 and Insolvency Act (1986), respectively (see Senbet and Wang, 2012). Prior studies (e.g. Daily and Dalton 1994b; 1995; Fich and Slezak 2008) also consider the direct associations between board attributes and corporate failure. The significant implication is that previous studies neglect a comprehensive analysis of the causal relationships between board's composition, structure, functions and their interactions on corporate failure. Simply put, a multi-theoretical approach that considers the interplay between board attribute and functions in the corporate failure context is non-existent. This, in part, contributes to the mixed findings, and, in this way, limits our understanding on the effects of corporate governance on corporate failure. I turn next to the study's motivation.

1.2 MOTIVATION OF THE STUDY

This study is motivated by schemes to strengthen the effectiveness of corporate boards and their committees, in the wake of extraordinary profile corporate failures. For instance, new proposals require board audit (e.g. Sarbanes-Oxley Act, 2002; Smith, 2003) and remuneration (Greenbury, 1995) committees to be entirely independent of top management. These proposals are intended to enhance boards' ability to monitor the CEO, reduce the predominant CEO-shareholder conflict, thereby reducing the likelihood of failure.

In the UK, the Higgs report (2003) requires that at least half of the board, save the chairman, should be independent non-executive directors (NEDs). The assumption of this is that outsider-dominated boards, due to their presumed board capital and independence (Hillman and Dalziel, 2003), are more likely to be effective board monitors (Johnson, Daily, and Ellstrand, 1996) and enhance firm's access to crucial resource (Pfeffer, 1972; Pearce and Zahra, 1991; Fich, 2005), thereby reducing environmental uncertainties (Pfeffer and Salancik,

1978) and the possibility of a firm's failure (Baysinger and Hoskisson 1990). Prior evidence in the US context, however, predates Higgs Report' (2003) recommendations (e.g. Chaganti, Mahajan and Sharma, 1985; Daily and Dalton 1994a; Gales and Kesner, 1994), or is not persuasive enough (see Hillman and Dalziel, 2003; Kumar and Sivaramakrishnan, 2008; Darrat, Gray and Wu, 2010; Chancharat, Krishnamurti, Tian, 2012; Platt and Platt, 2012). In short, studies on the impact of proportion of outside directors on corporate failure in the UK context, to the best of our knowledge are non-existent, despite series of reforms advocating for greater proportion of board seats for outside directors.

Recent board reforms in Europe call for female representation in decision making roles (Singh and Vinnicombe 2003), implying that board composition is taking a legalistic perspective. The UK government, for example, requires FTSE companies to have at least 25 per cent of female directors by 2015 (see Davies, 2011; Sealy and Vinnicombe, 2012). Embedded in board gender diversity reform is that women offer different perspectives to enrich the boardroom dynamics, and in this fashion, enhance firm's value (e.g. Shrader, Blackburn, IIes 1997; Carter, Simkins and Simpson 2003; Erhardt, Werbel and Shrader 2003). This, in turn, reduces the likelihood of firm's failure. Prior studies, however, examine the effects of board gender diversity on firm performance but not survival or otherwise (e.g Campbell and Minguez-Vera, 2008; Carter, D'souza, Simkins, and Simpson, 2010). Put differently, studies on the impact of board gender diversity on corporate failure, to the best of our knowledge are distinctively lacking.

The Code (2003) requires board to be of sufficient and manageable size. Inherent in this proposal is that increasing board size is linked to greater diversity, which enhances the board's ability to secure critical resources and enhance firm's survival (Platt and Platt, 2012; Darrat, Gray and Wu, 2010; Gales and Kesner, 1994; Chaganti, Mahajan and Sharma, 1985). On the contrary, increased board size may inhibit board's ability to discharge their monitoring and strategic roles (Goodstein, Gautam and Boeker, 1994), due in part to due to increased coordination and free-rider issues (Yermack, 1996; Chancharat, Krishnamurti and Tian 2012). The important implication of this is that smaller boards are more likely to be effective decision makers and CEO monitors (Platt and Platt, 2012), and, in this light, enhance the prospects of firm's survival. Research, however, predates the Code (2003) recommendations (e.g. Chaganti, Mahajan and Sharma, 1985; Gales and Kesner, 1994), or examined US firms (see Darrat, Gray and Wu, 2010; Platt and Platt, 2012). Simply put, evidence on the impact of board size on corporate failure in the UK context, to the best of our knowledge is non-existent.

Likewise, Cadbury (1992) requires listed firms to establish a proper, rigourous and clear system for new board candidates. Cadbury (1992) recommends that majority of membership on the nomination committee should be non-executive directors. Higgs (2003) approves Cadbury's (1992) recommendation of the nomination committee, emphasising on its main role and responsibilities. Integral in the nomination committee reforms is that an effective nomination committee is linked to greater board independence, which enhances the board's ability to be effective monitors of the CEO, thereby reducing the agency problem and firm's failure (Platt and Platt, 2012). Little, however, is known about the effects of nomination committee on corporate failure, despite series of nomination committee's guidance in the Anglo-Saxon literature (see Vafeas, 1999b; Ruigrok, Peck, Tacheva, Greve and Hu, 2006).

Cadbury (1992) also requires listed firms to establish a formal and transparent arrangement for considering risk and financial reporting. Smith (2003) validates Cadbury's recommendations on the board risk and audit committee, emphasising on a more prescriptive guidance on its purpose, membership, meetings, remuneration, skills and resources. Implicit in this is that the effectiveness of the board is strengthened by the quality and value of the audit committee. This means that firms can enhance their survival by strengthening the board audit committee (Platt and Platt, 2012). Little, however, is known about the effects of audit committee on corporate failure, despite series of audit committee's guidance in the Anglo-Saxon literature (see Zaman, Hudaib and Haniffa, 2011; Pucheta-Martinez and de Fuentes, 2007).

Similarly, Cadbury (1992) obliges listed firms to establish a formal and transparent arrangement for fixing executive remuneration. Greenbury (1995) and Higgs (2003) corroborate Cadbury's recommendation on the board remuneration committee, emphasising on guidance on its status, membership, meetings and resources. Implicit in the remuneration committee reforms is that an effective remuneration committee can reduce the predominant agency conflict through quality board monitoring and evaluation of the CEO’s performance. This in turn may enhance the prospects of the firm’s survival (Platt and Platt, 2012). Little, however, is known about the impact of remuneration committee on corporate failure, despite the vast amount of remuneration committee’s guidance in the Anglo-Saxon environment (see Conyon, 1997; Conyon and Peck, 1998).

This study attempts to fill the gaps identified above by developing, analysing and testing a robust UK corporate failure prediction model which is underpinned by a multi-theoretical framework: agency and resource dependency theories. Thus, this study invokes Zahra and Pearce’s (1989) notion that the corporate failure context is one of the opportunities for linking the existing corporate governance system theories. However, to date, empirical evidence using these theoretical lenses in the corporate performance or failure context are limited (see Hillman and Dalziel, 2003). Therefore, Scholars (e.g. Mellahi and Wilkinson, 2004) are calling for more research on the interaction of board attributes and roles on corporate failure. This study answers this call by proposing an integrated framework that encapsulates board attributes and functions as well as their interaction effects on corporate failure.

On the interaction effects, the study examines whether the interactions between board attribute measures and monitoring role (as measured by frequency of board meetings or CEO’s performance evaluation) are associated with corporate failure. In this regard, this study contributes to the extant literature on the effects of CEO’s performance evaluation (e.g. Young, Stedham, and Beekon, 2000) and frequency of board meetings (e.g. Vafeas, 1999a) on performance, by extending these measures in the corporate failure context. This study also examines whether corporate failure is related to the interactions between board composition measures and resource role (as measured by board interlock or NEDs interlock or former government official). In this respect, this study includes CEO’s corporate affiliation and government experience in the definitions of board interlock and former government official measures; this has been ignored in the interlocking literature (Vance, 1983; Rivas 2012).

On the direct effects, this study examines whether the composition and structure of corporate boards are related to corporate failure in the UK context, while controlling for financial and firm demographic features. Thus, this study invokes Taffler’s (1984) notion that the UK is a major global economic market, and in this manner, suitable for a successful development of prediction of failure model. Specifically, this study tests the research question using six measures of corporate board attributes: the proportion of outside directors, presence of female directors, board size, nomination committee effectiveness, audit committee effectiveness, and remuneration committee effectiveness. This study uses insolvency petition under the UK Insolvency 1986 as a proxy for corporate failure, because it provides an objective criterion for dating and distinction between our failed and non-failed samples. As well, prior studies (e.g. Platt and Platt, 2012) use nomination, audit and remuneration committee effectiveness' variables in isolation, but in this study constructs nomination, audit and remuneration committee effectiveness indexes that mirror Cadbury (1992), Smith (2003) and Greenbury's (1995) guidance, respectively. I turn next to the research problem of the study.

1.3 THE RESEARCH PROBLEM

An analysis of corporate failure prediction studies (from 1966-2012), shows that, previous studies rarely make reference to specific theory that explain why entities fail, but rather emphasise on the statistical method or financial ratio used (see also Charitou, Neophytou and Charalambous, 2004). Simply put, the lack of any real theory that guides the use of predictive variables remains a serious gap in the corporate finance literature (Balcaen and Ooghe, 2006; Agarwal and Taffler, 2007).

Few researchers use theoretical frameworks to select predictive variables. These theoretical frameworks, however, have been observed by Aziz and Dar's (2006) review as basic (Wilcox, 1971, 1973, 1976; Laitinen and Laitinen, 1998), complex (Santomero and Vinso, 1977; Vinso 1979), or insufficiently concrete (Scapens, Ryan and Fletcher, 1981; Booth, 1983; Blum 1974; Gentry, Newbold and Whitford 1985; Aziz, Emanuel and Lawson, 1988; Huyghebaert, Gaeremynck, Roodhooft, and Van De Gucht, 2000) to answer the practical questions of why businesses fail.

Similarly, the bulk of corporate failure prediction studies neglect the role of corporate goveranance but rather attempt to predict failure using financial data (see Balcaen and Ooghe, 2006). Thus, despite the renewed enthusiasm in issues of corporate governance and corporate failure in the wake of the recent unprecedented corporate failures, empirical studies remain scant (see Parker, Peters and Turetsky, 2002; Darrat, Gray and Wu, 2010; Platt and Platt, 2012).

Another limitation of the extant literature is its near universal focus on a direct association between corporate governance mechanisms on firm's financial performance or failure (Daily, Dalton and Cannella, 2003). For example, researchers (Chaganti, Mahajan and Sharma, 1985; Hambrick and D'Aveni, 1992; Daily and Dalton 1994a; 1994b; Gales and Kesner, 1994; Sheppard, 1994; 1995; Thornhill and Amit, 2003) consider some aspects of corporate governance and corporate failure neglecting a comprehensive analysis of the effects of corporate board attributes and functions as well as their interactions on corporate failure. This has invariably led to the limitation of the depth of our understanding of the link between corporate governance and the corporate failure prediction.

This study attempts to address some of the issues identified in the previous studies using recent data from the UK between 1999-2011 financial years to answer the following research questions:

Main Problem:

In the context of the UK, are corporate governance measures related to corporate failure?

Sub-problem 1:

To what extent are the composition and structure of corporate board related to corporate failure?

Sub-problem 2:

To what extent is corporate failure related to the interactions between board attributes and functions?

The study examines these questions through a multi-theoretical lens (i.e. agency and resource dependency theories). This paves the way for a brief overview of the overall approach adopted for this study in the next section.

1.4 OVERALL APPROACH

This study tests six main hypotheses regarding the impact of the following on the probability of corporate bankruptcy: proportion of outside directors (H1a), presence of female directors (H2a), board size (H3a), nomination committee effectiveness (H4a), audit committee effectiveness (H5a) and remuneration committee effectiveness (H6a). This study also examines the interaction effects of corporate board attributes and functions on corporate failure by testing nine additional hypotheses. This study, finally, tests 15 auxiliary hypotheses in line with the individual variables in the three composite measures namely: nomination committee effectiveness, audit committee effectiveness and remuneration committee effectiveness.

This study adopts the positivism approach due in part to the difficulties of obtaining data through interviews from boards of failed firms. Specifically, I extract corporate governance proxies from the annual reports for incorporation in the proposed models. Thus, this study considers both financial and non-financial proxies unlike prior UK studies that consider only the latter (see Balcaen and Ooghe, 2006).

This study opts for the random sample approach rather than the paired-sample approach. The justification is that matching criteria are habitually ad hoc and may lead to a "selection bias" (Balcaen and Ooghe, 2006: 29), resulting in sample specific failure prediction model (Zavgren, 1983). As well, this study seeks to investigate the effects of industry, firm age and size on corporate failure, in addition to the corporate governance proxies. This mirrors Peel Peel and Pope's (1986) notion that "a superior methodology would appear to be to use variables as predictors, rather than to use them for matching purposes" (p.7.).The final sample is 358 firms, consisting of 95 failed and 263 non-failed firms. Following previous studies (Hambrick and D'Aveni 1992; Sheppard, 1994; Lara, Osma and Neophytou, 2009), I stratify the dataset into five cross-sectional samples: 353, 351, 350, 346, and 346 for $t-1$ to $t-5$ (where t is the year of a firm's insolvency). This implies that the data reflects firms' governance and financial conditions in the relevant years prior to insolvency or lead time. Thus, this study accounts for temporal distance (Zavgren, 1985), which is a significant factor in the corporate failure context. Further, I randomly split each year's sample into two sub-samples: estimation and holdout test. The aim is to test the robustness of the models.

This study employs logit analysis because of the binary nature of the dependent variable: failed or non-failed firms. The empirical tests are based on three different model specifications (i.e. pooled cross-sectional, cross-sectional and multi-period data analysis) and sub-samples (i.e. estimation, holdout, and combined samples)[1]. The aim is to test the reliability of the predictions (see Altman, Haldeman and Narayanan 1977). For this reason, I use robust estimation and cluster by firm for all estimations of the pooled cross-sectional and multi-period LOGIT models and thus, moderate the effects of heteroskedasticity and serial correlation. The Jackknife procedure, however, is used for the holdout test of the cross-sectional models.

1.5 STRUCTURE OF THE THESIS

The rest of the thesis is outlined below and in Figure 1. Chapter 2 discusses the institutional background issues on corporate governance and corporate failure in the UK. The chapter is logically structured under five broad thematic areas namely: (1) leadership, (2) effectiveness, (3) accountability, (4) remuneration and (5) relationship with shareholders. It concludes with an overview of the insolvency rules in the UK.

Chapter 3 provides a systematic review of 89 articles reporting 160 prediction failure models published from 1966 to 2012 in scholarly reviewed journals in four main disciplines, namely: accounting, finance, banking, and economics. The discussion and critique of literature, in turn provides a solid foundation for the research. Consequently, the chapter concludes with a discussion of gaps in the literature where further research is inevitable. Therein lays the justification of the present study.

Chapter 4 reviews scholarly papers that map a route through the domains of corporate governance and corporate failure. The goal is to discuss important insights of the corporate failure syndrome from two main theoretical approaches, namely: agency and resource dependency. It is important to note that within the corporate failure literature the corporate

[1] For more detailed descriptions of the different model specifications and sub-samples see chapter 6 (section 5.4) and 7 (sections 7.5.3, 7.5.2 and 7.5.3), respectively.

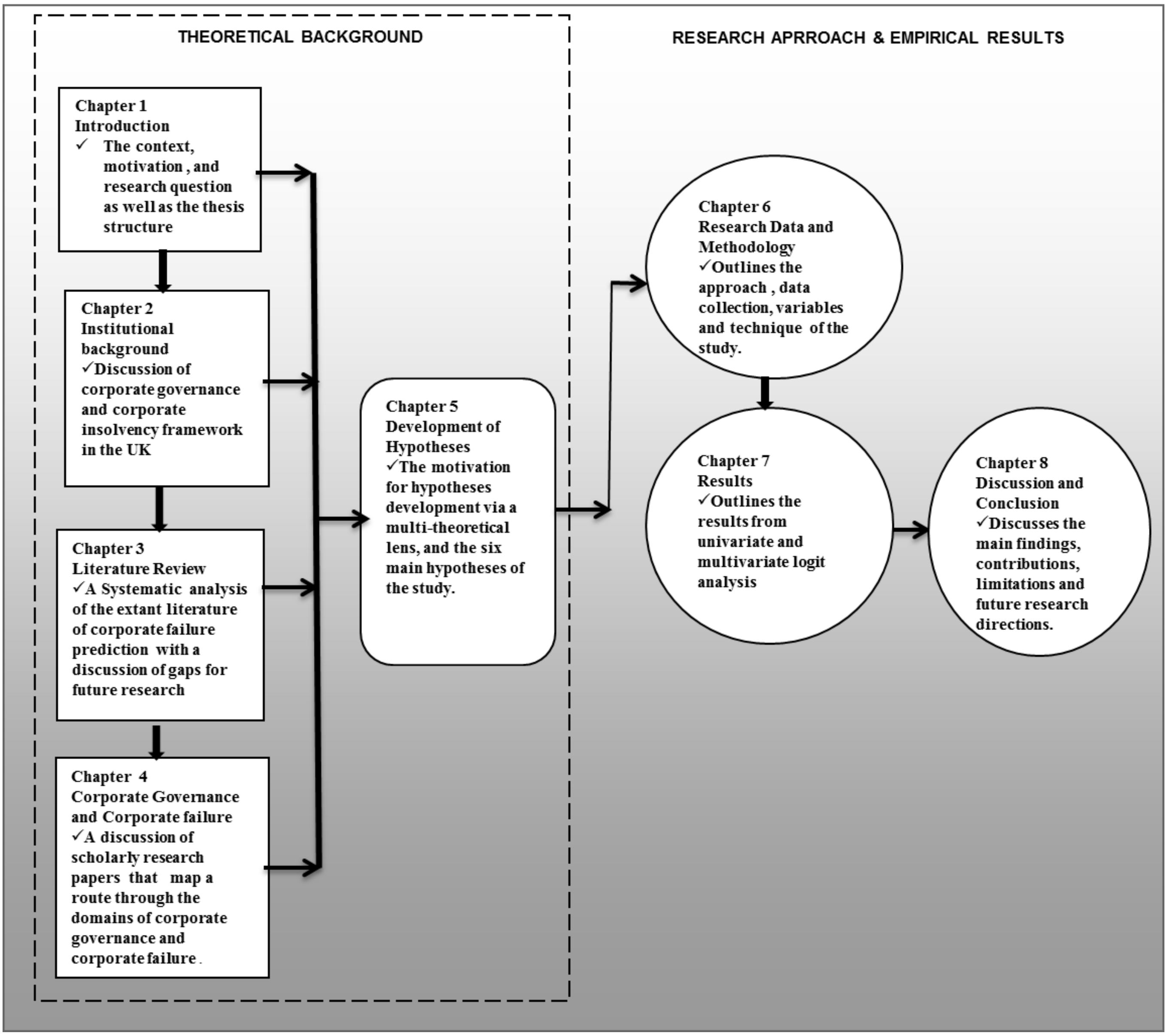
governance perspective is neglected. Accordingly, this chapter seeks to contribute by exploring the role of corporate governance within the corporate failure process.

Chapter 5 develops six main hypotheses of the study. Thus, I pull together work covered in chapters 2, 3 and 4. Chapter 6 describes the research data and methodology. It provides the empirical setting of the study. In particular, the philosophy approach, data collection, sample design, variables and statistical technique are addressed in the relevant sub-sections.

Chapter 7 presents the empirical results. This chapter reports the descriptive statistics, multicollinearity tests, univariate analysis as well as the results of the multivariate logit analysis in the relevant sections.

Chapter 8 discusses the findings and concludes the thesis. It emphasises on bridging the gap between theory and practice. Specifically, the chapter presents pragmatic policy recommendations based on the findings of the study. The aim is to facilitate prediction of the health of corporate UK through corporate governance proxies and financial indicators. This in turn, may trigger policy reforms to strengthen board effectiveness, and in this mode, reduce the likelihood of firm's failure. The main findings, promising contribution, limitations of the study as well as the recommendations for future research are discussed in the relevant sections.

Figure 1: The Structure of the Thesis



CHAPTER TWO
CORPORATE GOVERNANCE AND INSOLVENCY FRAMEWORKS IN THE UK

2.0 INTRODUCTION

The recent business scandals and financial crisis (Coffee, 2005) have renewed interest in corporate governance among stakeholders (Rajan and Zingales, 1998). This suggests that, weak corporate governance may deteriorate financial performance, and in this manner, increases the likelihood of firm's failure. This, in turn, triggers macroeconomic crises. Accordingly, Walker (2009) contends that gaknesses in risk management and board quality should be addressed to reduce the risk of a recurrence of the global downturn (see also Coffee, 2005).

The chapter proceeds as follows. Section 2.1 describes the concept 'corporate governance'. The evolution and principles of the framework of corporate governance in the UK are addressed in sections 2.2 and 2.3, respectively. Section 2.4 explains the term 'corporate failure'. Section 2.5 summarises the UK Corporate Insolvency process. Section 2.6 concludes.

2.1 DEFINITION OF CORPORATE GOVERNANCE

The term 'governance' originates from the Latin word 'gubernare', which means 'to steer' (Solomon, 2010), implying that corporate governance includes the function of direction rather than control. Thus, the governance role includes: (1) running of the business, (2) overseeing the executive actions and (3) satisfying legitimate expectations of accountability (Tricker, 1984).

Nonetheless, there are two paradigms in the quest to define the concept 'corporate governance', namely: Stock Market and Welfare State Capitalism (Dore, 2000). The former focuses on accountability to stockholders (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 2000). Thus, corporate governance is structures, processes, cultures and systems (Keasey, Thompson and Wright, 1997) to reduce principal and agents' conflict (Mayer, 1997), and in this way, ensures the firm is run for the benefit of the stockholder.

Critics, however, argue that shareholder long term interest would be best served by considering the wider interests of other stakeholders (e.g. employees). For this reason, Welfare State Capitalism takes a broader perspective of accountability to all stakeholders (Tricker, 1984; Noteboom, 1999). Solomon (2010), for example, defines corporate governance as both internal and external mechanisms which ensure that firms discharge their accountability to all their stakeholders. As well, Shleifer and Vishny (1997) define corporate governance mechanisms as financial and legal institutions that can be altered through the political process. In this regard, the impact of regulation on corporate governance occurs through its effect on 'the way in which companies are owned (stock exchange rules), the form in which they are controlled (legal forms) and the process by which changes in ownership and control take place (takeover codes)' (Jenkinson and Mayer, 2012, page 1).

This study adopts the classical definition of corporate governance in the UK due in part to its empirical setting, where corporate governance is seen as a system by which a firm is directed and controlled (Cadbury, 1992, paragraph 2.5). Further, given the nature of this research's theme i.e. bankruptcy, the study emphasises the fact that governance mechanisms aim at aligning managerial interests not only with those of shareholders but also with those other stakeholders (Cadbury 1992, 2.7; Coombes and Wong, 2004). This paves the way for a discussion of historical development of corporate governance in the UK.

2.2 EVOLUTION OF THE UK CORPORATE GOVERNANCE

Corporate governance dominates the public eye over the past two decades, due to the high-profile financial scandals involving entrenched CEOs and ineffective boards (Cadbury, 1992; Ezzamel and Watson, 2005). In response, the Cadbury Committee addresses the financial aspects of corporate governance in the UK. The Cadbury committee's (hereafter Cadbury 1992) guidance emphasises on three main principles namely: openness, integrity and accountability. These principles, in turn, allow investors to examine firms more comprehensively, and in this mode, promote efficient allocation of resources. For this reason, Cadbury (1992) triggers governance reforms worldwide, due in part to the use of its key proposals as benchmark of good governance (Brennan and Solomon, 2008; Aguilera and Cuervo-Cazurra, 2009).

Later, Greenbury (1995) sets out guidance for the executive remuneration committee under five thematic areas namely: accountability, responsibility, full disclosure, alignment of director and shareholder interests and improved company performance. Greenbury (1995, Section 1.14) contends that ‘the key to strengthening accountability lies in proper allocation of responsibility for determining Directors’ remuneration, proper reporting to shareholders and transparency’. Further, Greenbury (1995) endorses Cadbury’s (1992) proposal for the establishment of a remuneration committee, comprising entirely of non-executive directors (paragraph A1-A4). Greenbury (1995, Section B10), however, recommends a maximum notice period of 12 months term for service contracts rather than the three years suggested by Cadbury.

Hampel (1998) sanctions majority of the proposals of Cadbury (1992) and Greenbury (1995), and hence combined these reports with their work to produce the Code (1998). Hampel’s (1998) findings suggest that the Code is treated as sets of prescriptive rules, implying a ‘yes’ receives a tick. From this point, Hampel (1998) emphasises that ‘Box ticking’ is not efficient in preventing abuse (paragraph 1.12-1, 14). For this reason, Cadbury commends that UK listed companies should incorporate a ‘comply or explain’ statement into their annual reports.

Turnbull (1999) examines the risk management and internal control issues unresolved by the Cadbury (1992), which in part aided the collapse of Barings. The Turnbull’s guidance requires boards to review and report the system of internal control and risk management. It also encourages boards to express an opinion on the effectiveness of the system. More importantly, Turnbull outlines a frame of reference, against which boards could model their firms’ systems of internal control.

In 2001, the Enron-Andersen debacle raises questions globally about the effectiveness of the role of non-executive directors. This prompts the UK Government to set up the Higgs, Tyson and Smith Committees, the analysis of which I turn to. Higgs (2003) applauds more influential role for non-executive directors (NEDs), and in turn, greater accountability of boards in the UK. Explicitly, Higgs (2003) advocates a greater proportion of NEDs on boards (at least half) and more apt remuneration for NEDs. Higgs also encourages one NED to champion shareholder interest.

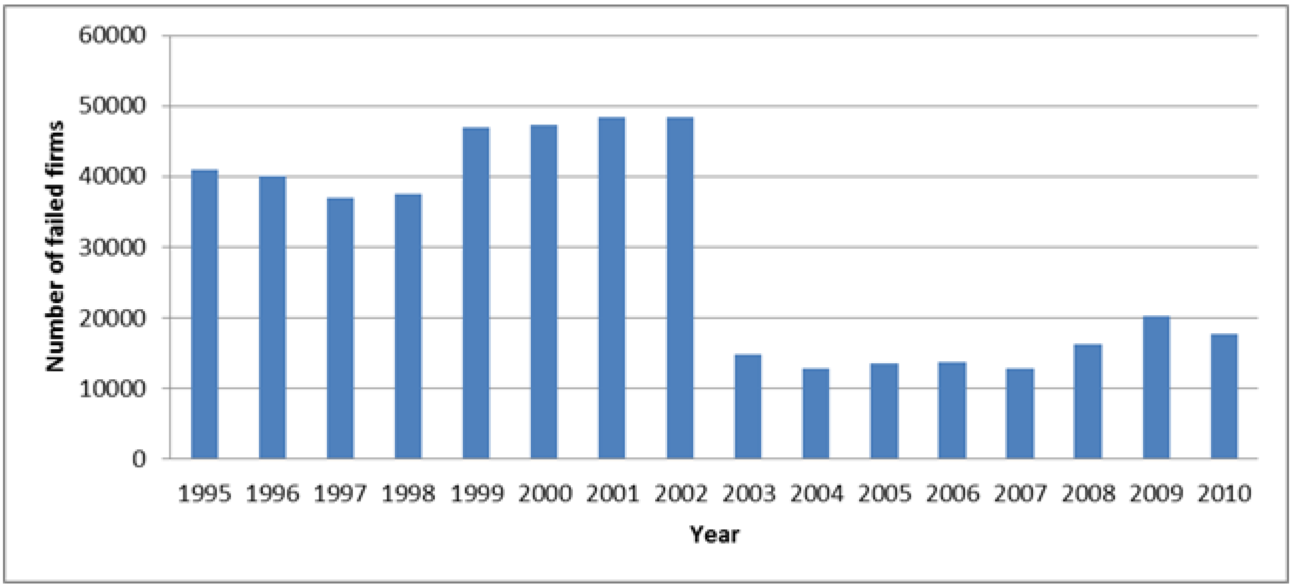
Tyson (2003) argues that diversity in backgrounds, skills and experiences of NEDs are factors required to enhance wider range of perspectives to bear on issues of company performance, strategy and risk. Tyson claims that board diversity may send a positive and motivating signal to stakeholders to enhance legitimacy to access critical resources necessary for firm's survival. Smith (2003) also identifies requirements on the purpose, membership, procedures, resources and remuneration of audit committee in UK listed entities. Unlike a more prescriptive approach in the US Sarbanes-Oxley Act (2002), the Smith's (2003) guidance follows the UK tradition of principles-based approach on the issues in question.

The Code (2003) includes: (1) main and supporting principles of the Code (1998), (2) compliance guidance on internal controls (Turnbull, 1999) and audit committees (Smith, 2003), (3) suggestions from Higgs (2003), and performance evaluation of board and its committees. Further, the Code (2003) provides criteria to evaluate the independence of NEDs. The Code also amends the principle of at least one-third NEDs on boards to at least half excluding chairman (on boards of FTSE 350) and at least two (other listed companies). From this point, Figure 2 depicts a sharp reduction of UK Corporate Insolvency from 2003 to 2010 compared to the astronomical figures recorded in 1994-2002. This sharp reduction is due in part to the enactment of the Enterprise Act (2002), which repeals administrative receivership by providing a stay on creditors' claims for loans made after September 15, 2003[2]. The Insolvency Act (2000) also introduces 28 day moratorium, while an eligible company puts together company voluntary arrangements (CVAs), with effect from 2 April 2001 and 1 January 2003. Further, the directors can seek creditors consent to extend the moratorium for additional two months. These modifications are encouraged by efficiency and fairness concerns, implying that the UK's Insolvency Law is moving towards the so-called "rescue culture" (Frisby, 2004; Armour, Hsu and Walters, 2008). In sum, the Enterprise Act

[2] Armour, Hsu and Walters (2008) document the impact of the Enterprise Act 2002.

(2002) and the Insolvency Act (2000) seek to preserve viable firms capable of making a valuable input to the UK economy[3].

Figure 2: Corporate Insolvency in the UK (1995-10)



Figures extracted from European Union Insolvency Report

Finally, the Code (2003) excludes disclosure of directors' remuneration, due to the enactment of "The Directors' Remuneration Report Regulations 2002", but demands further disclosures (e.g. number of meetings). The Directors' Remuneration Report Regulations (2002) supercede the earlier Code provisions and, in turn, require the boards to prepare a transparent and understandable remuneration report to shareholders (see Deliotte & Touche LLP 2004). As well, the Association of British Insurers (ABI) outlines principles on executive remuneration with emphasis on constructive and timely dialogue between remuneration committees and major institutional shareholders.

In July 2004, the London Stock Exchange (LSE) and RSM Robson Rhodes LLP propose a practical guidance on corporate governance issues (hereafter Guide). The aims of this Guide are two-fold. First, the Guide takes account of the principles and provisions of the Code (2003). Second, it strives to provide practical insights into best practice on boardroom

[3] See Report of the Review Committee, Insolvency Law and Practice, Cmnd 8558 (June 1982) ("Cork Report"), paragraph 198 and chapters 7-9.

effectiveness. This, in turn, helps boards achieve their strategic objectives and build enduring value in their businesses.

Myners (2005) endorses automated process as crucial alternative to ensure a more efficient voting system, after a thorough review of the impediments of UK voting shares. Turnbull (2005) makes minor changes but strongly sanctions the retention of the flexible, principles-based approach of Turnbull (1999). The International Accounting Standards Board (IASB) provides International Financial Reporting Standard on Share-based Payment (IFRS 2), suggesting that boards should account for Share-based Payment's impact (expense) on consolidation accounts beginning on or after 1 January 2005. It is also retrospectively applicable to grants of shares and/or share options from November 2002 that has not vested the directors or other staff prior to 2005. The National Association of Pension Funds (2005) provides a draft code of governance for pension scheme trust boards and management committees, in response to the "governance vacuum" and the tremendous growth in contract-based, defined contribution and workplace schemes.

In 2006, the FRC proposes three minor changes and thus, published the Code (2006). The changes are as follows: (1) board chair to sit on remuneration committee, (2) supplementary provisions on 'vote withheld', and (3) publishing the results of resolution on a show of hand. The FRC reassures the Code's content after a periodic review in 2007, 2008 and 2009. The Code (2009), however, incorporates recommendations from Walker Review (2009). The FRC reviews the Code (2009), and in turn, demands that much more attention needs to be paid to: first, the spirit of the Code as well as its letter, and second, interaction between the boards of listed companies and their shareholders.

To this end, the FRC has assumed responsibility for a stewardship code, which encourages institutional shareholders to engage more actively with boards, hence the first UK Stewardship Code (2010). It is argued that progressively, the UK corporate governance is taking on the characteristics of the German and Japan system, insider rather than outsider system. Nonetheless, the 25 unique codes since 1992 have not altered the ''comply or explain'' approach, the trademark of corporate governance in the UK (Aguilera and Cuervo-Cazurra, 2009). Compliance to the Code, however, is a necessary condition of listing in the

LSE, hence regarded as quasi-mandatory (Conyon and Mallin, 1997). Fernandez-Rodriguez, Gomez-Anson, Cuervo-Garcia's (2004) findings suggest that market reacts positively to announcements of compliance with the code. Appendix 1 (see page 285), sets out the main principles which underpin the corporate governance systems in the UK, the analysis of which I turn to.

2.3 THE PRINCIPLES OF UK CORPORATE GOVERNANCE CODE

Coombes and Wong (2004) stipulate that codes touch fundamental governance issues. These include but not limited to: (1) fairness, (2) accountability, (3) transparency, (4) board attributes, (5) the responsibility for stakeholders' interest, and (6) complying with the law. Zattoni and Cuomo (2010) concur, emphasising that these governance practices are necessary in order to avoid governance issues, and in turn, increase board effectiveness and firm performance.

For that reason, the FRC focuses on changing the ''tone'' of the Code by making limited but significant changes to signal the significance of general principles that guide board behaviours. In this respect, the Code (2010) describes five fundamental governance issues namely: leadership, effectiveness, accountability, remuneration, and relationship with shareholders, I will discuss each in turn.

2.3.1 Board Leadership in the UK

Following the agency theory (Berle and Means, 1932; Fama and Jensen, 1983) governance reforms preserve the unitary board structure in the UK. The UK Code on Corporate Governance (the Code) requires an effective board to head listed firms, suggesting that the board is jointly accountable for the firm's survival (Code 2010, section A). Cadbury (1992, paragraph 1.4), for example, recommends a dual role of the board namely: leadership of the board and executive obligation for running of the firm. Thus, no person should have unfettered influences on board decisions (section A. 2). In short, the division of responsibilities between the chairman and the chief executive should be clearly established and should not be exercised by the one person (paragraph A2.1).

Higgs (2003) suggests that the NEDs should constructively challenge formulation of firm's strategy. Again, Cadbury (1992) commends that the board should appoint one of the independent NEDs as senior member where there is CEO duality (1.2). However, the Code (1998) proposes the appointment of Senior Independent NED to cover contingencies (Section 3.18), whereas Higgs (2003) envisages an expanded role. In this regard, Higgs requires the senior independent NED to serve as an intermediary between other directors and shareholders (Code 2010, Section 3.18). Critics, however, suggest this creation of the 'trinity' at the top of the firm has attracted criticism. Nonetheless, the Code (2010) states that the chairman is responsible for the following: (1) leadership of the board and ensuring its effectiveness, (2) for achieving the requisite culture of constructive challenge by the independent NEDs, and (3) for training, evaluation and board composition (paragraphs A.3, B.4, B.4.1, B.4.2).

In consonance with the principle of integrity in Cadbury (1992), the chairman should meet the independence criteria set out in paragraph B.1.1 of the Code on his or her appointment. For example, there should not be any relationships (e.g. close family ties with key stakeholders) or circumstances (e.g. significant shareholdings) that may impair the chairman's independence in character and judgment.

Additionally, the boards' role is to set the company's strategic aims and standards and ensure that the necessary resources are in place for the firm to meet its objectives and review management performance. Indeed, the directors must act in the best interest of the firm consistent with their fiduciary and statutory duties. In fact as Cadbury (1992) notes, board's actions are subject to regulations and the shareholders in the annual general meeting, is germane here. Subsequently, the board must be effective, the analysis of which I turn to.

2.3.2 Board Effectiveness in the UK

The Code (2010) presents seven main principles to strengthen board effectiveness in the UK. These are as follows: (1) composition of the board, (2) appointments to the board, (3) time commitment consideration of directors, (4) professional development, (5) information and support, (6) evaluation, and (7) re-election of directors. I discuss each in turn.

Board Composition

The Code (2010) stipulates that the board and its committees should have balance of executives and non-executive directors with appropriate diversity and independence of the firm to enable them to discharge their roles effectively (paragraph B.1). This implies that no group of individuals can dominate the board process (paragraph B.1.3).

Cadbury (1992) requires boards to have at least three NEDs (with majority being independent in character and judgment). Shortly, the Hampel (1998) argues that for effective board contribution the NEDs should be a third of the board. Higgs (2003) recommends at half of the board save the chairman, should be independent NEDs. This implies that reforms continue to shift the overall power of the board in favour of NEDs.

Board Appointments

The Cadbury (1992, section 4.30) and subsequent amendments require a formal, rigorous and transparent mechanism for the appointment of new directors to the board. The board appointments should be made on merit and with due regard to board diversity (Code 2010, paragraph B.2.2). In addition, the board should satisfy itself that plans are in place for orderly succession planning (paragraph B.2.3).

Hence, a nomination committee, made up of majority independent NEDs (Cadbury 1992, section 4.30), and chaired by independent NED (Higgs 2003), or chairman save dealing with appointment of his successor (Code 2003, section A.4.1), is charged with three main duties. First, it proposes new board members (Cadbury 1992, section 4.30). Second, it evaluates the board diversity and independence. Finally, in the light of this evaluation, it prepares description of the role capabilities required for new appointment (Code 2003, Section 4.2).

Time Commitment Consideration of Directors

The Code (2010) requires directors to assign satisfactory time to the company to discharge their duties effectively (section B.3). The following supporting principles are relevant. First, appointment letters of NEDs should spell out the estimated time obligation and job specifications (Code 2003, section A.4.3-4). Second, the board should resist executive directors offers to take on chairmanship or more than one non-executive directorship in FTSE 100 company (Code 2003, section A.4.5).

Professional Development

The chairman is required to facilitate professional development of directors, due to the presumed board diversity (Cadbury, 1992), as follows. First, new appointees receive tailored induction (Code 2003, section 5.1). Second, directors update their skills and knowledge with the company to facilitate effective discharge of their roles (A.5 paragraph 3).

Information and Support

Cadbury (1992) requires the board chair to supply the board with relevant and reliable information required for effective board process (section 4.8). In this respect, the board chair should ensure that board committees have sufficient resources and advice from the company's secretary and/or independent professional (Cadbury, section 4.25; 1.5).

Evaluation

The Code (2003) states that boards should undertake a rigorous assessment of its members, performance and committees (Section A.6). Specifically, the directors' evaluation should assess each director contribution and commitment to their roles (A.6 paragraph 2). In turn, the chairman is required to act on the evaluation's results by addressing the weaknesses of the board (A.6 paragraph 2). In like terms, senior independent NED, taking into account the views of executive directors, is expected to evaluate the chairman's performance.

Recently, the Financial Reporting Council (FRC) via the Code (2010) is demanding FTSE 350 companies to undertake external evaluation on at least every three years (B.6.2). More so, a statement should be made available of whether an external facilitator has other connection with the company.

Re-election of Directors

Directors of UK listed companies are required by the listing rules to submit themselves for election at the first AGM after appointment (see Code 1998, section 3.21). More so, the Code (1998) endorses NAPF and the ABI's provision suggesting that directors submit themselves for re-election at intervals of no more than three years (3.21), subject to continued acceptable performance (Code 2003, section A.7). In this regard, directors of FTSE 350 companies are subjected to annual election by shareholders.

2.3.3 Board Accountability and Audit in the UK

The board should provide a true and fair assessment of the company's performance (Code 2003, C.1). Also, the board should safeguard shareholders' funds by maintaining a robust internal control system (Code 2003, C.2). In the same view, the board should enhance the financial reporting process and audit quality by establishing an audit committee (Cadbury 1992, 4.35; Code 2003, C.3).

Consistent with Cadbury, Smith (2003) endorses the minimum three NEDs membership but introduces modification in three main areas; namely (1) membership and appointment, (2) meetings, and (3) resources and skills, I will discuss each in turn.

Membership and Appointment of Audit Committee Members

Smith (2003) contends that audit committee should consist of minimum three independent NEDs (Section 3.1 and Code 2003; C.3.1). This contradicts Cadbury's (1992) view, suggesting majority of the audit committee members should be independent but not all (4.35b).

Further, Smith (2003) prohibits the board chair to be an audit committee member (Section 3.2). More importantly, Smith (2003) suggests that audit committee appointments should be made jointly by the board, nomination committee and the audit committee chairman (Section 3.3).

Meetings of Audit Committee

The audit partner and finance director may attend audit committee meeting at the request of the committee's chairman (Smith, 2003; Section 3.6). Further, Smith (2003) recommends at least three audit committee meetings in a financial year (Smith, 2003; Section 3.5), a view that differs from Cadbury's (1992) recommendation (see 4.35a). Finally, the audit committee is encouraged to discuss issues raised in the management letter with both external and internal auditors, in the absence of management (Smith, 2003; Section 3.8).

Resources and Skills of the Audit Committee

The Cadbury (1992) requires boards to provide sufficient resources required by the audit committee to discharge their supervisory role (4.35d). Thus, the audit committee may take professional advice at the company's expense (see section 3.14). Concerning skills of members, Smith (2003) prescribes that a member should have relevant financial experience (e.g. an auditor, finance director, professional accountancy qualification holder).

2.3.4 Board Remuneration in the UK

Directors' remuneration is one of the areas of failure of corporate governance and the Cadbury (1992), in particular. For this reason, directors' remuneration reforms (e.g. Greenbury 1995 and Directors' Remuneration Report Regulations 2002) provide proposals on openness (Cadbury 1992, Section 4.40). Following Greenbury (1995), I discuss three main aspects of board remuneration: remuneration committees, disclosure and remuneration policy.

Remuneration Committee

Cadbury (1992) and Greenbury (1995) encourage boards to establish remuneration committee with a minimum of three NEDs to supervise the executive remuneration process. Thus, the remuneration committee determines firm's remuneration policy (Greenbury 1995, 4.4.1). For that reason, the remuneration committee members should seek the interest of shareholders. This in turn, suggests that its membership should be entirely independent NEDs (Cadbury, 1992: 4.42).

Disclosure

Greenbury (1995:5.2) suggests that full disclosure of Directors' remuneration enhances accountability and restores investor community's confidence. Greenbury (1995:5.3), however, cautions that full disclosure should not result in the loss of crucial facts. In this vein, Cadbury (1992) requires boards to report directors' salary and performance related pay as well as future benefits (e.g. stock options). Further disclosures encouraged by Cadbury are the total and chairman's remuneration as well as those of the highest paid director.

Remuneration Policy

The Code (2010) requires boards to provide reasonably high remuneration to motivate directors to maximise shareholders' value (Section D.1). Further, boards enhance firms' long-term performance through the performance-related pay of top executives' remuneration (Section D.1 paragraph 2).

NEDs' remuneration, however, should not include share options and/or performance-related pay (Code 2010, D.1.3). Individual NED's remuneration should mirror his/her time commitment and role (e.g. annual fees and additional fees for chairmanship of committees). Nevertheless, advance shareholders' approval is inevitable in unique circumstances where share options are awarded to NEDs. In this regard, these shares should be held for a minimum of one year after the NED departs from the board.

2.3.5 Board Relationship with Shareholders

Boards are required by the Code (2003) to engage in satisfactory dialogue with shareholders based on mutual objectives. The chairman, especially, should ensure that directors are aware of shareholders' issues (Code, 2010). Cadbury (1992) requires institutional investors to exchange views and information on board strategy and performance (section 6.11, Para 1). Hampel (1998) affirms that 60% of shares in listed UK companies are held by UK institutions, is appropriate here. Enron trial, however, suggests that employees' interest may prevail over short-term shareholder value (Powell, 2006). Here, the national governance mechanisms protect the investors' rights and trade credit (La Porta, Lopez-De-Silanes, Shleifer, And Vishny, 2000). From this point, disciplinary mechanisms (i.e. both internal and external) for poorly performing executives seem to be at work in the Anglo-Saxon environment (Pochet, 2002). Sutton and Callahan (1987), Gilson (1990), and Gilson and Vetssuypens (1993) and Hambrick and D'Aveni's (1992) findings confirm this notion. Jensen (1993) concurs, emphasising that bankruptcy law is designed as a monitoring mechanism for healthy firms and more importantly, governance device for financially distressed firms.

Overall, the purpose of corporate governance is to facilitate effective management, thereby reducing the likelihood of a firm's failure (Code, 2010). The Companies Act (2006) lends support to this notion, emphasising that the board must promote the long term success of the firm by discharging their fiduciary duties of protecting the interest of shareholders (section 172:1).

Directors, however, can wind up the firm voluntarily by making a statutory declaration within 5 weeks preceding the date of directors' resolution to the effect that the firm is solvent and thus, can redeem its total liabilities, within 12 months from the start of the winding up (Insolvency Act, 1986). Here, the directors must submit both the statutory declaration and the recent statement of financial position to the registrar of companies within 15 days after the date of the resolution. Here too, the Insolvency Act (1986) provides for punitive measures such as fines and imprisonment for the firm and every director who contravenes the above provisions.

Similarly, the Insolvency Act (2000) introduces a revised moratorium procedure for small companies in financial distressed. The Directors' role in obtaining a moratorium includes filing with the court: (a) an outline of voluntary arrangement; (b) the financial position of the company, (c) the company's eligibility for a moratorium; and (d) the nominee's consent.

Insolvency law, however, forces communal governance mechanisms on an insolvent firm and its creditors (Armour et al, 2008) by providing an orderly winding up or reorganisation of the insovent company's affairs (Frisby, 2004). In this respect, critics argue that firms should rather be free to contract upfront over how controlling rights will be allocated in insolvency (Armour et al, 2008). The next section presents the definition of the term corporate failure in the UK.

2.4 DEFINITION OF CORPORATE FAILURE IN THE UK

The term failure has multiple meanings (Mellahi and Wilkinson, 2010); hence, there is no agreement as to what is meant by the term 'corporate failure' (Balcaen and Ooghe, 2006). For the purpose of this thesis, corporate failure is companies in insolvency. A firm is deem as insolvent, if it fails to pay due debts (Insolvency Act 1986). Accordingly, our empirical setting limits our definition to companies in formal insolvency procedures namely: compulsory or voluntary liquidation, administration, administrative receivership, and/or dissolved. Appendix 2 (see page 282) presents the main features of five but one of the procedures, the analysis of which I turn to.

Explanation of the Five Main Stages in the Definition

A firm is said to be in liquidation when the court appoints a liquidator to run and 'wind up' an entities' affairs properly. In the UK, however, there is no provision of an automatic stay, suggesting that secured creditors may sell entities' assets without heeding to other claimants' interest. This action may not be challenged save fraudulent or negligent (Davydenko and Franks, 2008). Nonetheless, the liquidator may dispose the company or its assets (i.e. piecemeal) to redeem debts, strictly as follows: (1) secured debts, (2) liquidation costs, (3) preferential, (4) floating charge holders, (5) unsecured debts, (6) interest on debts, and finally, (7) residual claimants. In this regard, the liquidator may face legal action or dismissal if he/she delays the entity's sale by using secured creditors' funds to run the company. At the end of the process, the liquidator will apply to have the company's name deleted from the register at Companies House.

Liquidation may be either compulsory or voluntary (either Members or Creditors). First, a company enters compulsory liquidation when the court, petitioned by creditors or board, makes an order for its 'wind up'. In this respect, all the directors are required by law to present the winding-up petition jointly. Thus, a single director cannot present a winding-up petition save when he/she is the only director of the firm.

Second, a company enters members' voluntary liquidation, where the shareholders opt for liquidation. This is permitted by the law provided there are sufficient funds to settle entities' total debts. Creditors' voluntary liquidation, however, is where the shareholders, normally at the boards' request, opt for liquidation. This is also permitted by the law provided the entity is deem insolvent, thus, it lacks sufficient funds to settle entities' total debts.

The Insolvency Act provides reorganization as an alternative to liquidation. The primary aim of reorganization is to secure the company as a going concern. Therefore, the priority rule in the liquidation process is not applicable in reorganizations. The Insolvency Act offers four reorganization procedures namely: administration receivership, administrative, company voluntary arrangements and moratorium.

Administrative receivership is the appointment of an administrative receiver by floating charge holder(s) over the entities' assets. Specifically, the Administrative Receiver seeks the best outcome for his appointer, implying that he/she has no duty of care to other creditors. This, in turn, may result in ineffective liquidation of many financial distressed firms (Kaiser, 1996).

Further, existing claims receive primacy over new financing. This may hinder the firm's reorganization plan, if it needs injection of funds to secure its going concern. Franks and Sussman's (2000) findings also suggest that that recovery rates for junior creditors in distressed UK SMEs are negligible.

Second, there is no automatic stay provision in the UK's receivership code. Franks, Nyborg and Torous (1996) argue that an important constraint on the receiver's discretion is liens held by other creditors on specific assets. For this reason, the Insolvency Act (1986) offers two rescue procedures: administration and Company Voluntary Arrangement (CVA). Pochet (2002) and Davydenko and Frank (2008), however, suggest floating charge holders' veto right in favor of an administrative receivership limits the use of these two procedures.

Subsequently, Enterprise Act (2002) repeals administrative receivership for loans made after September 15, 2003, and substituted it with administration. The floating charge holder may appoint the administrator, whose duty of care extends to every debt holder. Consequently, the administrator has legal backings to stay creditors' claims, and in this mode, avoid repossession attempts from owners of leased asset. Further, the administrator, due to the presence of court-administered procedure to secure new financing, has more flexibility in dealing with debt.

Finally, dissolution is not an insolvency procedure, but relate to Section 1000 of the Companies Code (2006) allowing the striking off company not carrying on business or in operation from the registrar of companies in the Companies House. This sets the scene for the justification of the corporate failure definition adopted for the study in the next subsection.

Motivation for Adoption of the Definition

The rationale for adoption of the legal definition is multiple fold. First, the five stages confirm the argument that corporate failure is a state of insolvency or bankruptcy (in US parlance) where control of assets is exercised for creditors' benefit, rather than its owner(s) (Booth, 1983: D'Aveni, 1990). Thus, this echoes Gillespie and Dietz (2009:128) argument that "failure is a single major incident, or cumulative series of incidents, resulting from the action (or inaction) of organisational agents that threatens the legitimacy of the organisation and has the potential to harm the well-being of one or more of the organisation's stakeholders".

Second, the definition verifies organisational ecologist view of failure, in particular, dissolution. Freeman, Carroll and Hannan (1983) explain dissolution as the state at which an organisation 'ceases to carry out the routine actions that sustain its structures, maintain flows of resources, and retain allegiance to its members'.

Finally, the definition is objective due to its legalistic nature. Indeed, there is a general agreement in the literature that, the above five stages constitute failure (see, Morris, 1997). Figure 3 presents an overview of the insolvency process in the UK, the analysis of which I turn to.

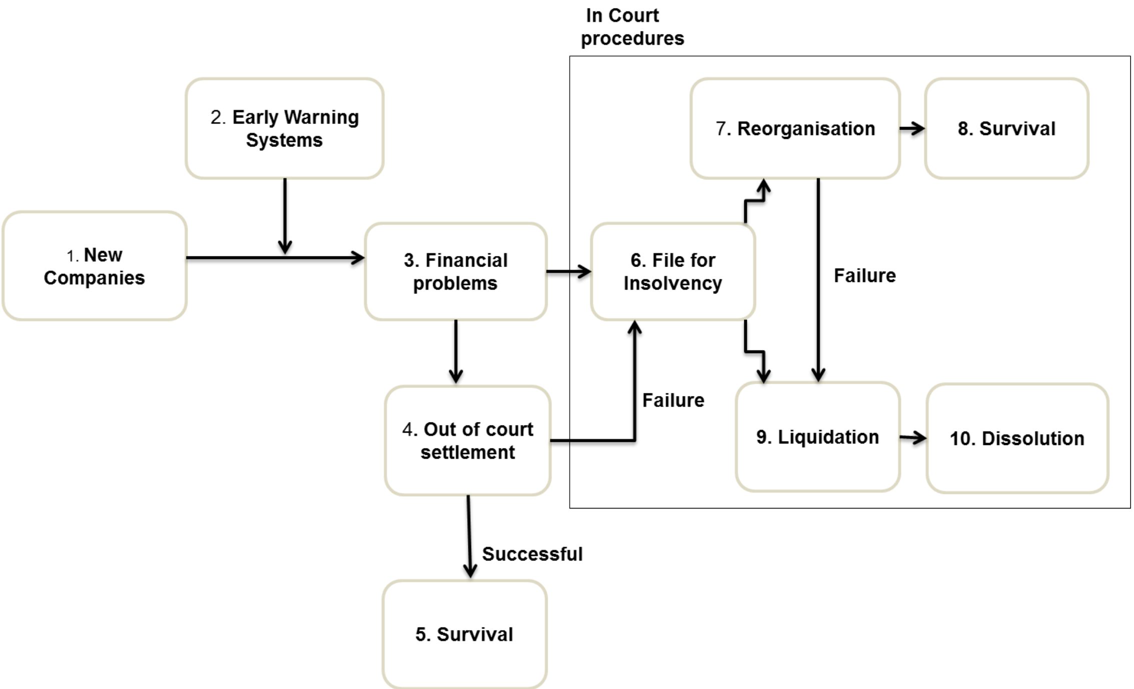
2.5 AN OVERVIEW OF THE INSOLVENCY PROCESS IN THE UK

The relevant insolvency legislations in UK include but not limited to Companies Act (2006), Enterprise Act (2002) and Insolvency Act (1986). Notwithstanding these numerous documentation, the UK Insolvency Laws are fundamentally unfamiliar to the US's rescue culture and most importantly, remain under the government. In this vein, Pochet (2002) notes, UK creditors prevent adverse effects of proposed insolvency rules by devoting adequate resources to defensive activism. From this point, critics (e.g. Kaiser, 1996) contend that the UK Act encourages creditors to hastily liquidate a financial distressed firm. In a sharp contrast, the US's chapter 11 allows the debtor to retain control of the firm at least for a limited period, to propose a plan of reorganization (Franks et al, 1996).

Nonetheless, in the UK, an out-of-court workout between a firm and its creditors is possible. On one hand, company voluntary arrangement allows the company's directors to compromise its liabilities to creditors and, in turn, avoids a more costly administration or liquidation procedure (see Insolvency Act 1986, section 1-7 and Enterprise Act 2002, section 1A). At the other, the use of this procedure is hindered by the lack of automatic stay of secured creditors. For this reason, small companies may opt for the moratorium option, which allows 28 days automatic stay to enable the directors to rescue the company, under the supervision of the insolvency practitioners (Insolvency Act 2000). In other words, an insolvency practitioner is appointed by the bankruptcy court or the creditor (in the case of receivership), to liquidate or reorganize the firm, and the board immediately steps down save the moratorium option. As Flynn (2000) puts it, the Insolvency Act (2000) is a milestone towards a more debtor-oriented system.

Appendix 2 depicts debtors' breach of a debt covenant is the main criterion for creditors to initiate the insolvency process save members voluntary liquidation. These covenants may include but not limited to instalment schedules, minimum liquidity and/ or maximum leverage ratios. On the contrary, Franks et al (1996) contend that creditors may not wish to precipitate a firm into insolvency despite breach of its loan covenants. Further, the directors may not initiate members' voluntary liquidation, when the company is solvent. On one hand, this mirrors creditors' unwillingness to take managerial control of the firm and management preference for power, at the other. As a result, the Insolvency Act has adequate penalties for directors who trade while the firm is insolvent. Figure 3 (adopted from Expert Group 2011) sums up the insolvency process from the time the company starts experiencing considerable financial problems until the company is eventually dissolved.

Figure 3: An overview of insolvency process in the UK



Source: Report of Expert Group (2011)

2.6 CHAPTER SUMMARY

This chapter builts on the foundation laid in chapter one of the thesis. In particular, it outlines the definitions of corporate governance and corporate failure within the empirical setting. Further the evolution of corporate governance in the UK and the Code's provisions are discussed in the relevant sections and sub-sections. The chapter concludes with allocation of control rights to various stakeholders regarding the future of the failing firm in the UK in section 2.4, 2.5 and in particular, Appendix 2 (see page 282). In conclusion, the issues discussed in this chapter provide a starting point for the conceptual framework and hypotheses testing during later stages of the research. For this reason, the scene is set for a critical review of predicting corporate failure extant literature, in the next chapter.

CHAPTER THREE
LITERATURE REVIEW

"***One might ask a basic and possibly embarrassing question: why forecast bankruptcy? This is a difficult question, and no answer or justification is given here. It could, perhaps, be argued that I are dealing with a problem of "obvious" practical interest***

(Ohlson, 1980, p3)*"*

3.0 INTRODUCTION

At a glance, one judges interest in corporate failure by the considerable number of articles in journals of diverse disciplines dealing with prediction of corporate bankruptcy. Here, since Beaver (1966, 1968) and Altman's (1968) seminal work, the literature on corporate failure prediction has developed at a speed equal to the growth of corporate failure itself, due in part to the impact of corporate failure on stakeholders (Wilson and Sharda, 1994). On one hand, one significant feature of this vast literature is the general agreement that accounting proxies are capable of predicting corporate failure. On the other hand, these models, due in part to the ad hoc selection of variables approach in modelling, lack full professional acceptance (Scott, 1981; Agarwal and Taffler, 2007).

Similarly, prior reviews are limited in scope and/or out of date (example: Kumar and Ravi, 2007; Aziz and Dar, 2006; Balcaen and Ooghe, 2006; Dimitras, Slowinski, Susmaga, Zopounidis, 1999; O'Leary, 1998; Keasay and Watson, 1991; Morris, 1997; Jones, 1987; Altman, 1984; Altman and Narayanan, 1996; Taffler, 1984; Scot, 1981). More importantly, to date, there is no systematic literature review that contributes towards a better understanding of research issues that integrates corporate failure prediction models from the three strands namely: classical statistical techniques, artificially intelligent expert systems and theoretical approaches. This chapter attempts to fill this gap.

Following the approach of Biolchini, Mian, Natali and Travassos (2005) the aim of this chapter is accomplished through a systematic literature review (SLR). Thus, the chapter presents the state-of-the-art in corporate failure prediction, to uncover several gaps both theoretical and empirical. The presentation of the SLR in this chapter is particularly motivated by the structures of Nicolas and Toval (2009).

The chapter proceeds as follows: Section 3.1 summarises the main aspects of the design of the SLR. The results, discussions, research gap and limitations of the SLR are presented in sections 3.2, 3.3, 3.4, and 3.5, respectively. Finally, section 3.6 concludes the SLR with recommendations for further research.

3.1 PLANNING THE SYSTEMATIC LITERATURE REVIEW

We follow Biolchini et al (2005) and Nicolas et al's (2009) review protocol in this SLR. Accordingly, section 3.1.1 presents the scope. Section 3.1.2 outlines the research questions that guide the SLR. Section 3.1.3 states the planning of the search process. Section 3.1.4 reports the inclusion and exclusion criteria. Section 3.1.5 describes the data collected from the selected studies, and finally, the data analysis is the focus of section 3.1.6.

3.1.1 Scope of the SLR

The aim of the SLR is stated in section 3.0. Nonetheless, the SLR is limited to reviewing scholarly studies on corporate failure prediction from three broad research paradigms namely: statistical techniques, intelligence techniques and theoretical foundation. Table I contains an overview of related methods of the three research paradigms discussed in section 3.3.

Table 1 is structured into four main columns. First, column one outlines the various related methods under each paradigm. As well, column one reports the respective author(s) who initiated the method in the corporate failure context. A brief description, strengths and limitations of each method are outlined in columns 2, 3, and 4, respectively.

3.1.2 Research Question of the SLR

The SLR seeks to answer the four main research questions:

RQ1. What value can be drawn from the literature in respect to corporate failure prediction from models?

RQ2. What techniques have been employed in this field?

RQ3. What are the methodological issues in the literature?

RQ4. What is the main research gap in the literature?

Table 1: Three perspectives of Corporate Failure Prediction

DIMENSION	*STATISTICAL TECHNIQUE(1-5), AIES (6-16) AND THEORETICAL (17-19)*		
Models(M)/ Landmark study	*description*	*Major strength*	*Major limitation/Critics*
1.0 Univariate/ Beaver (1966)	**1.1 If a firm records a higher ratio compared to a certain cut-off point, this signals strong financial health and vice versa.**	**1.2 Simple to understand and easy to apply.**	**1.3 Neglects multi-dimensional nature of corporate failure (Keasey and Watson, 1991)**
2.0 MDA Altman (1968)	**2.1 Linear combination of certain discriminatory predictors in the form of Z-Score**	**2.2 Constructs a discriminant function (Z-Score) by maximizing the ratio of between-groups and within-groups variances (Fisher, 1936).**	**2.3 Demanding Assumptions: (1)Linear separability, (2) Multivariate normality& (3) equal and within group covariance and others (Eisenbeis and Avery, 1972)**
3.0 LPM Meyer and Pifer(1970)	**3.1 Expresses the likelihood of firm's failure as a dummydependent variable**	**3.2 Estimates the odds of firm's failure with probability**	**3.3. Results in model considered complex forthe average user to interpret**
3.0 Logit / Martin (1977)	**3.1 Replaces the LPM distribution with a logistic cumulative distribution.**	**3.2 Same as LPM.**	**3.3 Results in models considered complex for the average person to interpret**
4.0 Probit/ Zmijewski (1984)	**4.1 Estimate the parameters of the linear model by the maximum likelihood estimation procedures.**	**5.2 Replaces the logistic function with normal distribution function.**	**5.3 Several assumptions: Dependent variable categorical, error term has a cumulative normal distribution, and others (Aldrich and Nelson, 1984).**
5.0 CUSUM Kahya& Theodossiou (1999)	**5.1 The time series behaviour of the attributes variables for each of the failed and non-failed firms is estimated by a finite order VAR model**	**5.2 CUSUM model has a very 'long memory' in the case of bad performance of the firm**	**5.3 CUSUM model has a very 'short memory' in the case of past good performance.**
6.0 Partial adjustment processes/ Laitinen & Laitinen(1998)	**6.1 View failure as firm's inability to pay financial obligations as they fall due.**	**6.2 Compared to non-failed, failing firms exhibit smaller absolute elasticity of cash balances.**	**7.3 Too narrow**
7.0 MDS Neophytou and Molinero (2004)	**7.1 Produces graphical representations of the main characteristics of the data**	**7.2 Allows the inclusion of qualitative information and assesses the reasons of the probability of specific firm's failure.**	**8.3. Practitioners interested in the health of companies not included in the original sample must add these.**
8.0 Neural networks Bell, Ribar& Verchio	**8.1 Perform classification tasks in a way intended to emulate**	**8.2 Ability to induce algorithms for recognising patterns**	**8.3 NN models are characterized as 'black boxes' which decision makers may be reluctant to rely**

(1990)	brain processes.	(Zhang, Hu, Eddy Patuwo and Indro, 1999).	upon due to a lack of transparency.
10.0 CBR/ Kolodner (1993)	10.1 Solves a neclassification problem with the help of similar prior solved cases.	10.2 Fits conveniently in the bankruptcy context due to it four-stage procedure.	10.3 Is purely based on the assumption that similar cases are useful for predicting the outcome of the new case.
11.0 *K*-Nearest Neighbour (kNN) Tam & Kiang (1992)	11.1 Distribution-free technique applicable under less restrictive conditions regarding population distribution and data measurement scales	11.2 A nonparametric method for classifying observations that relaxes the normality assumption as well as eliminates the functional form required in statistical techniques (e.g. MDA and logit)	11.3 Same as NN
12.0 Genetic algorithm (GANN)/ Kingdom & Feldman (1995)	12.1GA works as a stochastic search technique to find an optimal solution to a given problem from a large number of solutions	12.2 Optimized linear functions without restrictive statistical hypotheses such as normality of explanatory variables or the equality of the variances/co-variances matrix.	12.3 same as NN
13.0 Rough set/ Slowinski & Zopounidis (1995)	13.1 classify objectsusing imprecise information	13.2 Result in a set of easily understandable decision rules which are supported by a set of real example.	13.3 same as NN
14.0 Survival Analysis/ Lane, Looney and Wansley (1986)	14.1 Appropriate when measuring the time of event (Cox&Oakes, 1984).	14.2 Provides us with a possibility to model dynamic aspects of the failure process.	14.3 The date of annual closing of accounting is not necessarily a natural starting point for the failure process.
15.0 Data Envelopment analysis(DEA) Premachandra, Bhabra &Sueyoshi (2009)	15.1 Designed to assess the efficacy of decision-making units (DMUs) with both inputs and outputs.	15.2 Study the frontier shift over time horizon, suggesting that it explores the dynamic change of corporate failure on a time horizon.	15.3 Same as NN
16.0 Iterative dichotomizer 3 (ID3) Quinlan (1979)	16.1 ID3 creates a decision tree that classifies the training sample.	16.2 Like RPA, ID3 employs a non-backtracking splitting procedure. This in turn, maximises the entropy of the split subsets.	16.3 It assumes that the entire space of possible events begins as a single category (Braun and Chandler, 1987).
17.0 Balance sheet decomposition measure Lev (1973)	17.1 Examine changes in the structure of the balance sheet	17.2 Significant changes in the composition of assets and liabilities, indicates a firm is incapable of maintaining the equilibrium state.	17.3 Assumes that firms try to maintain equilibrium in their financial structure
18.0 Gambler's ruin theory/ Scot (1981)	18.1 Views the firm as a gambler.	18.2 The gambler, playing repeatedly with some probability of loss, continues to play until its net worth goes to zero (i.e failure)	18.3 Assumes a net positive probability that firm's cash flows will be consistently negative over a run of periods.

19.0 Cash Management Theory/ Aziz, Emanuel & Lawsonl (1988)	**19.1 An imbalance in cash flows depicts failure of firm's cash management function, persistent of which may cause financial distress and ultimate failure**	**19.2 Short-term management of firm cash flow is a major concern for a firm's going concern.**	**19.3. Too simple**

A similar approach has been used by Aziz and Dar (2006)

3.1.3 Search Process of the SLR

I select five main sources to perform the SLR. These are: (1) Google Scholar (http://scholar.google.co.uk), (2) Wiley Interscience (http://onlinelibrary.wiley.com), (3) ScienceDirect (www.sciencedirect.com),(4) Web of Knowledge (via Thomson Reuters), and (5) Business Source Complete (http://web.ebscohost.com). Specifically, I search scholarly reviewed articles of corporate failure prediction from these sources.

At this point, I identify that some articles used bankruptcy, insolvency, liquidation, financial distress and dissolution as synonyms for corporate failure. Hence, I extend the search string in the various search engines for other articles using a search framework that encapsulates all the terms identified. In this respect, all the string defined is the following: ("Prediction” OR "Predicting" OR "Forecasting") AND ("Liquidation" OR "Bankruptcy" OR "Insolvency" OR "Dissolution" OR "Failure”) AND ("Corporate" OR "Firms" OR "Company").

3.1.4 Inclusion and Exclusion Criteria

First, the search string depicts that it is satisfactory to read the title of the article to consider its inclusion or otherwise in the SLR. Second, in cases where the title is inadequate to determine inclusion, the abstract is read and, if need be the introduction, and to the extreme the conclusions or the whole article. For this reason, the full texts of the article must be present in an electronic format. Finally, the paper must be written in English.

In contrast, to ensure the SLR is within reach, I devise exclusion criteria as follows. First, I exclude articles with synonym titles such as organisation mortality and death as well as organisational exit, decline, retrenchment, downsizing, setbacks and financial distress. Thus, the SLR invokes Greenhalgh, Lawrence and Sutton’s (1988) notion, suggesting that these should not be considered as failure. Secondly, books, PhD Thesis, working papers, technical reports as well as articles in conference proceedings, due in part to the SLR quality bias, are excluded. Accordingly, each article is scrutinised further to ensure that it is published in a peer-reviewed journal.

3.1.5 Quality Assessment of the SLR

The quality of the selected studies in section 3.1.4 is addressed as follows:

a) Publication place: I select articles published in at least gradetwo ranking journal as per Association Business School Academic (ABS) Journal Quality GuideVersion 4 2010 Edition (hereafter the Guide) due in part to quality preference.
b) Estimation and Validation procedures: In addition to (a) above, I select studies with reasonable estimation sample or ex-ante validation or ex-post data validation or Lachenbruch test (see Collopy, Adya and Armstrong, 1994).
c) Finally, each paper and its resultant model(s) passes through an in-depth scrutiny on four critical dimensions namely: robustness, predictive accuracy, adaptability and explanatory capability.

3.1.6 Data Collection of the SLR

An integrated template designed after taking a cue from prior reviewers, particularly Kumar and Ravi (2007), Aziz and Dar (2006), and Balcaen and Ooghe (2006) is filled for each selected work. The form consists of the research attributes. These include results (RQ1), technique used (RQ2), and methodological issues (RQ3 and RQ4). The methodological issues comprise purpose, sample, variables, matching, origin, and operational definition among others.

3.1.7 Data Analysis of the SLR

The data collected are formulated to display:

a) The identifier allocated (i.e. its authors, bibliographic reference, origin and year of publication) to the study in the SLR.
b) The organization of the study following the taxonomy suggested (presented in 3.2.2).
c) The rational for the study and it results are discussed in relation to RQ1. In addition, a discussion of the corporate failure prediction studies is the focus of section 3.3.
d) The research technique and method used to develop and validate model (concerning RQ3). Consistent with Aziz and Dar (2006) and Dimitras et al' s(1999) reviews, studies that used two or more methods are counted as more than one empirical investigation. This sets the scene for a discussion of the results in section 3.2 and particularly the search results in section 3.2.1.

3.2 RESULTS OF THE SLR

3.2.1 Search Results and Deviations from Protocol

The search string is used in the search engines of the five main sources. Table 2 reports a summary of the number of papers identified per source, candidates and selected studies[4]. Thus, the inclusion and exclusion criteria are used to identify the candidate and selected studies, respectively..

Table 2: Search Results

Source	Studies found	Candidate Studies	Selected Studies
Google Scholar	**142**	**57**	**13**
Wiley Interscience	**32**	**13**	**13**
Science Direct	**11357**	**32**	**32**
Web of Knowledge	**54**	**17**	**16**
Business Source Complete.	**128**	**13**	**13**
Other-deviation from protocol			**10**
Total	**11,713**	**132**	**97**

Note: Identical studies in different sources have not yet been eliminated.

The search process also results in 11 scholarly reviewed articles and one book (see section 3.0 above). These are read with a critical eye for the following reasons: (1) to generate a representation of the state of the art about the SLR subject. For this reason, I read these prior reviews with Darwin's Evolution Theory at the back of our mind, suggesting that all organisms are derived from a common ancestral gene pool. The goal is twofold: First, to acquaint ourselves with prior authors, and second, deepen our knowledge on the field under study. The bibliographies of the prior reviewed articles also reveal related papers relevant to the SLR's research questions. In view of that, the SLR includes 10 papers that satisfy the quality criteria but two: Altman (1973) and Wilcox (1973). On one hand, this is a deviation of protocol that concerns repetition of the SLR. On the other hand, the interest of working with more widespread set of papers must prevail.

Consequently, the present SLR covers 97 articles reporting 160 prediction failure models (see table 3), published in scholarly reviewed journals in nine main disciplines. These are as follows: finance (57), information management (32), operations (32), accountancy (22),

[4] To conserve space, I present only the selected studies in Table 2

economics (5), management (4), marketing (3), entrepreneurship (3), international business (1) and finally, tourism (1). The important implication of this is that, the prediction of corporate failure is a multi-disciplinary field. In particular, 17, 16, 14, 13, 10, and 9 studies are published in the following Journals: (1) Intelligence System Accounting Finance and Management, (2) Expert System Application, (3) Business Finance Accounting, (4) Decision Support Systems, (5) Banking and Finance, and (6) Accounting Research, respectively. Furthermore, selected studies originate from 12 countries. Table 3 shows that 53%, 14%and 10% of the studies used dataset from the US, Korea and UK, respectively. In addition, Australia, Belgium and Canada account for 4% each, whereas the rest of the world accounts for the remaining (i.e. Finland 3%, France 3%, Greece 2%, Italy 2%, Brazil 1% and Spain 1%). These disclosures pave the way for an in-depth discussion of the methodological issues in the extant literature, in the next sub-section.

3.2.2 Synthesis of the Proposals

This section provides a synthesis vision of the field of knowledge addressed by the SLR questions, to facilitate future research in this area. In particular, this section answers RQ3, what are the methodological issues in the literature? In this respect, the selected papers' attributes are tabulated in table 3. From this point, taxonomy is proposed for the papers selected in this SLR based on the five steps used by prior researchers to achieve their respective contribution. These steps are as follows: (1) research objective, (2) application focus, (3) data collection, (4) development of model and (5) empirical results. I discuss each in turn.

Step 1-Research Objective

The present SLR identifies four common objectives from prior studies. First, most researchers test the predictive ability of variables and/or statistical technique (e.g. Beaver 1966; Altman, 1968, 1973; Casey and Bartczak, 1984; Tam and Kiang, 1992). Second, others (e.g. Tam and Kiang 1992) test the predictive accuracies of various statistical methods, due in part to Joy and Tollefson's (1975) criticisms. Third, Deakin (1972), Moyer (1977), Booth (1983), Fanning and Cogger (1994) and others also examine the predictive abilities of prior models, Altman's (1968) model, in particular, Finally, minority (e.g. Altman, Halderman and Narayanan, 1977; Dambolena and Khoury, 1980; Mensah, 1983; Back, Laitinen and Sere,

1996) focuses on methodological issues (example: variables selection, dataset or statistical technique).

Nonetheless, to avoid overlaps, the SLR follows Dietrich (1984) and, in this way, categorises the aims of prior papers into two namely: testing the association between distressed measures (R1), and developing models to predict corporate failure (R2). In this respect, the former and the latter account for 86% and 14%, respectively (see table 3, column 5).

Step 2-Issues Associated to the Application Focus of Models

Most of the models reported in table 3, are application driven. Thus, researchers apply numerous statistical techniques and firms' accounting data to predict corporate failure (Cybinski, 2001; Balcaen and Ooghe, 2006). Thus, models are the outcome of a statistical search through a number of accounting variables (Balcaen and Ooghe, 2006). In this regard, Cybinski (2001) contends that prior prediction models are the outcome of 'putting the cart before the horse'. The implications are twofold namely: (a) neglect of non-financial information and (b) ad hoc selection of variables. I discuss each in turn.

Table 3: Summary of Attributes of Papers Reviewed

NO.	AUTHOR(S)	YEA	AIM	VAR	TERM	MATC	YPTF	F-SAMP	FIRMS	ORIG	MODEL	OPA	ET1	ET11	VT1	VTII	V MET
S001	Beaver	1966	R1	FR	D5D6	23	5	79:79	Mix	USA	UA	90	22	5	34	8	h-out
S002	Altman	1968	R1	FR	D5	23	5	58:99	M	USA	LDA	96	6	3	4	21	h-out
S003	Deakin	1972	R2	FR	D5	123	5	43;55	M	USA	LDA	97	3	3	18	23	ex-ante
S004	Casey et al	1984	R1	FR	D5	2	5	60:230	Mix	USA	UA	75	17	27	3	35	h-out
S005	Casey et al	1984	R1	FR	D5	2	5	60:230	Mix	USA	LDA	86	17	13	37	11	h-out
S006	Casey et al	1985	R1	MIX	D5	12	5	60:230	Mix	USA	LDA	87	13	13	13	33	h-out
S007	Casey et al	1985	R1	MIX	D5	12	5	60:230	Mix	USA	Logit	88	37	5	60	5	h-out
S008	Martin	1977	R2	FR	D13	6	6	23;5575	Banks	GBR	QDA	87	9	8	8	45	h-out
S009	Martin	1977	R2	FR	D13	6	6	23;5575	Banks	USA	LDA	82	17	4	50	20	h-out
S010	Martin	1977	R2	FR	D13	6	6	23;5575	Banks	USA	Logit	91	9	9	17	10	h-out
S011	Collins	1980	R1	FR	D1	6	1	162;162	Credit	USA	LPM	94	4	2	0	0	none
S012	Collins	1980	R1	FR	D1	6	1	162;162	Credit	USA	LPM	93	4	3	0	0	none
S013	Trieschmann et al	1973	R2	FR	D1	23	1	26;26	Insurance	USA	LDA	94	8	4	0	0	none
S014	Moyer	1977	R1	FR	D5	23	3	27;27	Mix	USA	LDA	91	5	14	20	14	none
S015	Taffler	1982	R2	FR	D1	67	1	56;55	M	GBR	LDA	94	12	0	40	0	h-out
S016	Altman	1973	R2	FR	D5	8	2	21;71	Railroad	USA	LDA	98	2	0	0	0	h-out
S017	Altman et al	1977	R2	MIX	D5	12	5	53;58	R&M	USA	LDA	93	4	10	5	7	h-out
S018	Altman et al	1977	R2	MIX	D5	12	5	53;58	R&M	USA	QDA	93	6	9	23	8	h-out
S019	Sharma et al	1980	R2	FR	D5	23	5	36;36	R	USA	LDA	92	nr	nr	nr	nr	h-out
S020	Wilcox	1971	R1	FR	D5	n/a	n/a	n/a	n/a	USA	Ruin	n/a	0	0	0	0	h-out
S021	Dambolena et al	1980	R1	FR	D5	12	5	23:23	R&M	USA	LDA	91	17	0	17	13	h-out
S022	Altman et al	1979	R2	FR	D5	12	3	23:35	Mix	BRA	LDA	91	12	7	21	15	h-out
S023	Altman	1977	R2	FR	D5	6	5	56:107	S&L	USA	QDA	96	4	4	4	8	h-out
S024	Booth	1983	R1	FR	D5	12	1	25;25	Mix	AUS	LDA	85	18	12	25	50	h-out
S025	Betts et al	1987	R1	FR	D5	6	3	50;50	Mix	GBR	LDA	96	8	2	8	19	h-out
S026	Altman et al	1976	R2	MIX	D5	6	1	40:113	Brokers	USA	QDA	90	10	10	18	12	h-out
S027	Koh et al	1990	R2	FR	D5	23	1	48:420	Mix	USA	LDA	93	6	9	21	11	h-out
S028	Baldwin et al	1992	R1	FR	D5	123	6 Q	40;40	Mix	USA	LDA	nr	0	0	0	0	Jack
S029	Taffler	1983	R1	FR	D1	237	1	46;46	M	GBR	LDA	96	4	0	0	4	h-out
S030	El Hennawy et al	1983a	R1	MIX	D1	7	5	31;31	M,C&D	GBR	LDA	98	5	4	0	0	h-out
S031	El Hennawy et al	1983a	R1	MIX	D1	7	5	31;31	M,C&D	GBR	LDA	98	5	4	11	10	h-out
S032	El Hennawy et al	1983a	R1	MIX	D1	7	5	53;53	M,C&D	GBR	LDA	97	7	6	11	10	h-out
S033	El Hennawy et al	1983a	R1	MIX	D1	7	5	53;53	M,C&D	GBR	LDA	98	5	4	11	10	h-out
S034	Neophytou et al	2004	R1	FR	D1	23	1	50;50	Mix	GBR	MDS	nr	nr	nr	0	0	h-out
S035	Lo	1986	R1	FR	D5	123	1	38;38	Mix	USA	LDA	nr	0	0	0	0	none
S036	Lo	1986	R1	FR	D5	123	1	38;38	Mix	USA	Logit	nr	0	0	0	0	none
S037	Wilcox	1973	R1	FR	D5	23	5	52;52	Mix	USA	Ruin	94	0	0	0	0	h-out
S038	Santomero et al	1977	R1	FR	D5	6	1	00:00	Banks	USA	Ruin	nr	0	3	0	0	h-out
S039	Vinso	1997	R1	FR	D5	6	nr	20:20	Utilities	USA	Ruin	nr	0	0	0	0	none
S040	Blum	1974	R2	FR	D5	123	8	115:115	Mix	USA	LDA	94	7	10	20	15	h-out
S041	Gentry et al	1985	R1	FR	D5	123	3	56;56	Mix	USA	Logit	83	21	12	26	30	h-out

S042	Aziz et al	1988	R1	FR	D5	23	5	49;49	Mix	USA	LDA	89	0	0	0	0	h-out
S043	Aziz et al	1988	R1	FR	D5	23	5	49;49	Mix	USA	Logit	92	14	2	14	16	h-out
S044	Begley et al	1996	R1	FR	D5	23	1	130:2600	Mix	USA	LDA	78	22	22	19	25	h-out
S045	Begley et al	1996	R1	FR	D5	23	1	265:3300	Mix	USA	Logit	72	12	17	11	27	h-out
S046	Altman et al	1994	R1	FR	D5	23	3	554:554	Mix	ITA	LDA	88	4	7	5	10	h-out
S047	Altman et al	1994	R1	FR	D5	23	3	404:404	Mix	ITA	BPNN	94	5	8	14	11	h-out
S048	Mensah	1983	R1	FR	D5	23	1	41:65	M	USA	LDA	100	0	0	54	31	ex-ante
S049	Mensah	1983	R1	FR	D5	23	1	41:65	M	USA	Logit	97	0	0	0	0	ex-ante
S050	Gentry et al	1987	R1	FR	D5	123	3	33;33	Mix	USA	Probit	84	21	12	0	0	none
S051	Aly et al	1992	R1	FR	D5	1234	3	26;26	Mix	USA	LDA	90	12	8	0	23	jack
S052	Aly et al	1992	R1	FR	D5	1234	3	26;26	Mix	USA	Logit	100	0	0	0	0	jack
S053	Jones et al	2004	R1	FR	D5D6	6	5	423:7818	Mix	AUS	Mxlogit	99	0	0	0	0	ex-ante
S054	Wilson et al	1994	R1	FR	D5	23	1	65:64	Mix	USA	LDA	89	17	6	7	8	h-out
S055	Wilson et al	1994	R1	FR	D5	23	1	65:64	Mix	USA	BPNN	100	0	0	4	4	h-out
S056	Jones et al	2004	R1	FR	D5D6	6	5	423:7818	Mix	AUS	MNLogit	nr	0	0	0	0	h-out
S057	Kim and Gu	2006	R1	FR	D5	3	1	33;33	Restaurants	USA	Logit	94	18	14	26	16	h-out
S058	Luoma et al	1991	R1	FR	D1	23	1	36;36	SME: R&Ind	FIN	SA	62	38	38	0	0	none
S059	Luoma et al	1991	R1	FR	D1	23	1	36;36	SME: R&Ind	FIN	LDA	80	35	24	0	0	none
S060	Laitinen et al	1998	R1	MIX	D5	123	2	41;41	SMEs	FIN	logit	87	12	15	34	29	h-out
S061	Hensher et al	2007a	R1	MIX	D5D2D6	3	5	423:7818	Mix	AUS	MxLogit	81	27	3	nr	nr	ex-ante
S062	Hensher et al	2007b	R1	MIX	D5D2D6	6	5	790:4036	Mix	AUS	ECMlogit	82	9	1	nr	nr	h-out
S063	Jones et al	2007a	R1	MIX	D5D2D6	6	5	592:7818	Mix	AUS	Nlogit	nr	nr	nr	0	5	ex-ante
S064	Nam et al	2000	R2	FR	D5	23	6	74;70	Mix	KOR	Logit	77	20	26	26	22	h-out
S065	Kim et al	2010	R1	FR	D5	6	1	729:729	M	KOR	NN	75	23	35	9	17	h-out
S066	Kim et al	2010	R1	FR	D5	6	1	729:729	M	KOR	BNN	76	18	32	23	26	h-out
S067	Kim et al	2010	R1	FR	D5	6	1	729:729	M	KOR	BANN	77	17	31	23	26	h-out
S068	Yang et al	1999	R1	FR	D5	6	1	33:89	OilGas	USA	PNN	84	37	10	nr	nr	h-out
S069	Yang et al	1999	R1	FR	D5	6	1	33:89	OilGas	USA	LDA	87	12	13	nr	nr	h-out
S070	Varetto	1998	R1	FR	D5	6	3	2369:2369	Mix	ITA	GANN	97	4	2	17	3	h-out
S071	Salchenberger et	1992	R1	FR	D5	35	1	229:229	S&L	USA	BPNN	97	4	2	15	1	h-out
S072	Salchenberger et	1992	R1	FR	D5	35	1	229:229	S&L	USA	Logit	94	10	3	28	1	h-out
S073	Luoma et al	1991	R1	FR	D1	23	1	36;36	SME: R&Ind	FIN	Logit	72	27	29	0	0	none
S074	Lussier	1995	R1	NFI	D5	235	1	108;108	SMEs	USA	Logit	69	27	27	0	0	none
S075	Frydman et al	1985	R1	FR	D5	6	1	58;142	R&M	USA	LDA	70	18	12	0	0	none
S076	Pompe et al	2005	R1	FR	D5	6	5	1369:3000	SMEs	BEL	LDA	76	29	25	29	54	h-out
S077	Pompe et al	2005	R1	FR	D5	6	5	1369:3000	SMEs	BEL	NN	77	nr	nr	0	0	h-out
S078	Huyghebaert et al	2000	R1	CF	D5	7	1	81:742	MIX	BEL	Logit	56	16	73	31	28	none
S079	Kahya et al	1999	R1	FR	D6	6	1	72:389	R&M	USA	CusumNN	82	18	17	na	19	none
S080	Kahya et al	1999	R1	FR	D6	6	1	72:117	R&M	USA	LDA	76	31	17	0	0	none
S081	Kahya et al	1999	R1	FR	D6	6	1	72:117	R&M	USA	Logit	76	32	16	0	0	none
S082	Mckee	2000	R2	FR	D5	6	1	100:100	MIX	USA	Rough set	93	nr	nr	14	10	h-out
S083	Lacher et al	1995	R1	FR	D5	7	4	94:188	M	USA	CascorNN	94	11	2	9	2	h-out
S084	Lee et al	1996	R1	FR	D5D2D11	3	1	83:83	MIX	KOR	LDA	68	nr	nr	nr	nr	ex-ante
S085	Lee et al	1996	R1	FR	D5D2D11	3	1	83:83	MIX	KOR	ID3	74	nr	nr	nr	nr	ex-ante
S086	Lee et al	1996	R1	FR	D5D2D11	3	1	83:83	MIX	KOR	MDA-NN	70	nr	nr	nr	nr	ex-ante

S087	Lee et al	1996	R1	FR	D5D2D11	3	1	83:83	MIX	KOR	ID3-NN	73	nr	nr	nr	nr	ex-ante
S088	Lee et al	1996	R1	FR	D5D2D11	3	1	83:83	MIX	KOR	SOFA(MDA)NN	84	nr	nr	nr	nr	ex-ante
S089	Lee et al	1996	R1	FR	D5D2D11	3	1	83:83	MIX	KOR	SOFM(ID3)NN	74	nr	nr	nr	nr	ex-ante
S090	Min et al	2005	R1	FR	D5	6	1	944:944	MIX	KOR	SVM	88	nr	nr	18	16	h-out
S091	Jo et al	1997	R1	FR	D5	2	3	271;271	MIX	KOR	LDA	82	nr	nr	0	0	h-out
S092	Jo et al	1997	R1	FR	D5	2	3	271;271	MIX	KOR	NN	84	nr	nr	0	0	h-out
S093	Jo et al	1997	R1	FR	D5	2	3	271;271	MIX	KOR	CBR	82	nr	nr	0	0	h-out
S094	Boritz et al	1995	R1	FR	D5	7	1	171:6153	MIX	CAN	LDA	99	nr	nr	0	0	h-out
S095	Boritz et al	1995	R1	FR	D5	7	1	171:6153	MIX	CAN	QDA	63	0	0	0	0	h-out
S096	Boritz et al	1995	R1	FR	D5	7	1	171:6153	MIX	CAN	NPDA	99	0	0	0	0	h-out
S097	Boritz et al	1995	R1	FR	D5	7	1	171:6153	MIX	CAN	Logit	99	0	0	0	0	h-out
S098	Boritz et al	1995	R1	FR	D5	7	1	171:6153	MIX	CAN	Probit	99	0	0	0	0	h-out
S099	Boritz et al	1995	R1	FR	D5	7	1	171:6153	MIX	CAN	OETNN	99	0	0	0	0	h-out
S100	Boritz et al	1995	R1	FR	D5	7	1	171:6153	MIX	CAN	BPNN	99	0	0	0	0	h-out
S101	Fanning et al	1994	R1	FR	D5	6	5	190:190	MIX	USA	Logit	96	nr	nr	6	24	ex-ante
S102	Fanning et al	1994	R1	FR	D5	6	5	190:190	MIX	USA	GANNA	95	nr	nr	6	24	ex-ante
S103	Fanning et al	1994	R1	FR	D5	6	5	190:190	MIX	USA	BPNN	95	nr	nr	6	24	ex-ante
S104	Zhang et al	1999	R1	FR	D5	23	1	110;110	M	USA	CV-NN	79	18	24	0	0	none
S105	Theodossiou	1991	R2	FR	D5D13	6	1	81:420	M	GRE	LPM	93	11	4	0	14	ex-ante
S106	Theodossiou	1991	R2	FR	D5D13	6	1	81:420	M	GRE	Logit	94	7	4	4	8	ex-ante
S107	Theodossiou	1991	R2	FR	D5D13	6	1	81:420	M	GRE	Probit	93	7	5	4	5	ex-ante
S108	Ohlson	1980	R1	FR	D5	6	3	105:2058	Mix	USA	Logit	96	11	27	12	17	h-out
S109	Tam	1991	R1	FR	D5	3	2	81;81	Banks	USA	LDA	85	7	24	18	36	h-out
S110	Min et al	2005	R1	FR	D5	6	1	944:944	Mix	KOR	LDA	79	nr	nr	nr	nr	h-out
S111	Min et al	2005	R1	FR	D5	6	1	944:944	Mix	KOR	Logit	80	nr	nr	nr	nr	h-out
S112	Min et al	2005	R1	FR	D5	6	1	944:944	Mix	KOR	BPNN	85	nr	nr	21	14	h-out
S113	Tam	1991	R1	FR	D5	3	2	81;81	Banks	USA	Logit	87	12	14	36	9	h-out
S114	Tam	1991	R1	FR	D5	3	2	81;81	Banks	USA	kNN	69	36	25	41	5	h-out
S115	Tam	1991	R1	FR	D5	3	2	81;81	Banks	USA	ID3	92	10	5	23	18	h-out
S116	Tam	1991	R1	FR	D5	3	2	81;81	Banks	USA	BPNN	96	0	8	18	11	h-out
S117	Tam et al	1992	R1	FR	D5	3	2	81;81	Banks	USA	BPNN	96	0	8	9	12	jack
S118	Tam et al	1992	R1	FR	D5	3	2	81;81	Banks	USA	ID3	92	10	5	21	17	jack
S119	Tam et al	1992	R1	FR	D5	3	2	81;81	Banks	USA	DA	89	0	22	17	11	jack
S120	Tam et al	1992	R1	FR	D5	3	2	81;81	Banks	USA	Logit	92	9	7	12	17	jack
S121	Tam et al	1992	R1	FR	D5	3	2	81;81	Banks	USA	kNN	69	36	25	19	31	jack
S122	Charitou et al	2004	R2	MIX	D1	23	3	51;51	Mix	GBR	BPNN	96	0	8	14	18	jack
S123	Charitou et al	2004	R2	MIX	D1	23	3	51;51	Mix	GBR	Logit	94	8	4	16	13	jack
S124	Bryant	1997	R1	FR	D5	7	3	85:2000	R&M	USA	CBR	61	73	5	73	5	ex-ante
S125	Park et al	2002	R1	MIX	D5	23	1	1072;1072	Mix	KOR	AHP-KNN-CBR	83	nr	nr	0	0	none
S126	Frydman et al	1985	R1	FR	D5	6	1	58;142	R&M	USA	RPA	84	14	2	0	0	none
S127	Mckee	1995	R2	FR	D5	67	1	30;30	Electronics	USA	ID3	97	0	6	0	0	none
S128	Shin et al	2002	R1	FR	D5	6	1	264;264	M	KOR	MSD-ICPB	81	0	0	0	0	ex-ante
S129	Nanda et al	2001	R1	FR	D5	23	1	75;75	Mix	USA	LDA	69	5	nr	4	0	ex-ante
S130	Nanda et al	2001	R1	FR	D5	23	1	75;75	Mix	USA	MSD	65	6	nr	8	0	ex-ante
S131	Nanda et al	2001	R1	FR	D5	23	1	75;75	Mix	USA	MSD-ICPB	72	2	nr	4	0	ex-ante

S132	**Nanda et al**	**2001**	**R1**	**FR**	**D5**	**23**	**1**	**75;75**	**Mix**	**USA**	**GANN**	**74**	**6**	**nr**	**4**	**0**	**ex-ante**
S133	**Nanda et al**	**2001**	**R1**	**FR**	**D5**	**23**	**1**	**75;75**	**Mix**	**USA**	**GANN-ICPB**	**69**	**2**	**nr**	**2**	**0**	**ex-ante**
S134	**Fletcher et al**	**1993**	**R1**	**FR**	**D5**	**23**	**1**	**18;18**	**Mix**	**USA**	**BPNN**	**89**	**nr**	**nr**	**0**	**0**	**h-out**
S135	**Fletcher et al**	**1993**	**R1**	**FR**	**D5**	**23**	**1**	**18;18**	**Mix**	**USA**	**Logit**	**77**	**nr**	**nr**	**0**	**0**	**h-out**
S136	**Etheridge et al**	**2000**	**R1**	**FR**	**D5**	**6**	**3**	**137:941**	**Banks**	**USA**	**BPNN**	**96**	**13**	**4**	**44**	**5**	**h-out**
S137	**Etheridge et al**	**2000**	**R1**	**FR**	**D5**	**6**	**3**	**137:941**	**Banks**	**USA**	**CLNN**	**93**	**0**	**7**	**17**	**8**	**h-out**
S138	**Etheridge et al**	**2000**	**R1**	**FR**	**D5**	**6**	**3**	**137:941**	**Banks**	**USA**	**PNN**	**98**	**44**	**2**	**48**	**3**	**h-out**
S139	**Cienlen et al**	**2004**	**R1**	**FR**	**D5**	**7**	**1**	**90:276**	**Mix**	**BEL**	**MSD**	**78**	**29**	**19**	**26**	**16**	**jack**
S140	**Cienlen et al**	**2004**	**R1**	**FR**	**D5**	**7**	**1**	**90:276**	**MIX**	**BEL**	**DEA**	**85**	**26**	**11**	**24**	**10**	**jack**
S141	**Cienlen et al**	**2004**	**R1**	**FR**	**D5**	**7**	**1**	**90:276**	**MIX**	**BEL**	**C5.0**	**80**	**45**	**11**	**37**	**7**	**jack**
S142	**Mckee**	**2003**	**R1**	**FR**	**D5**	**123**	**1**	**146:145**	**Mix**	**USA**	**Rough set**	**61**	**nr**	**nr**	**0**	**0**	**h-out**
S143	**Peel, Peel&Pope**	**1986**	**R1**	**MIX**	**D1**	**6**	**2**	**22:56**	**MIX**	**GBR**	**CLA**	**97**	**2.94**	**2.27**	**17**	**0**	**h-out**
S144	**Peel &Peel**	**1988**	**R1**	**MIX**	**D1**	**6**	**3**	**23:59**	**industrial**	**GBR**	**mnlogit**	**90**	**nr**	**nr**	**0**	**0**	**ex-ante**
S145	**Peel&Peel**	**1988**	**R1**	**MIX**	**D1**	**6**	**3**	**23:59**	**industrial**	**GBR**	**Logit**	**92**	**8.6**	**6.8**	**0**	**0**	**ex-ante**
S146	**Keasey et al**	**1990**	**R1**	**FR**	**D1**	**123**	**5**	**62:62**	**Mix**	**GBR**	**mnlogit**	**90**	**nr**	**nr**	**0**	**0**	**h-out**
S147	**Keasey, et al**	**1990**	**R1**	**FR**	**D1**	**123**	**5**	**62:62**	**Mix**	**GBR**	**Logit**	**86**	**14**	**86**	**36**	**30**	**jack**
S148	**Zhang et al**	**1999**	**R1**	**FR**	**D5**	**23**	**1**	**110;110**	**M**	**USA**	**Logit**	**79**	**22**	**20**	**0**	**0**	**none**
S149	**Park et al**	**2002**	**R1**	**MIX**	**D5**	**23**	**1**	**1072:1072**	**Mix**	**KOR**	**CBR**	**68**	**28**	**17**	**0**	**0**	**none**
S150	**Park et al**	**2002**	**R1**	**MIX**	**D5**	**23**	**1**	**1072:1072**	**Mix**	**KOR**	**RegKNN**	**76**	**nr**	**nr**	**0**	**0**	**h-out**
S151	**Park et al**	**2002**	**R1**	**MIX**	**D5**	**23**	**1**	**1072:1072**	**Mix**	**KOR**	**LogitKNN**	**79**	**nr**	**nr**	**0**	**0**	**h-out**
S152	**Premachandra et al**	**2011**	**R1**	**FR**	**D5**	**6**	**1**	**50;951**	**Mix**	**USA**	**DEA**	**83**	**28**	**17**	**0**	**0**	**h-out**
S153	**Jardin et al**	**2011**	**R1**	**FR**	**D5**	**23**	**3**	**1430;1430**	**Retail**	**FRA**	**LDA**	**82**	**18**	**27**	**30**	**13**	**h-out**
S154	**Jardin et al**	**2011**	**R1**	**FR**	**D5**	**23**	**3**	**1430;1430**	**Retail**	**FRA**	**Logit**	**81**	**18**	**20**	**29**	**12**	**h-out**
S155	**Jardin et al**	**2011**	**R1**	**FR**	**D5**	**23**	**3**	**1430;1430**	**Retail**	**FRA**	**BPNN**	**83**	**18**	**17**	**28**	**13**	**h-out**
S156	**Jardin et al**	**2011**	**R1**	**FR**	**D5**	**23**	**3**	**1430;1430**	**Retail**	**FRA**	**SA**	**81**	**20**	**18**	**13**	**18**	**h-out**
S157	**Jardin et al**	**2011**	**R1**	**FR**	**D5**	**23**	**3**	**1430;1430**	**Retail**	**FRA**	**SOM**	**83**	**16**	**19**	**18**	**19**	**h-out**
S158	**Sanchez-Lasheras et al**	**2012**	**R1**	**FR**	**D5**	**6**	**1**	**256;63467**	**Construction**	**SPA**	**SOM-MARS**	**85**	**12**	**11**	**nr**	**nr**	**h-out**
S159	**Lau**	**1987**	**R1**	**MIX**	**D5**	**3**	**3**	**100;700**	**Mix**	**USA**	**mnlogit**	**96**	**nr**	**nr**	**nr**	**nr**	**h-out**
S160	**Platt et al**	**1990**	**R1**	**MIX**	**D5**	**123**	**1**	**57;57**	**Mix**	**USA**	**logit**	**90**	**7**	**12**	**14**	**14**	**h-out**

A Similar approach has been used by Aziz and Dar (2006)

Abbreviations:

FIRST ROW*: YEA-year of publication, AIM-objective of study, VAR-independent variables, TERM-definition of corporate failure, MATC-matching technique, YPFT-number of years prior to failure considered, of the term , F-SAMP-full sample, ORIG-origin, OPA-overall predictive accuracy in %,ET1-estimation type I error in %, ETII-estimation type II error in %, TEST-validation results in %,VT1-validation type I errors in %, VTII-validation type II errors in %, Validation Method.*

FIFTH COLUMN: FR-financial ratios, MIX-financial and non-financial ratios, NFI-non-financial ratio

TENTH COLUMN: M-manufacturing, R-retail, M-manufacturing, n/a-not applicable, C-construction, D-distribution, Ind-industrial, S&L-savings and Loans.

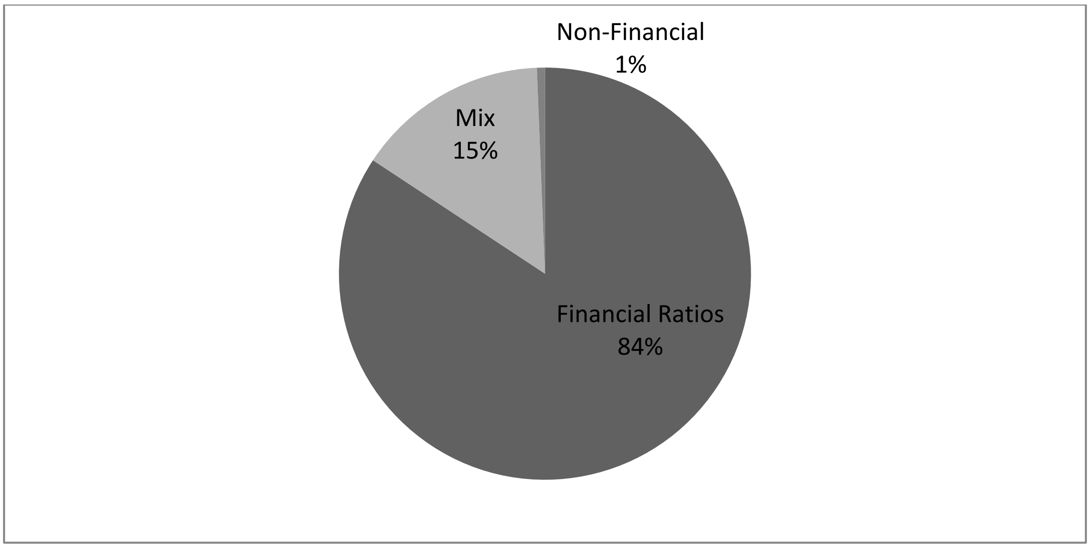


Figure 4: Independent Variables used in Prior Studies

(a) Neglect of Non-financial Information

Figure 4 shows that 84%, 1% and 15% of prior studies employed financial ratios, non-financial ratios and both, respectively. Thus, there is a general agreement that financial ratios provide the best predictions of corporate failure (Aziz and Dar, 2006). Financial ratios are arguably objective meas
ures based on publicly available data (Laitinen, 1992). This in part accounts for the dominance of its use in the corporate failure context.

However, there is little agreement about the most suitable ratios to use from, accrual-based financial ratios (Casey and Bartczak, 1984), cash based ratios (Gentry, Newbold and Whitford 1987; Aziz and Lawson, 1989) or both (Gentry, Newbold and Whitford, 1985). In this regard, the list of ratios[5] extracted from the papers reviewed verifies Dimitras, Zanakis, and Zopounidis's (1996) findings, suggesting that working capital/total assets, EBIT/total assets, total debt/total assets, net income/total Assets, quick assets/current liabilities, and current assets/current liabilities are the most common ratios used in prior studies.

There are disadvantages, however, in using financial ratios. First, small and medium enterprises in most countries are not obliged to publish financial statements. This limits prior studies to dataset from listed firms (95.63%). Also, but for Luoma and Laitinen's (1991)

[5]To conserve space the full list of ratios per each study is available upon request.

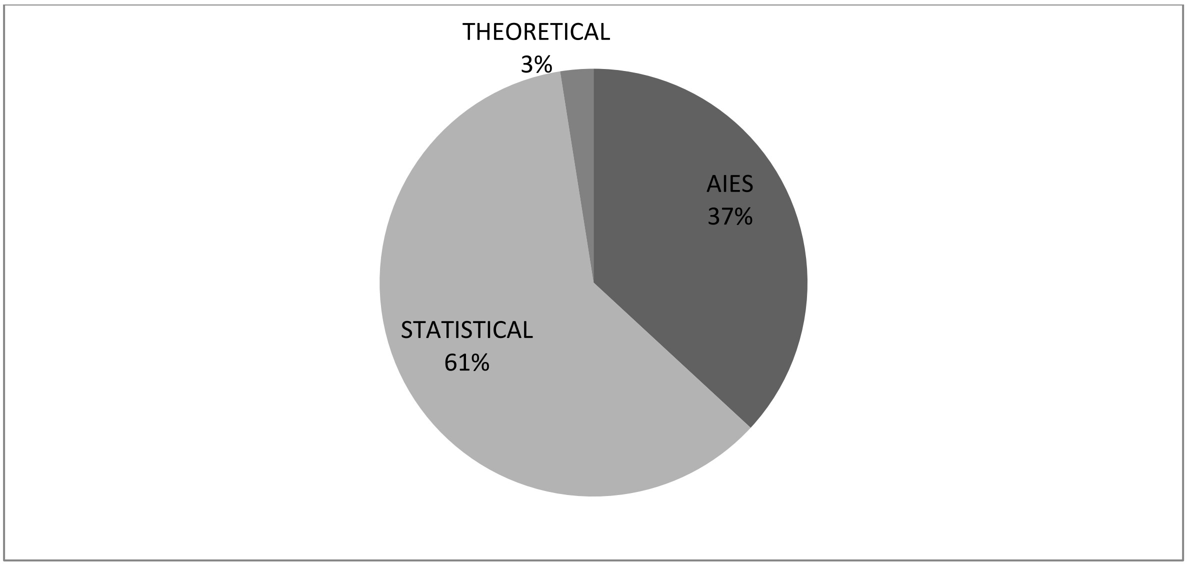
analysis in unincorporated entities, where the incidence of failure is greater (Altman, 1968), literature on unincorporated entities is distinctively lacking. Secondly, financial statements may not necessarily be true and fair, due in part to creative accounting. In this regard, accounting measures are subject to manipulation due to the accounting policies (see Argenti, 1976; Chakravarthy 1986; Keasey and Watson 1987; Rosner, 2010). This indicates that the financial ratios calculated may be unreliable. Thirdly, models, due in part to occurrence of extreme ratio values and errors, may be contaminated (see Balcaen and Ooghe, 2006). Finally, financial prediction models assume that all relevant failure indicators are reflected in the accounting proxies. For this reason, Zavgren (1985) contends that any model containing only financial information will not predict with certainty the failure or success of a firm (see also Argenti 1985). In this respect, Argenti (1985) notes the crucial question of why the entities fail is beyond the scope of financial ratios, emphasising those financial predictors may give signpost on the verge of collapse.

Few (15%) researchers (e.g. Argenti, 1976; Altman, Haldeman, Narayanan, 1977; Ohlson, 1980; Peel, Peel and Pope, 1986; Peel and Peel, 1988), however, favour financial and non-financial indicators (i.e. Mix) in the corporate failure context. Lussier’s (1995) study employs exclusively non-financial indicators from 108 matched paired firms, and finds that professional advice, education, staffing and parents are significantly different between the successful and failed US SMEs. Peel et al (1986) also show the efficacy of the timeliness of financial reporting to predict financial distress, using data from the UK.

(b) Ad-hoc Selection of Variables

Figure 5 indicates that majority (98%) of prior models are based on ad hoc selection of variables through statistical (61%) and artificially intelligent expert systems (37%) techniques. This suggests that existing models are purely based on empirical consideration, due in part to the lack of theory in the identification of predictive variables. Researchers use arbitrarily criteria which include: (1) prior studies’ ratios, commonly Altman (1968) (e.g. Deakin, 1972; Collins, 1980; Sharma and Mahajan, 1980; Salchenberger, Cinar and Lash, 1992; Kim and Gu, 2006), (2) ratios popularity and predictive success in prior studies, (3) researchers speculation, and (4) data availability for computation of ratios. Beaver (1968b) notes that the selection of variables based on popularity may be problematic, emphasising that popular ratios are more likely to be manipulated and, thus, may not be reliable.

Figure 5: Techniques used in Prior Studies



For this reason, empirical considerations are used to reduce the large set of potential financial ratios into seven key sets of decision dimensions: profitability, leverage, liquidity, cash, capital, inventory, and receivables (Pinches, Mingo and Caruthers 1973).

There are disadvantages, however, to this empirical consideration approach. First, the choice of variables is sample specific, implying that the resulting model is data specific (Zavgren, 1985). This may result in unexpected signs for some co-efficient (see Keasey, McGuinness and Short, 1990). This approach is heavily criticised. Blum (1974), for instance, argues that in the absence of a theory of symptoms, researchers cannot use statistical analysis of accounting ratios and anticipate a sustained correlation between explanatory variables and bankruptcy prediction. This SLR notes the classical papers of Blum (1974), Gentry et al (1985) and Aziz, Emanuel and Lawson, 1988) as the few exceptions to the present predicament. Thus, "***these models do not command full professional acceptance, in part because they lack the underpinnings of an explicit and well-developed theory*** (Scott, 1980:p1). Agarwal and Taffler (2007), however, propose a sound practical reason why these statistical based models work in practice, emphasising that "potential insolvency is difficult to hide when such 'holistic' statistical methods are applied" (p.298). Put simply, practitioners may not be so concerned about theory in developing failure prediction models. Nonetheless, Agarwal and Taffler (2007) suggest that future researchers must consider theoretical arguments to select suitable financial and non-financial variables for their models.

Step 3-Data Collection Stage of Prior Studies

The data collection stage is characterised by six features worth mentioning. These are: (1) subjectively defining the term corporate failure, (2) subjectively matching technique, (3) sample selectivity issues, (4) Non-consideration of misclassification cost, (5) assessment of classification results and (6) data sources. I discuss each in turn.

(a) Subjective Definition of the term "Corporate Failure"

I code the definition of the term "corporate failure" of each study on a scale of D1 to D13, using Morris' (1997) spectrum of indicators of business distressed. These are: liquidation (D1), delisting (D2), going concern qualification (D3), creditors' composition (D4), and creditors' protection (D5). Others are default of debt agreements (D6), reconstruction (D7), director resignation (D8), take-over (D9), closure or disposal of part of business (D10), and a reduction in dividend (D11). The rest are profits below forecast and zero capital for D12 and D13, respectively.

From this point, table 3 records 73.75% and 12.5% for D1 and D5, respectively. These, in turn, suggest that there is a general agreement on the legal definition of corporate failure, bankruptcy (D5) or insolvency (D1), in the US or UK, respectively. This definition allows an objective criterion for dating the failing firms and splitting the sample into failed and non-failed sub-samples (Charitou, Neophytou and Charalambous, 2004).

In contrast, researchers develop economic bankruptcy models but not legal bankruptcy models (Altman, 1968; Shumway, 2001; Hillegeist, Keating, Cram and Lundstedt, 2004). Hence, researchers (e.g. Beaver 1966, Lau 1987; Altman, Marco and Varetto 1994; Lee, Han and Kwon 1996; Jones and Henser, 2004 and Jones, Henser and Greene, 2007; Du Jardin and Severin, 2011) broaden the legal definition to include more than one of the Morris' (1997) spectrum. Balcaen and Ooghe (2006) concur, stressing that the corporate failure's definition is artificial and applied inappropriately to corporate failure prediction.

The definition of failed and non-failed companies is essential to minimise possible outliers and errors (i.e. Type I and II), in particular. Researchers' bias to minimise the type II errors, due in part to the heterogeneous nature of non-failed firms, results in a careful selection of non-failed firms (see. Altman and Loris, 1976; Taffler and Tisshaw, 1977; and El Hennawy and Morris 1983). Researchers, also, minimize type I errors by adopting the legalistic definition. Thus, researchers seek to avoid classifying business closure, delisting, mergers and acquisition as failures. As Watson and Everett (1996) observe closure firms may have sound financial position, but closed for other reasons.

(b) Subjective Matching Technique

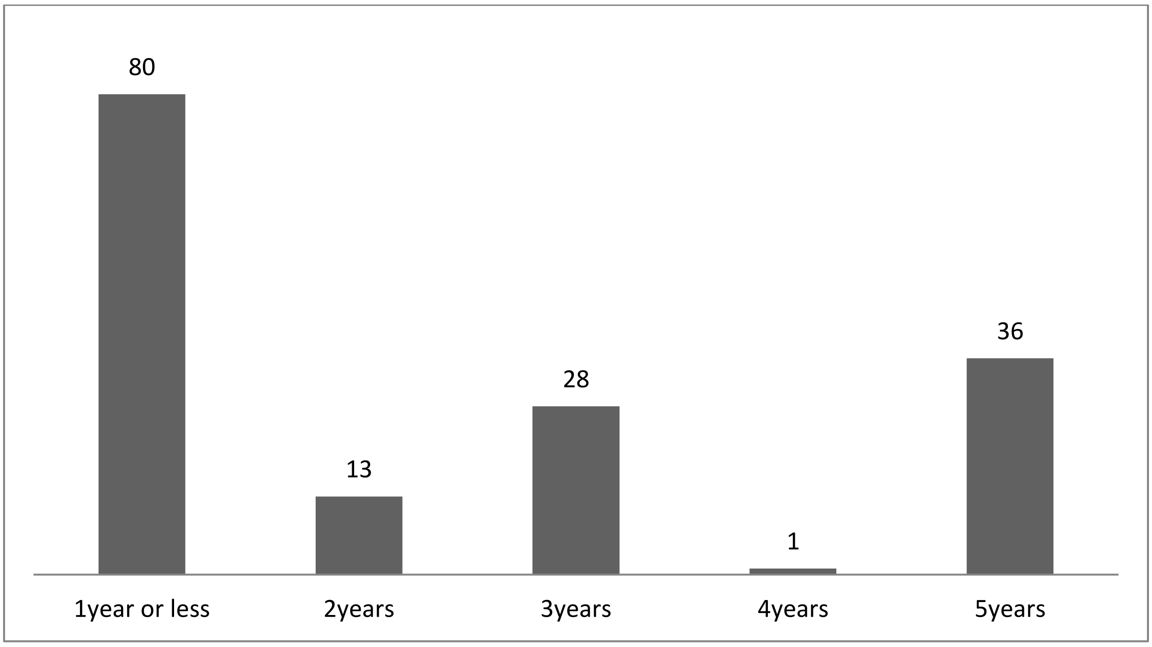
Having subjectively defined the term failure, researchers' next key task is to devise a procedure for matching the failed to the control sample. For clarity, I code the matching techniques of prior studies on a scale of 1 to 8, representing year, industry, size, inventory and depreciation method, location, random, bias, industry averages, respectively. The SLR records 30%, 27%, 22%, 9%, and 9% for size (e.g. assets, capital size, employees etc.), industry, random, year and bias, respectively. This result indicates overlap, due in part to combination of one or two items in the matching scale. Nonetheless, our results support the notion that size and/or industry dominates the matching technique in the extant literature.

There are disadvantages, however, with matching by size and industry. First, it leads to sample selection bias (Martin, 1977, Zmijewski 1984) and, in this way, asymptotic bias parameter and probability estimates (Menski and Lerman 1977). Morris (1997), for example, contends that sampling bias explains why the market does not appear to behave in the way expected if failure identification models are consistently successful. On one hand, matching on the basis of size leads to too many small companies in the non-failed sample. On the other, matching on the basis of industry leads to too many companies from recession-hit industries in the failed sample (Lennox, 1999). The important implication of matching by size and industry is that study's samples may not depict the firms' population.

Second, the use of relatively small sample may lead to over-fitting. This in turn, may impact on the models' stability (Platt and Platt, 1990), implying that model's predictive accuracy is misleading. Casey and Bartczak (1985) agree, emphasizing that matching on size limits the generalizability of the study's findings in the predictive context. Third, it is not possible to examine the role of industry and size on the likelihood of failure (Jones 1987).

Zmijewski's (1984) study, however, suggests that the qualitative findings of the arbitrarily matching and random sampling techniques are comparable. For this reason, Ohlson (1980) argues that the suitable criteria for matching are not clear. Though, a sizeable proportion of the literature follows the standard random sampling design (e.g. Martin, 1977; Jones and Henser, 2004; Kim and Kang, 2010).

Figure 6: Prior Studies and Number of years considered



(c) Sample Selectivity Issues

The sample selectivity issues are discussed logically as follows: (i) neglect of the time dimension of corporate failure, (ii) neglect of large size and (iii) arbitrary sample period.

(i) Neglect of the Time Dimension to Corporate Failure

The lack of data for the failed companies, especially in developing countries (see Altman and Narayanan, 1996), accounts for the numerous one year data models. Figure 6 indicates 80 and 36 out of 160 models consider one and five year data, respectively. Further, the US and UK studies account for 71% and 16% of the five year prior models.

There are demerits, however, of the dominance static prediction models. The demerits are primarily grounded in the two unrealistic assumptions. First, successive financial accounts are independent, repeated measurements (i.e. uniform failure-process). In an ex-ante predictive context, however, application of these static models to consecutive annual accounts of a firm may result in conflicting predictions (see Keasey, McGuiness and Short, 1990; Luoma, and Laitinen, 1991). Second, it also considers failure as a sudden event, and thus, neglects time-series behaviour (Luoma and Laitinen, 1991).

(ii) Neglect of Large Sample Size

The bulk of the literature is filled with small sample size models. The few notable exceptions are Ohlson (1980), Min and Lee (2005), Pompe and Bilderbeek (2005), Park and Han (2002), Hensher and Jones (2007), Jones and Hensher (2007), Du Jardin and Severin (2011) and Sanchez-Lasheras, De Andres, Lorca and De Cos Juez (2012).

To overcome the limitations of small sample size, prior studies collect data from mix industries (51%). Beaver (1966), Boritz, Kennedy, and De Miranda (1995), Charitou et al’s (2004) mix industries models, despite industry sensitive (Altman and Lavallee, 1981), record accuracies as high as 90%(87%), 99%(99%) and 96%(86%) for estimation (validation), respectively.

(iii) Subjective Sample Period

The definition of corporate failure is applied to a subjective chosen time period (Balcaen and Ooghe, 2006). Table 3 shows that sample period ranges from eight months (see Hyghebaert, Gaeremynck, Roodhooft, Van De Gucht, 2000) to 23 years (see Fanning and Cogger, 1994). On one hand, more than one year time frame is desirable to facilitate sufficient datasets for failed firms. Morris (1997) contends that 2% of listed firms fail in each year is germane here. On the other, two main assumptions are vital for models reliability namely: data stationarity and stability (Altman and Eisenbeis, 1978; Zmijewski, 1984). Stationarity implies stable relationship, first, among the independent variables (Edmister, 1972) and second, between the dependent and independent variables (Mensah, 1984 and Jones, 1987). Data stability also requires no change in the macroeconomic environment (i.e. inflation, interest rate and phase of business cycle, see Moyer 1977 and Mensah 1983).

The synthetic definition of failure which is applied to a subjective time period leads to sample selection bias (see Taffler, 1982; 1983). For this reason, models are valid for sample specific data within the chosen time period (Joos, De Bourdeaudhuij, and Ooghe, 1995). Simply put, prior models are sensitive to data examined, implying that models' power shrinks with ex-ante sample (Moyer, 1977).

Attempts to overcome data instability include but not limited to stability measures (Altman et al 1977, Dambolena and Khoury, 1980; Betts and Belhoul, 1987; Pompe and Bilderbeek, 2005) industry-relative ratios (Platt and Platt, 1990, El Hennawy and Morris 1983), deflated financial ratios (Mensah, 1983; Yang, Platt and Platt, 1999). These studies' results, however, are mixed. Yang et al (1999), for example, verify Platt and Platt's (1990) notion that deflation enhances the discriminant ability of prediction models. Dambolena and Khoury (1980) and Betts and Belhoul (1987) also suggest that inclusion of standard deviation of ratios improves significantly the ability of the discriminant function of large firms but not in the ex-ante's results. Pompe and Bilderbeek's (2005) findings, however, dispute Dambolena and Khoury (1980), suggesting that ratio stability measures do not enhance model's power, using small and medium industrial firms. Platt and Platt (1990) also suggest that industry-related variables do not significantly improve model's stability.

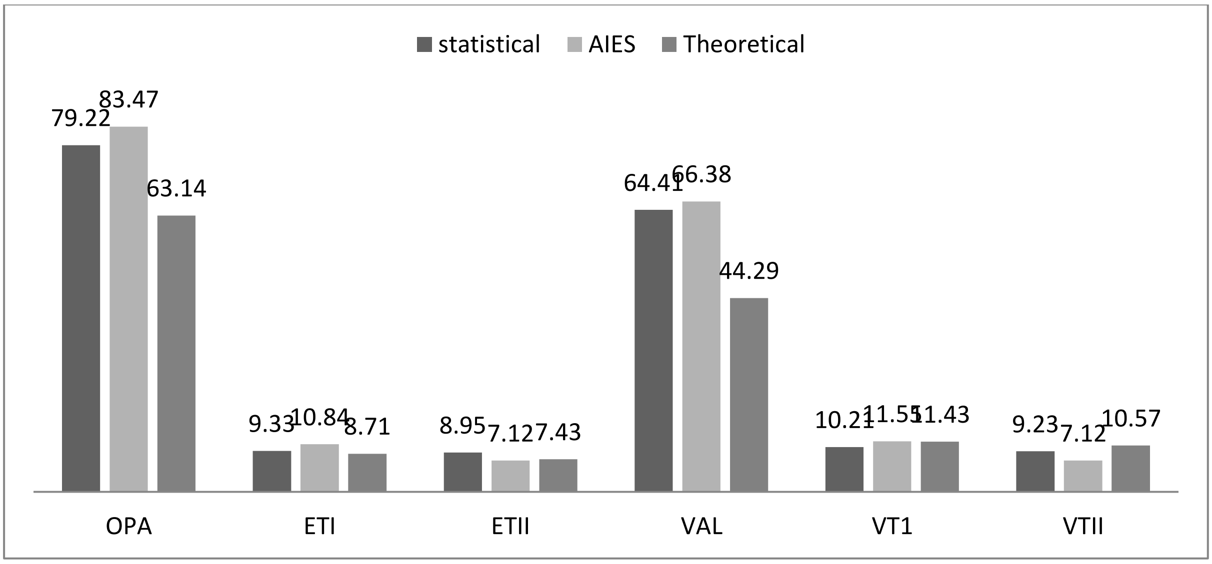
(d) Non-consideration of Misclassification Cost

Another issue worth mentioning is the non-consideration of misclassification cost. This indicates that prediction models depend fundamentally on the choice of the optimization measures and the modelling method. In this respect, there is no superior modelling method and optimization cut off-point, both are exclusively at the researcher's choice. In addition, researchers attempt to optimize various goodness-of-fit measures such as classifications accuracies, r-squared and maximum likelihood (Zavgren, 1985; Ooghe and Balcaen, 2002). In this respect, Balcaen and Ooghe (2006) posit that there is no point in finding a model that minimises a performance measure that is irrelevant to researcher's aims. Koh (1992) contends that the non-consideration of misclassification costs in prior studies does not appear to be a severe limitation. Ohlson (1980) shows, however, that consideration of misclassification costs may lead to different optimal cut-off points and thus, different results.

To mitigate the effects of non-consideration misclassification costs, researchers use ex-post and/or ex-ante sample as well as Lachenbruch jackknife test (Joy and Tollefson 1975) to examine both overfitting and violation of the stationarity assumption (see also Zavgren, 1983; Zmijewski, 1984; Mensah 1984). In particular, Jones (1987) is not in favour of the Lachenbruch method, since it does not test external validity. The inter-temporal test, which is equivalent to Lachenbruch Jackknife validation test, is a statistical technique widely accepted for validation of relatively small sample size. The SLR indicates 59.12%, 16.98%, 15% and 8.81% for holdout test, ex-ante test, no validation and Lachenbruch test for the extant literature, respectively. This probably confirms Moyer (1977), Mensah (1984), Charitou et al (2004) and Balcaen and Ooghe's (2006) notion, suggesting that existing failure models suffer from non-stationarity and data instability problems.

Most of the studies also register significant results using one-year financial data prior to failure, but results deteriorate 2-5 years prior to failure. Further, existing models' power is questionable with ex-ante data. Consequently, a sizeable number (15%) of models are not validated. This is perhaps one of the major limitations in the literature. Mensah (1983), El Hennawy and Morris (1983), Taffler (1982: 1983), Peel and Peel (1988) and Shin and Lee's (2002) studies, however, consider ex-ante sample for models' validation.

Figure 7: Classification Results of Prior Studies in %



(e) Assessment of Classification Results of Prior Studies

In general, independent variables' contribution may be assessed using one of the following: (1) forward stepwise discriminant analysis, (2) backward stepwise discriminant analysis, (3) scaled vector test, separation of means test (see Mosteller and Wallace, 1963; Joy and Tollefson, 1975; Altman et al, 1977), (4) conditional deletion test (Altman and Eisenbeis 1978), (5) univariate f-statistic and (6) Mosteller Wallace Analysis. Obviously, this is also another tonic issue, since the various methods result differs. The scaled vector method, in particular, is over criticised in the literature (see Joy and Tollefson, 1975; Moyer, 1977).

Figure 7 depicts that AIES, statistical and theoretical models record grand mean of overall predictive accuracy (OPA) estimation of 83.47 %, 79.72 %, and 63.14 %, respectively. Further, AIES slightly maintains its supremacy in the overall validation accuracy (VAL) of 66.38%, compared to 64.42% and 44.29% for statistical and theoretical models, respectively. This probably supports Aziz and Dar's (2006) findings, but sharply contrasts Plat and Platt's (1990) notion that within the sample classification results one year prior to failure are fairly invariant with respect to methodology. The validation results verify Platt and Platt's (1990) findings, suggesting that these results are disappointing. In this respect, Wood and Piesse (1987) suggest that theses disappointing results occur because the values of certain independent variables differ markedly between the validation and estimation periods.

On the contrary, the assessment of Type I and II errors indicates that the results are mixed. First, the theoretical models record lower type I errors in both estimation (ET1) and validation (VT1) of 8.71% and 11.43%, followed by the statistical and AIES. The AIES, however, records lower Type II errors of 7.12% in both the estimation (ETII) and validation (VTII), compared to estimation (validation) of 7.43%(10.57%) and 8.95%(9.23%) for theoretical and statistical techniques, respectively. This inconsistency is due in part to different techniques of validation. These confirm Aziz and Dar's (2006) notion, suggesting that choosing between techniques is problematic.

However, the estimation (validation) result of individual studies using AIES, statistical techniques and theoretical arguments are between 100%(99%)-61%(58%), 100%(100%)-56%(50%), 94%(90%)-83%(68%), respectively. This possibly confirms Scott's (1980) findings, suggesting that failure prediction is both empirically possible and theoretically understandable.

(f) Data Sources for Prior Studies

The US and UK offer multiplicity of data sources for prediction of corporate failure studies. The US data sources include but not limited to Moody Industrial Manual, Compustat Industrial Tape, OTC Manual, Wall Street Journal Index, and The Standard & Poor Stock Reports. The UK studies data sources are mainly from the Jordan Dataquest Database, DataStream, Compustat and Worldscope, Financial Times Actuaries All Share Index, and Department of Trade Databank. The Australian data sources include Sydney Stock Exchange and Australian Graduate School of Management Annual Report File. The rest are: *Centrate dei Bilanci*, Korean Stock Exchange, Compustat, SABI *Bureau Van Djik*, French Database Diane and National Bank of Belgian for Italy, Korea, Canada, Spain, France and Belgium, respectively.

3.3 DISCUSSION

This section presents the answer to RQ1: What techniques have been employed in this field? Consistent with the literature evolution, the section is structured as follows: statistical (3.3.1), artificially intelligent expert systems (3.3.2) and theoretical studies (3.3.3).

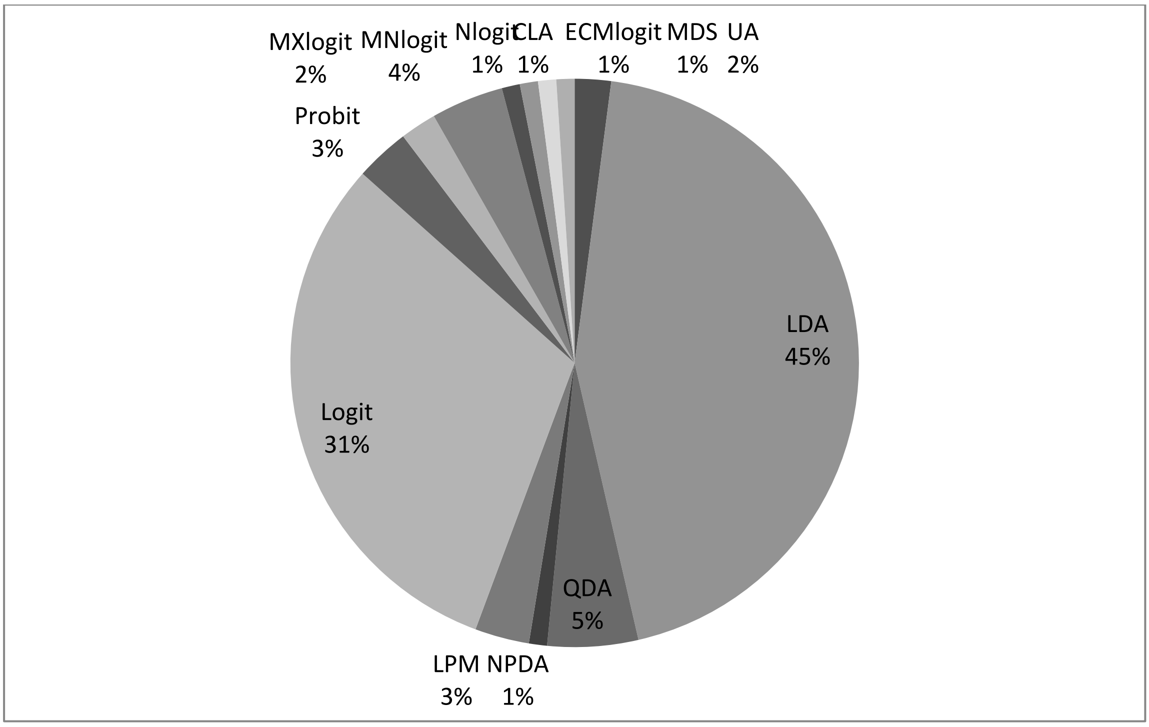


Figure 8: Statistical Methods used in Prior Studies

3.3.1 Review of Statistical Approaches Studies

Figure 8 contains the statistical methods used in prior studies. This sub-section presents a comprehensive discussion of the numerous statistical approaches as follows: (a) Univariate Analysis, (b) Multivariate Discriminant Analysis, (c) Multivariate Conditional Probability, and (d) Advanced Probability Modelling.

a. *Empirical Studies Using Univariate Analysis*

Univariate approach (UA) is analysing the predictive ability of independent variables, one at a time. Beaver's (1966) study, for example, finds that cash flow to total debt can predict failure five years prior to the event. Pompe and Bilderbeek's (2005) study confirms the predictive power of the cash flow to total debt.

Casey and Bartczak (1984), however, suggest that a firm's debt level, access to capital markets and the saleability of its capital assets as well as its reservoir of liquid assets may be better indicators of its likelihood of failure rather than cash flow data. Nonetheless, the comparison of these studies is inappropriate due in part to the huge sample size of Casey and

Bartczak (1984) and the subsample approach of Beaver, which in turn, makes both results misleading.

Altman (1968) concurs; stressing that UA's results adaptation for assessing the likelihood of a firm's failure is questionable. Others, too, give emphasis to the weaknesses in the UA's assumptions (e.g. Whittington, 1980; Keasey and Watson, 1991). UA is based on the rigorous assumption of linear relationship between all independent and the dependent measures (Balcaen and Ooghe, 2006). As well, UA ignores the holistic view of the explanatory variables. Casey and Bartczak (1984), however, argue that unlimited factors affect the likelihood of a firm's failure, implying that one variable cannot accurately and consistently predict failure. In sum, Zavgren (1983) contends that UA is the simplest and the weakest methodology in the corporate failure context. Discriminant Analysis, which is the focus of the next subsection, overcomes the deficiencies in UA by capturing predictors concurrently to discriminate between the failed and non-failed firms.

b. *Empirical Studies Using Multivariate Discriminant Analysis*

Fisher's (1930) Multivariate Discriminant Analysis (MDA) forms a linear combination (Z-Score) by drawing the multidimensional features of the density function of the population's variables (Zavgren, 1983). Thus, $Z= \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots \beta_n X_n$, where Z is the score used to predict group membership, whereas, β_1, β_2 and β_n are the coefficients, X_1,X_2, X_n are the independent variables and finally α, is the constant (see Lachenbruch, 1975). Prior studies employ two main MDA methods. These are: (i) linear discriminant analysis (LDA), and (ii) quadratic discriminant analysis (QDA), the analysis of which I turn to.

(i) Linear Discriminant Analysis

Following Altman's (1968) seminal paper, researchers apply LDA with varying degrees of success in: (1) homogeneous groups of firms (e.g. Altman and Loris, 1976, Vinso, 1979; Kim and Gu, 2006), (2) re-estimation (e.g. Moyer, 1977), (3) going concern evaluation (e.g. Koh and Killough, 1990). Other extensions include: induction of stability measures (Altman et al, 1977; Dambolena and Khoury, 1980; Betts and Belhoul, 1987), assignment of prior probability membership classes (Deakin, 1972), balance sheet decomposition (Booth, 1983), cash management models (Blum, 1974), quarterly annual account information (Baldwin and

Glezen, 1992), and current cost information (Keasey and Watson, 1987; Aly, Barlow and Jones, 1992). In addition, classical country extensions include: Brazil (Altman, Baidya and Dias, 1979), England (Taffler and Tisshaw, 1977) and beyond (see Altman and Narayanan, 1997).

Nevertheless, LDA models' application seems to be problematic due in part to the violation of its assumption in the real world (Lo, 1986; Lacher, Coats, Sharma, and Fant, 1995).These assumptions include linear separability, multivariate normality, and equal and within group covariance (Eisenbeis, 1977). Ohlson (1980) also argues that the output of the application is a Z-Score, which has slight intuitive interpretation. As a result, Taffler (1983) and Eisenbeis and Avery (1972) prefer the quadratic function, despite the substantial complexity (Eisenbeis, 1977), the analysis of which I turn to.

(ii) Quadratic Discriminant Analysis (QDA)

Altman and Loris (1976) six variable quadratic model employs dataset from 40 failed and 113 non-failed broker dealer firms and records 90% (86%) estimation (validation) predictive accuracy a year to failure. Altman's (1977) integrated system of three separate, two-group quadratic discriminant models predict savings and loans performance up to 3 semi-annual reporting periods prior to a specific critical date.

Altman (1977), however, observes that QDA may not produce accuracies better than the LDA, emphasising that the former is highly sensitive to individual sample observations. Lachenbruck, Sneeringer and Revo (1973) also observe that the quadratic rule is badly affected by departure from normality. Boritz et al's (1995) findings suggest that NPDA (99%/99%), LDA (99%/98%) and probit (99%/99%) produce similar results (estimation/validation) and are superior to QDA (63%/62).

Avery, Eisenbeis and Sinkey (1981) note that DA techniques suffer from four other related problems namely: (1) relative impact of the individual predictors, (2) reduction of dimensionality, (3) elimination of insignificant predictors, and (4) existence of time series associations. As a result, practitioners prefer multivariate conditional probability over DA (Press and Wilson, 1978; Maddala, 1991), on two grounds. First, logit is practically as efficient as a linear classifier (Harrell and Lee, 1985), whether or not the assumptions of DA hold. Second, probit, in particular, is considered theoretically superior to MDA, ID3 and NN (see Dietrich and Kaplan, 1982).

b. *Empirical Studies Using Multivariate Conditional Probability*

Multivariate Conditional Probability employs the explanatory variables' coefficients or marginal effects to predict the occurrence likelihood of a binary dependent measure (Dielman, 2001). It considers the explanatory measures and, in this way, generates firm's score in order to categorise as failed or otherwise (Charitou, Neophytou, and Charalambous, 2004). I discuss the multivariate conditional probability methods as follows: (i) logistic, probit and linear probability models and (ii) advanced probability modelling.

(i) Logistic, Probit and Linear Probability Models

Logistic regression examines the probability that the firm fails in a pre-specified time period (Maddala, 1986; Gujarati, 2003). No assumption is required on prior probabilities of failure and/or predictors. Logit is a nonlinear logistic function modelled as:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \beta_0 + \beta_1 X_i + \varepsilon \tag{1}$$

where L_i is the log of the odd ratio (i.e. logit), Zi is the dependent variable (e.g. "failed" vs. "non-failed"). As well, $\beta_0,\ \beta_1$ and ε are the regression intercept, coefficient and the error term, respectively. The regression coefficient describes the size of the risk factor's contribution, suggesting that a positive and large coefficient indicates that the independent variable increases the probability of the outcome and *vice-versa*. Further, but for the use of cumulative logistic function by the logit, cumulative normal distribution by the probit, as well as the boundary values by the linear probability model (LPM), the three are similar (Boritz, et al,1995).

Martin's (1977) findings suggest that bank capital adequacy is significantly related to the likelihood of a firm's survival. Martin also records similar accuracies for the logit (91.20%) and the discriminant analysis (91.65%). Casey and Bartczak's (1985) study verifies other studies in the US (e.g. Martin, 1977; Gentry, Newbold, and Whitford, 1985; Ohlson, 1980) and Korea (Min and Lee, 2005), suggesting that LDA and Logit models generate similar results, despite the shortcomings of the former. Aly, Barlow and Jones (1992), however, have evidence from 23 matched pairs of failed and non-failed US firms to refute this assertion. Specifically, Aly et al use combined historical cost and current cost accounting and show the superiority of Logit (100%) over MDA (90%) as far as three years prior to failure. Lo (1986) notes that logistics is more robust than MDA, but under specific distributional assumptions both procedures yield consistent estimates and the latter is asymptotically efficient. In this regard, Ohlson (1980) contends that a model's predictive power is based on the time the information is assumed to be available.

Mensah's (1984) study shows that specific price level data do not greatly enhance prediction model. This supports Moyer's (1977) findings, suggesting that failure prediction models are fundamentally unstable, due in part to the prevailing macroeconomic factors. For this reason, it is argued that efforts to overcome inter-sectoral and inter-temporal development of the models may produce reliable results (see Moyer, 1977).

Theodossiou (1991) illustrates that both logit and probit outperformed LPM (see also Press and Wilson 1978; Lo 1986; Lennox 1999). Further, Theodossiou's (1991) LPM result is similar to Collins' (1980) re-estimation models for Altman (94%) and Meyer and Pifer (93%). The comparison, however, between logit and probit is not straightforward. Nonetheless, Theodossiou (1991) advances the notion that logit is better, due to the computational difficulties associated with the probit model.

(ii) Advanced Probability Modelling

Contemporary researchers employ theoretical and econometric underpinnings of advanced probability modelling in the prediction of corporate failure context. Among these models are closed form generalised extreme value such as the nested logit model (Jones and Henser, 2007), and open-form simulation based approaches such as mixed logit (Jones and Henser, 2004; Hensher and Jones, 2007) and error component logit (Hensher and Jones, 2007). These advanced probability models, and mixed logit in particular, provide appreciably superior explanatory and statistical power than the standard logit models. As Hensher and Jones (2007) note, mixed logit appears to have the greatest promise in terms of essential behavioural realism, necessary econometric properties and overall efficacy. Mixed logit, however, captures unobserved elements representing the random component of each utility expression.

Lau (1987) extends previous corporate failure prediction models in two ways. First, Lau uses five financial states to measure financial health, implying a sharp contrast to the conventional failing and non-failing. Second, Lau's model predicts the probabilities that a firm will enter each of the five states, instead of classifying a firm into a certain financial state. In particular, Lau's multivariate logit analysis model records overall accuracy rates of 96%, 92%, and 90% for years 1-3.

Peel and Peel's (1988) study shows that multilogit model allows analysts with the latest accounts of a firm to generate four probabilities, up to three years prior to failure. In a follow-up study, Keasey, McGuinness and Short's (1990) study show that the notion of signal consistency is far from straightforward. On one hand, the healthy firms exhibit consistent pattern of signals. On the other, dating is more haphazard process, in particular distant failures.

Neophytou and Molinero's (2004) Multidimensional Scaling (MDS) model suggests firms' leverage, profitability, and liquidity are crucial measures in predicting financial health of UK firms. However, the main setback of the MDS is that practitioners interested in the health of firms excluded from the original sample must add these, in order to assess its health through another plot.

There are disadvantages, however, to using Multivariate Conditional Probability statistical methodology. For instance, when nominal variables exist the assumption that the dependent variable is a linear function of the independent variables may be questionable (Liang, Chandler, Han, and Roan, 1992). The cumulative normal distribution error assumption of the probit, for example, may be violated due in part to the presence of nominal variables. Artificially Intelligent Expert System is considered as alternative to parametric multivariate methods in the corporate failure context, the analysis of which I turn to.

3.3.2 Empirical Studies Using Artificially Intelligent Expert Systems (AIES)

Artificially Intelligent Expert Systems (AIES) overcome non-linearity issues in statistical models studies. AIES are computer systems ‘trained’ to spot full patterns by taking simulation from recognized facts about how the brain functions. Our results show that 34 different architects have been employed in prior studies. The Back Propagation Neural Network (BPNN) accounts for 25%, whereas Iterative dichotomizer 3 (ID3), Generalised Adaptive Neural Networks Algorithm (GANN), and Case-based Reasoning (CBR) record 7%, 5%, and 5%, respectively. This section proceeds as follows: (a) artificial neural networks, (b) case-based reasoning, (c) decision tree techniques, (d) evolutionary approaches, and (e) rough set models.

a. ***Artificial Neural Networks Techniques***

Artificial Neural Network (ANN) comprises of interconnected homogeneous processing units of artificial neurons, which is motivated by the functional features of genetic neural network. As Tam and Kiang (1992) note, ANN is characterized by a weighted directed graph with units and connections.

Similarly, the feed forward networks display three types of units namely: input, output and hidden layers of neurons (Tam and Kiang, 1992; Boritz et al, 1995; O’Leary, 1998). Likewise, the back-propagation learning algorithm is designed to train multi-layer network in the feed forward. Further, ANN prohibits links within and/or higher to lower layer but changes its structure based on information that flows through the network. Following Kumar and Ravi’s (2007) review, I discuss ANN applications as follows: (i) back propagation trained NN, (ii) self-organising feature map, and (iii) other ANN topologies.

(i) Back Propagation Trained Neural Network (BPNN)

Back propagation trained neural network (BPNN) minimizes the mean-squared error in the network and thus, more suitable for prediction but not classification problems. Tam (1991), for example, suggests that BPNN is more robust for assessing firms’ failure. Salchenberger, Cinar and Lash (1992), Fletcher and Goss (1993), Zhang, Hu, Eddy Patuwo, and Indro, 1999) and Charitou, Neophytou, and Charalambous (2004) confirm this notion, emphasizing on the superiority of BPNN over the Logit models. Wilson and Sharda (1994), Odom and Sharda (1990) also show that the BPNN performs significantly better than LDA.

Altman, Marco and Varetto's (1994) study, however, reports conflicting results between the BPNN and LDA. From this point, Yang, Platt and Platt (1999) use dataset of 122 oil and gas companies in the US, and show the superiority of the MDA over the BPNN and other probabilistic NN (see also Swicegood and Clark, 2001). Elsewhere in Belgium, Piramuthu, Ragavan, and Shaw (1998) have evidence to advance the predictive power of BPNN with feature construction over the ordinary ANN (see also Lee, Booth and Alam, 2005).

Boritz et al's (1995) study, however, suggests that the BPNN does not achieve the 'magical' results that the literature claims. Specifically, Boritz et al (1995) show that the combinations of proportions of failed firms in the training and testing data sets and assumptions about misclassification costs affect the BPNN's results. Salchenberger, Mine Cinar and Lash's (1992) study posits that better results might be expected with the NNs when the relationship between the variables does not fit the assumed model. The BPNN method requires user expertise due to its computational intensity and lack of formal theory. In fact, BPNN may yield illogical behavioural estimates when input values are varied (Altman, Marco and Varetto, 1994) due to the distribution nature of the network and the unboundedness of the transfer functions (NeuralWare, 1996), is germane here.

(ii) Self-Organizing Feature Maps (SOFM)

Self-Organising Feature Maps (SOFM) display a multidimensional input space over a plane and conserve its topological features (Serrano-Cinca, 1996). Lee, Han and Kwon (1996) have evidence from 83 matched pairs of failed and non-failed firms in Korea to suggest that hybrid neural network models are very promising in terms of predictive accuracy and adaptability. Serrano-Cinca (1996) concurs, asserting that SOFM provide a complete analysis, without renouncing simplicity for the analyst.

(iii) Other Neural Network Topologies

Lacher, Coats, Sharma and Fant's (1995) cascade correlation model documents an accuracy of 84.1%, 89.4%, 94.7% for years 3, 2 and 1, compared to the re-estimated Altman's results of 72.3%, 74.5%, and 86.2%. This indicates that cascor is more accurate in pattern classification in comparison with Altman's LDA.

Yang, Platt and Platt's (1999) U.S. oil and gas industry study shows that probabilistic neural networks without pattern normalization and LDA produce similar results but the latter shows lower type *I* errors. However, both categorical learning and probabilistic NN are trained to categorise data patterns into discrete categories, whereas BPNN forecasts continuous output values based on a set of continuous input parameters (Etheridge, Sriram, and Hsu, 2000), and thus, not suitable for binary outcome

Kim and Kiang's (2010) findings suggest that bagged NN produces a more accurate single classifier vis-à-vis boosted NN, due to the constraint of new classifier generation of the latter. The generalisation of Kim and Kiang's results, however, is misleading, due in part to non-consideration of the impact of the interdependence of combined classifiers on joint accuracy (Opitz and Maclin, 1999). Kim and Kiang's boosted NN ignores boosting algorithms such as confidence rated boosting (Schapire and Singer, 1999), and logit boost (Friedman, 2001).

The ANN, however, is often referred to as 'black boxes', suggesting that the user cannot readily comprehend the final rules that the NN models acquire (Shin and Lee, 2002). Other limitations of the NNs include but not limited to configuration issues (see Pao, 1989), computational efficiency and explanatory capability (see Tam, 1991). For these reasons, Bryant (1997) proposes the case-based reasoning as a viable machine learning technique that mitigates the deficiencies in statistical and neural networks models, the analysis of which I turn to.

b. *Case-Based Reasoning Techniques (CBR)*

Case-Based Forecasting System (CBFS) employs the past analogous cases' result to forecast the present case's outcome (Jo, Han and Lee, 1997; Bryant, 1997; Park and Han, 2002). For this reason, it is regarded as forecasting-by-analogy (Kolodneer, 1991). Jo, Han and Lee

(1997) show that CBFS consists of three sub-processes: (1) classifying cases to forecast the object variable, (2) retrieving related cases, and (3) producing a prediction through combining the related cases nominated.

Bryant's (1997) study employs the v-fold cross validation procedure and 3 case libraries of 30 decisions trees to develop three CBR models with dataset covering the period 1978-94. Bryant (1997) records 72.70% (82.90%) for estimation (validation) Type *I* error, implying that CBR's models lack power. This probably contradicts Park and Han (2002) notion, suggesting that CBR is an effective technique which integrates knowledge and reasoning approach.

Jo, Han and Lee's (1997) study also suggests that LDA (82.22%) and CBR (81.52%) produce similar results, but both are inferior to BPNN (83.79%).Jo, Han and Lee attribute the CBFS's inferior performance to the low correlation between dependent and independent variables as well as the binary dependent variable.

Park and Han's (2002) study proposes an analogical reasoning structure for feature weighting using analytic hierarchy process (AHP)-weighted k-nearest neighbour (K-NN) algorithm. Park and Han (2002) record errors of 17% for the K-NN hybrid (AHP-K-NN-CBR) model compared to 20.8% and 31.7% of the Logit-CBR and pure CBR, respectively.

c. *Decision Trees Techniques (Recursive Partitioning Algorithm&ID3)*

Inductive algorithms or Iterative dichotomizer 3 (ID3) shows a tree structure by organising cases in memory (Quinlan, 1986). Unlike statistical approach, inductive learning approach generates knowledge structures by employing different assumptions and algorithms. Frydman, Altman and Kao's (1985) study shows that both RPA and the LDA techniques lead to accurate results in the bankruptcy context, but the former dominates in the results of the actual, cross-validation, and bootstrapped. Mckee's (1995) study proposes a parsimonious ID3 model which predicts as high as 97% in all cases. Mckee's model result, however, is misleading due in part to the subjective approach in determining the optimal model and the pruning rules. Messier and Hansen (1988) document that the attribute sets induced for the production systems only partially intersect the attribute sets included in the discriminant models, but the former outperforms the latter in all cases

Chung and Tam (1992), however, contend that the inductive learning algorithms, particularly, ID3 and AQ (79.5%) are more understandable but exhibit lower accuracy compared to NNs (85.3%). Recently, Cielen, Peeters and Vanhoof�even (2004) study indicates that data envelopment (DEA) model outperforms linear programming model (MSD) and rule induction (C5.0).

d. ***Evolutionary Approaches***

Genetic algorithms (GAs) use four steps (i.e. initialisation, selection, crossover, and mutation) to search complex and large spaces with a set of random possible solutions (Davis, 1991). Fanning and Cogger (1994) show the time savings and the predictive accuracies available from generalised adaptive neural network algorithm (GANNA). Practical application of GANNA, however, is not feasible because the most effective network may not be as suitable with other sets of independent cases (Altman, Marco and Varetto, 1994). This partly explains why the countless researchers using the AIES methodology ignore validation test.

Varetto's (1998) study shows the efficacy of GA in the failure context, despite the supremacy of LDA over GA. Nanda and Pendharkar (2001) contend that an integrated misclassification cost preferences (ICPB) based classification approach (example: ICPB-MSD and ICPB-GA) results in lower misclassification costs compared to goal programming approach (MSD) and GA approaches without misclassification cost. Shin and Lee's (2002) results from Korean SMEs suggest that GA extracts rules that are understandable to users, unlike NNs.

e. ***Rough Sets***

Rough set considers the problem of indiscernibility between objects in a set (Pawlak, 1991). For this reason, rough set applications include dominance relations (Greco, Matarazzo, Slowinski, 1998) and in particular, corporate failure (see Slowinski and Zopounidis,1995, Mckee 2003, Dimitras, Slowinski, Susmaga, and Zopounidis, 1999). Mckee's (2003) study, however, disputes the notion that rough set theory offered significant predictive power over the actual auditors' approaches.

AIES is also limited in several respects. First, AIES requires too much efforts and time (Lawrence, Giles, and Tsoi, 1997). Second, analysts have difficulty in clarifying the predictive results. Finally, AIES suffers from difficulties with generalization due to lack of explanatory power and over fitting. This paves the way for a review of models with theoretical foundation, in the next section.

3.3.3 Review of Models with Theoretical Foundation

The previous section has shown that researchers select predictive variables with no underpinning theory, suggesting that resultant models depict the signs of failure but not the causes. This, perhaps in part, accounts for why practitioners have not embraced corporate failure prediction models, despite their outstanding predictive accuracies.

This section reviews the few notable efforts by prior studies to predict failure using theoretical arguments to select variables for modelling. The section proceeds as follows: (a) Gambler's Ruin Theory, (b) Balance Sheet Decomposition Measure/Entropy and finally, and (c) Cash Management Theory.

(a) Empirical Studies Using the Gambler's Ruin Theory

Wilcox's (1971; 1973; 1976) ruin model offers a more reliable option to assessing the probability of a firm's failure. Wilcox considers the firm as a gambler with an initial amount of money (hereafter net worth). The firm utilises the net worth in a series of independent trials, implying that the firm may win or lose a dollar, representing probability p and 1-p, respectively. During these series of trial the firm meets losses by disposing its assets. Ultimately, the net worth may either grow or fall to zero, indicating non-failed and failed firms, respectively. Wilcox acknowledges that this is simplistic view of a firm, pointing out that injection of capital and managerial resources, can rescue the firm. For this reason, Wilcox argues that a better model is feasible if additional capital and management talent injection is considered as failures.

Further, Wilcox (1973) proposes adjusted cash position, mean adjusted cash flow and variance of the adjusted cash flow as significant predictors of long term business risk, however, the empirical evidence is abysmal. Nonetheless, Wilcox (1976) outlines how the information gained under this approach may be used by boards to reduce the likelihood of firms' failure.

Santomero and Vinso's (1977) study shows that financial institutions are exposed to a reasonable risk of suspended operations, which changes very little with variations in the capital account buffer. Likewise, Vinso (1979) concludes that, it is possible to quantify the risk of ruin through a safety index determined using a variation of the annuity process of collective risk theory. In comparison to Altman's (1968) study, Vinso claims superiority of his model despite the major differences in approach. Wilcox (1971; 1973; 1976), Santomero and Vinso's (1977) results are misleading due to lack of ex-ante or ex-post validation.

(b) Balance Sheet Decomposition Measure

Booth (1983) confirms the proposition that decomposition measures are useful as variables in financial statement scanning device (Lev, 1973), despite the huge Type II errors (50%). Booth (1983) also confirms the significant predictive power of firm size recorded by prior studies (e.g. Ohlson, 1980).

Similarly, the profile analysis indicates that the decomposition measures of failed companies are larger and less stable over time than those of similar non-failed companies. Nevertheless, the robustness of Booth's model is compromised due to the small sample size for validation vis-à-vis the huge Type II error.

(c) Empirical Studies Using the Cash Management Theory

Blum (1974) introduces three theoretical underpinning in corporate failure context namely: (1) a theory of symptoms, (2) a cash-flow framework and (3) the failing company model. Blum also employs the Cash flow framework to select his independent variables, emphasising that accounting ratios represent principals. Blum's (1974) model considers the entity as a reservoir of financial resources, implying that its likelihood of failure is based on the expected flows of those resources '*ceteris paribus*'.

Gentry, Newbold and Whitford's (1985) study employs cash-based funds flow model and documents that MDA and probit produce similar results. They also argue that the cash-flow based funds flow components offer a viable alternative for classifying failed and non-failed firms. This probably contradicts Casey and Bartczak's (1984) findings, but there are fundamental differences in the research design of the two studies. Laitinen and Laitinen's (1998) study supports the efficacy of inventory cash management to predict failure using data from Finland, is relevant here. Aziz, Emanuel and Lawson (1988) use Lawson's (1971) cash flow identity, and find that fund flow measures are better suited than accrual based ratios to detect impending failure(see also Huyhebaert, Gaeremynck, Roodhooft, and Van de Gucht, 2000).

3.4 THE RESEARCH GAP IN CORPORATE FAILURE LITERATURE

Following a detailed review of the literature, I are overwhelmed by the valuable contributions made by studies reviewed and those cited to the existing body of Accounting, Finance and Economics Literature, particularly in the area of prediction of corporate failure. Prior studies address the problems applying useful: (1) statistical techniques (e.g. Beaver, 1966; Altman, 1968; Martin, 1977; Zmijewski, 1984), (2) AIES (e.g. Lacher, Coats, Sharma, and Fant, 1995; Kumar and Ravi, 2007; Jo, Han and Lee, 1997) and (3) theoretical models (Wilcox 1971; 1973; 1976), and most have successfully accomplished their stated objectives.

However, there is no logical theory underpinning the use of independent variables but weak guidance on the suitable measures is provided in diverse studies (Taffler, 1982). Put simply, there is no consistency in variable selection and/or definition, to answer the practical questions of why firms fail. Wilcox (1973), Vinso (1979), and Taffler (1982, 1983), however, identify this gap, but followed the norm of the ad hoc means of selecting variables. The first two researchers on the above list, attempt to fill the gap by looking for a single measure, despite the criticisms of the UA.

In summary, the SLR reiterates **Taffler (1983) assertions that** "***The lack of any real theory relating to the use of financial ratio analysis constitutes a serious gap in the accounting literature (Taffler, 1983. p.3).*** In this respect, future empirical researchers should consider theoretical arguments from classical theories such as resource dependency and agency in selecting predictive variables for their models. This in turn, may offer insightful findings to deepen our understanding on the corporate failure phenomena. In particular, I argue that these theories can answer the grey question of when and why businesses fail.

Concerning objective of prior studies, the SLR reviews the need for developing models to predict corporate failure. Only 14% of the reviewed studies have attempted to develop models to predict corporate failure. More importantly, only two models (i.e. Altman 1968; Taffler, 1983) are extensively used by both practitioners and academies (see Charitou et al, 2004; Agarwal and Taffler, 2007). This suggests that future research direction must focus on the development and testing of models to predict failure.

On the subject of independent variables, the SLR notes the neglect of non-financial information as a major gap in the literature. Only 1% of the reviewed studies have employed exclusively non-financial information in the corporate failure context. For this reason, I encourage future research to examine non-fanancial information ranging from corporate governance to the five measures of the balanced scorecard (i.e. financial, customers, internal business process, learning and growth, and the community)

On the topic of dataset, the SLR records the neglect of dataset from unincorporated entities as one of the gaps in the extant corporate failure literature. While the incidence of failure is greater in unincorporated entities, only one study (i.e. Luoma and Laitinen, 1991) has used dataset from unincorporated entities. Therefore, I encourage future studies to examine the causes of failure in unincorporated entities.

On the definition of 'corporate failure, the SLR reviews the need to broaden the legal definition to include more than one of the Morris's (1997) indicators of corporate distressed. Only 13.75% of the reviewed studies have defined the term 'corporate failure' to include delisting, reduction in dividend (Lee, Han and Kwon, 1996), default of debt agreement (Beaver, 1966; Jones and Hensher, 2007) and zero capital (Theodossiou, 1991). Consequently, I encourage future studies to broaden the scope of the definition of corporate failure to include other issues which may be termed as financial distressed.

On the topic of matching technique, the SLR notes matching by size and industry dominates the literature. It also notes the numerous disadvantages associated with matching by size and industry. This notwithstanding, Ohlson (1980) argues the apprioriate criteria for matching are not obvious. While, Zmijewski's (1984) studies claim the arbitrary matching and random sample techniques are comparable. The important implication is that more research is needed to clarify issues surrounding matching techniques to depeen our understanding on the appropriate criteria for matching in the corporate failure context. Specifically, I encourage future research to consider more advanced matching techniques such as propensity score matching.

Regarding sample selectivity issues, the SLR notes the neglect of time dimension as one of the gaps in the literature. Only 22.5% of the reviewed studies have employed five year data to analysis the corporate failure phenomena. Further, only 13% of these five year data models have used dataset beyond the US and UK. This suggests that future research direction must focus on five year dataset from countries other than the US and UK.

3.5 LIMITATIONS OF THE SLR

The limitations of the present SLR are as follows. First, the searches in this SLR are defined by using certain synonymous words with corporate failure to six search engines (see section 3.1.3). Thus, I cannot promise that all relevant papers to the scope of the SLR have been found. For instance, 10 important papers in this SLR is directly included in the review as a result its citation in prior reviews. However, after checking the references to the papers included in the SLR, 40, 95, 23 have been published in four, three and two, star journals of ABS Guide, respectively. This implies that I have analysed the contents of an illustrative sample of the field. This notwithstanding, the repetition of the SLR is not feasible due to the deviation from protocol stated in 3.2.1. This deviation, however, is inevitable in other to have a complete sample for more comprehensive discussion. I consider reasonable sample estimation and validation sample as well as models robustness, predictive accuracy, adaptability and explanatory capability to be part of quality assessment criteria (see section 3.1.5), but these items are difficult to quantify with precision.

3.6 CHAPTER SUMMARY

This chapter presents a SLR, during the period 1966-2012, in the application of statistical, intelligent techniques and theoretical approaches to solve the bankruptcy prediction problem faced by firms in twelve different countries. This review answers three main questions. First, what techniques are employed in this field? Second, what are the methodological issues in the literature? Finally, what is the main research gap in the literature?

The search engines of, Google Scholar, Wiley Interscience, Science Direct, Web of Knowledge, Business Source Complete of the Social Sciences are systematically searched for the reviewed papers using a defined search string. The review intergrates the approaches used by previous review researchers namely: Aziz and Dar (2006), Kumar and Ravi (2007) Balcaen and Ooghe (2006). Thus, for each paper I extract study attributes such as author, year, period, accuracy, errors, sample, matching technique, variables, origin, firm type, journal of publication (see Aziz and Dar, 2006; Kumar and Ravi, 2007).

Second, following Balcaen and Ooghe's (2006) study, I propose a synthesis of the proposal to discuss the methodological issues in the literature. Third, the rationale behind research and operational definition of failure are extracted and discussed using a template from Dietrich (1984) and Morris (1997), respectively. Finally, I discuss the significant contributions of each paper in the relevant section and concluded the review with suggestions to shift the focus from the recent paradigm to innovative ways to enhance the robustness of future prediction models as well as enrich our understanding in the corporate failure syndrome. The approach followed in all the papers reviewed may be termed ex post empirical. Thus, a group of actual failures is identified from an arbitrary period and the characteristics of these firms at least one year prior to failure are compared with a group of firms which did not fail. In addition, the results indicate significant body of literature on but a sound, accurate, simple and widely used theoretical framework for prediction of corporate failure is yet to be developed. Thus, despite the countless models, the question of why businesses fail is still a grey area.

For this reason, future researchers must consider the link between the corporate failure phenomena and theoretical arguments from proponents of existing economics theories. In particular, sound theoretical arguments based on agency and resource dependency perspectives using the corporate governance lens may offer insight and deepen our understanding in the corporate failure process. This has set the scene for the next chapter, which seeks to contribute by exploring the nexus between corporate governance and the corporate failure syndrome.

CHAPTER FOUR
CORPORATE FAILURE AND CORPORATE GOVERNANCE THEORIES

4.0 INTRODUCTION

The previous chapter highlights that prior corporate failure studies attempt to predict failure using financial symptoms (e.g. profitability, liquidity, leverage). Put simply, prior studies neglect the question of how the firm got into financial trouble (Daily and Dalton, 1994a). As Argenti (1985) observes, the corporate failure process becomes financial as a firm moves to the penultimate phase of failure.

Similarly, the recent Enron-Andersen debacle, as well as those at WorldCom, Lehman Brothers, Parmalat and others provide signal that accounting data can be influenced to disguise deteriorating financial performance. Fich and Shivdasani (2006) confirm this notion and contend that CEOs can potentially influence the accuracy of the business disclosures. Daily and Dalton (1994a, 1994b), Gales and Kesner (1994) and Platt and Platt (2012) concur, emphasising that corporate governance failures of firms may provide one possible explanation of corporate failure.

This chapter discusses significant insights connected to corporate failure from two main theoretical approaches namely: agency and resource dependency perspectives. The motivation is threefold. First, I answer the call that the corporate failure context is one of the opportunities for linking the aforementioned theories (see Zahra and Pearce, 1989; Hillman and Dalziel, 2003). Second, I propose an integrative model to explain the corporate failure phenomenon (see Mellahi and Wilkinson 2004; Amankwah-Amoah and Debrah, 2010). Finally, I review the literature with respect to corporate governance attributes and relate it to corporate failure.

The chapter proceeds as follows. The link between corporate failure and the agency and resource dependency perspectives are set out in Sections 4.1 and 4.2, respectively. Section 4.3 describes the synthesis integrating the corporate governance theories. Section 4.4 presents the theoretical model. Section 4.5 concludes the chapter.

4.1 CORPORATE FAILURE: THE AGENCY THEORY PERSPECTIVE

The agency theory considers the universal agency relationship, in which the principal gives work to the agent (Eisenhardt, 1989). Berle and Means (1932) contend that the dispersion of shareholding in listed firms has resulted to a separation of ownership and control, hence the agency problems. Davis, Schoorman and Donaldson (1997), Gomez-Mejia, and Wiseman, (2007) concur, emphasizing that the delegation allows CEOs to opportunistically seek their interest at the expense of shareholders' value. Jensen and Meckling (1976), for example, suggest top management and shareholders may extract perks (e.g. private jets) out of a firm's assets rather than maximizing shareholders wealth. Others suggest CEOs may excessively increase their compensation and prestige by pursuing diversification strategies (Amihud and Lev, 1981; Goforth, 1993).

In this vein, Black, (1976), Jensen and Meckling (1976), Myers (1977) consider the firm as a collection of groups with conflicting interest. For this reason, agency theory is concerned with resolving conflict of interest and problem of risk sharing. Simply put, it focuses on determining the best efficient contract governing the principal agent relationships (Jensen and Meckling, 1976: Eisenhardt, 1989). Thus, the principal agent relationships should reflect efficient form of organisation of information and risk-bearing cost (Fama, 1980), if the firm is to survive.

Consequently, agency scholars endorse alternative executive compensation schemes and governance structures to decrease the agency cost (Jensen and Meckling, 1976). Thus, agency theory advocates for enhanced agent controls to bridge the goal conflict between the principals and the agents (Jensen and Meckling, 1976). This in turn, moderates the agency loss (Eisenhardt, 1989) through reducing the potential adverse selection problems (Williamson, 1985; Gomez-Mejia, and Wiseman, 2007), and ultimately, enhances the survival of the firm.

Fama and Jensen (1983) advocate that the agency problem is controlled by check and balances that separate the firm's management and control of decisions. Smith and Jensen (2000) concur, emphasising that a firm's survival is enhanced through undertakings where specific knowledge significant for decisions is expansively diffused among professional managers.

Similarly, Jensen and Meckling (1976), Fama (1980) and Fama and Jensen (1983) argue that boards enhance firms' survival by performing the critical function of monitoring and rewarding the CEO. Thus, effective board monitoring reduces agency cost (Waldo, 1985) which in turn, reduces the likelihood of a firm's failure.

The boards' monitoring task includes planning CEO succession (Picher, Chreim and Kisfalvi, 2000) and evaluating CEO's performance (Boyd, 1995). The aim of board monitoring is the obligation to ensure that management maximizes shareholders' value. This fiduciary obligation demands a thoroughly review of the CEO's agenda by the board (Hillman and Dalziel 2003), thus, if the firm is to survive.

Therefore, Fama (1980) suggests that the board composition determines directors' ability to be effective monitors of the CEO's actions. Fama and Jensen (1983) and Baysinger and Hoskisson (1990) agree, stressing that board's effectiveness in monitoring CEO is a task of both insiders and outsiders directors. Chancharat, Krishnamurti, Tian (2012) confirm this notion and show that inside directors play a complementary role to outsiders in mitigating a firm's failure. Critics (e.g. Baysinger and Hoskisson, 1990; Daily and Dalton, 1994a, b: 1995; Hillman and Dalziel, 2003) suggest, however, that inside directors' loyalty to the CEO, may reduce their ability to provide a fair evaluation. This, in part, may lead to expropriation of shareholders' wealth (Fama, 1980), thereby increasing the likelihood of a firm's failure.

Accordingly, Carter, Simkins and Simpson (2003) argue that the viability of the board is enhanced by including outside directors to reduce the likelihood of collusive arrangements. Thus, outside directors are viewed as mediators whose task is to encourage and oversee competition among firms management (Fama, 1980). Fama and Jensen (1983) concur, stressing that outside directors act as arbiters in disagreements among insiders and approve resolutions that include severe agency problems. Put simply, there is growing body of conceptual literature that effective boards will consist of higher proportions of outside directors (e.g. Lorsch and Maciver, 1989; Beasley, 1996).

Dalton, Daily, Ellstrand and Johnson (1998) also contend that the corporate community is more outspoken on outside dominated boards. For instance, the UK Code stipulates that half the board, excluding the chairman, should comprise independent non-executive directors, save for smaller firms. Smith (2003) recommends that audit committees should include at least three independent non-executive directors. The remuneration committee members must be exclusively non-executive directors (Greenbury, 1995).

Evidence, however, on the impact of outside directors on board performance is mixed. Some scholars (e.g. Ezzamel and Watson 1993; Rosenstein and Wyatt, 1990) find a positive nexus between proportion of outside director and firm performance. Rosenstein and Wyatt (1990), for example, show inclusion of outside directors on boards is associated with a positive abnormal stock return. In parallel, Dalton, Daily, Ellstrand and Johnson's (1998) meta-analysis of fifty-four studies shows no significant statistical relationship between board independence (proportion of outside directors), and firm performance. Chancharat, Krishnamurti, Tian's (2012) result indicates that the relationship between board independence and performance, is nonlinear. They attribute this to the increased monitoring costs faced by outsiders due to higher information asymmetry.

Fama (1980) and Jensen and Meckling (1976) argue that when incentives are aligned with shareholders' interest, boards will be more effective monitors of management, and corporate failure will be avoided. Spence and Zeckhauser (1971) and Ross (1973) concur, but pinpoint the problems associated with this incentive. Dalton, Daily, Certo, Roengpitya's (2003) meta-analysis fails to find statistical significance to support the notion that equity compensation links the interest of agent and principal.

Jensen and Meckling (1976), Fama (1980) and Smith and Jensen (2000) contend that capital and managerial-labour markets regulate the degree to which CEO's action can deviate from value-maximizing behaviour. Thus, the corporate-control market limits managerial investment, financing, and dividend decisions, thereby enhancing the survival of firms (Manne, 1965). Jensen and Ruback (1983), for example, argue management teams contest for the privileges to manage corporate resources in the capital market.

The managerial labour market also disciplines ineffective CEOs of distressed firms with the stigma of failure (see Sutton and Callahan, 1987; D'Aveni, 1990; Efrat, 2005). This in turn, reduces the value of their human capital and reputation (Ezzamel and Watson, 2005). Gilson (1990) confirms this notion and shows that directors of financially distressed firms are not employed in the board network for a minimum of three years. Kaplan and Reishus (1990) find that CEOs in dividend reducing firms have less than 50% chance to serve as outside directors for an exchange-listed firm.

Similarly, the right to speak and vote on major corporate matters (e.g. takeovers and elections of directors), is noted as the greatest legal right of shareholders (Manne, 1965; Shleifer and Vishny, 1997). In particular, shareholders of failing firms may invoke corporate governance mechanisms resulting in, but not limited to: hostile takeover, CEO replacement (e.g. Gilson, 1990; Kang and Shivdasani, 1997, Frank and Mayer 2001), and reducing CEO pay (Gilson and Vetsuypens, 1993; Kaplan, 2005).

The above analysis suggests as follows. First, outside directors, due to their independence from firm's management, may enhance firm's survival by monitoring the CEO's agenda (Carter, Simkins and Simpson, 2003; Dalton, Daily, Certo, Roengpitya, 2003). However, second, empirical evidence is mixed, suggesting that not all outside directors are independent of firm management (see Bainbridge, 1993; Daily and Dalton, 1994a). Hence, third, outside directors may not be effective monitors of top management. Nonetheless, Kosnik (1987) shows that, agency theory explains the question of how firms react to "greenmail." Therefore, finally, if outsider directors fail to monitor CEO, external mechanisms such as bankruptcy will emerge to control CEOs (Walsh and Seward, 1990). Thus, I argue that bankruptcy can be viewed as the legal resolution of severe shareholder-top management conflicts about the levels of financial assets and performance that the latter should maintain.

In addition to the shareholder-top executive conflict, another contributing factor to corporate failure is the shareholder-creditor conflict. D'Aveni (1989b), for example, contends that bankruptcy can be viewed as the legal resolution of severe shareholder-creditor conflicts about the levels of assets that the firm should possess. The creditors have the legal right to dissolve the debtor. The creditor may invoke his right if the board of directors and outside directors, in particular, fail to resolve the shareholder-creditor conflicts. Agency logic (see Jensen and Meckling 1976) suggests that creditors and shareholders have divergent interest, which must be resolved if the firm is to survive (D'Aveni, 1989b). For example, they differ over how a firm should be managed. Warner (1977) identifies four major sources of conflict between the creditor and shareholder namely: (1) claim dilution, (2) assets substitution, (3) underinvestment and (4) dividend pay-out[6].

Concerning claim dilution, it is argued that the interests of current creditors are endangered if a firm takes on new debt (Jensen and Meckling, 1976). Further, in times of crises controlling shareholders may take undue risks (Green, 1984). This excessive risk is exaggerated if the controlling shareholders are expected to lose their residual claim of a failing firm's resources (D'Aveni, 1989b). Thus, shareholders may assume strategies that are extremely risky for the creditors and this conflict is deepened if the firm is distressed (D'Aveni, 1989b). Agency logic, therefore, expects outside directors to monitor and evaluate firm's financing decisions with the view of resolving shareholder-creditor conflict, if the firm is to survive.

Turning to asset substitution and underinvestment, Green (1984) posit that if the firm alternates high-risk for low risk projects, this increases shareholders' value but not the creditors' claim. Thus, the value of equity, due to its limited liability feature, is considered an option (Ju and Ou-Yang 2006). As well, Myers (1977) argues that firms with outstanding risky bonds may reject positive net present value (NPV) projects when the project's benefit accrues to bondholders. This is because controlling shareholders bear the costs of the projects but shares the benefits with creditors (Ju and Ou-Yang 2006). In sum, asset substitution and underinvestment suggest that certain decisions increase shareholders' value but reduce creditors' wealth. Thus, agency logic expects the outside directors to monitor and evaluate firms' investment strategies with the view of resolving shareholder-creditor conflict, if the firm is to survive.

Concerning dividend pay-out, Kalay (1982) proposes that the value of debt is reduced by unforeseen dividend increases, if debts are priced on the assumption that the firm's dividend

[6] Jensen and Smith (1985) present a comprehensive discussion of the sources of conflict between the creditor and shareholder.

policy will be unchanged. Black (1976) contends that shareholders have the incentive to pay out the entire assets in the form of dividend, and thus, leave the creditors holding an empty shell. This practice is particularly tempting if a firm is incurring prolong losses, which suggest that shareholders have no chance of receiving any dividends from the future cash flows of the firm (D'Aveni, 1989b). In this regard, Smith and Jensen (2000) argue that there is a natural conflict over the level of liquidity that a debtor must maintain and this conflict is worse when the debtor is financially troubled. This conflict is heightened by the limited liability feature of equity claims, implying that creditors may have an empty shell in the event of bankruptcy (see, Black, 1976; Jensen and Meckling 1976). Accordingly, using the agency lens, the outside directors must monitor and evaluate firms' dividend pay-out policy with the view of resolving shareholder-creditor conflict, if the firm is to survive.

In sum, these conflicts must be managed and resolved by the board and outside directors, in particular (Fama 1980). Borrowing from the legalistic and class managerial hegemony perspectives boards are weak vis-à-vis top management (Mace, 1971). Drucker (1981), for example, blames boards of being 'the last to know' in every financial scandal over the past five decades. This suggests that the shareholder-creditor conflict, in practice, is resolved by a firm's CEO (Donaldson and Lorsch, 1983). Using the agency lens, firm's top management is untrustworthy, hence shareholder-creditor conflicts will not be resolved well (Fama 1980).

As a result, corporate governance mechanisms ensure that creditors exchange their finances for control rights. These control rights include cessation of assets, petition to the court for liquidation, speak and remove vote in reorganizations. It is worth noting that bankruptcy rules offer creditors more legal protection than that of the shareholder. This implies that creditors would resort to bankruptcy laws to resolve the dominant shareholder-creditor conflict.

However, empirical studies of the degree to which agency theory contributes to the board's governing effectiveness and corporate failure, in particular, are limited. This study contributes to this debate. It attempts to fill the gap on the agency logic and corporate failure prediction, using empirical evidence from the UK. Accordingly, building on the agency logic, this study examines the presence of women representation on board, outside directors and board standing committees (i.e. nomination, audit and remuneration) and corporate failure. This study also argues that the resource dependency perspective of boards complement the agency theory. According, I turn to the analysis of the link between the resource dependency theory and corporate failure in the next section.

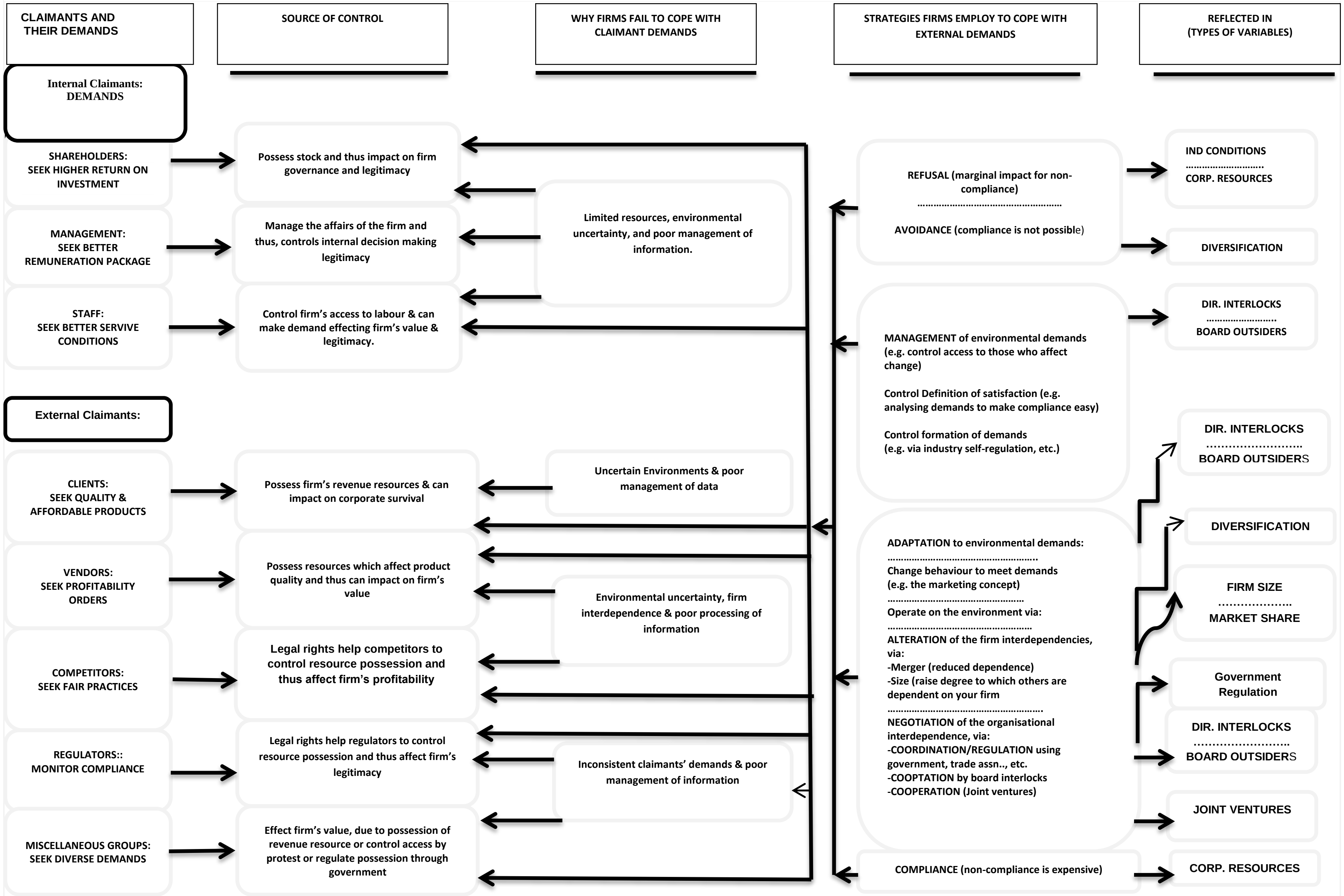
4.2 CORPORATE FAILURE: THE RESOURCE DEPENDENCE THEORY PERSPECTIVE

The resource dependency theory suggests that a firm's survival is dependent on its ability to gain control over resources (Pfeffer and Salancik, 1978). Thus, a primary tenet of resource dependency theory is resource scarcity, suggesting that firms compete for limited resources (Hessels and Terjesen, 2010). Resource dependency theory therefore focuses on the firm's ability to establish contacts with coalition to access resources (Van Witteloostuijn and Boone 2006). Coalition (Pearce, 1982) is a group with a stake in organisational action (Goodman and Pennings, 1977). These coalitions can be internal (e.g. shareholders and employees) or external (e.g. suppliers and regulators) (see Cyert and March, 1963). Each group of coalition possess means to controls the use, access and possession of critical resources necessary for a firm's survival (Sheppard, 1995). Diverse coalitions groups, however, monitor contradictory aims, indicating that the firm must encompass a variety of inconsistent goals, if the firm is to survive (Cyert and March, 1963).

Pfeffer and Salancik (1978) also contend that a firm reacts in diverse ways (e.g. refusal, avoidance, compliance etc.) to coalitions' demands, implying that firms are not bound by such demands. Sheppard (1995) agrees, emphasising that four factors are critical to the firm's ability to effectively employ a response. These are: (1) the firm's reliance on the coalition, (2) its resources, (3) environmental uncertainty, and (4) accurate management of information.

Following Sheppard (1995), I present a resource dependence model in Figure 9. The model shows the interface between coalitions and their power and demands in column 1. Column 2 describes the source of control by internal and external claimants of the firm. Columns 4 and 3 also outline potential strategies which firms employ to manage coalition demands and moderating factors, respectively. The final column, in particular, shows vital elements in the resource dependence model (e.g. diversification, director interlocks, board outsider and firm size). Thus, firms minimise the effects of external dependence and thereby increase their chances of survival if they select more profitable domains (Pfeffer and Salancik, 1978), and establish external linkages (Pfeffer and Salancik, 1978) to minimise dependency effects (Thompson, 1967). This implies that firm's survival is dependent on vital strategic decision: corporate, business, networking, and financial. I will discuss each in turn.

Figure 9: Resource Dependence Model



ADOPTED FROM SHEPPARD (1995)

4.2.1 Corporate Level Strategy

Corporate level strategy comprises issues concerning choosing the firms' operating domains (Hofer and Schendel 1978; Hill and Jones, 1992). This entails the dissemination of firm resources among the diverse industries and/or national markets (Beard and Dess, 1981). Sheppard (1995) claims that a firm's operating domains can play a vital role in its survival. Pfeffer and Salancik (1978) agree, highlighting that the presence of conflict in the firm's environment indicates a lack of ability to coordinate interdependent activities between firm and its environment. The conflict is anchored in resource scarcity (Pfeffer and Salancik, 1978). Industry growth (Porter, 1980), industry instability (Dess and Beard, 1984) and industry profitability (Dalton and Penn, 1976) are identified as indicators of resource scarcity.

Porter (1980) observes that, firms in high growth industries can increase market share without pilfering sales from competitors. Firms in deteriorating industries, however, contest each other for sales (Sheppard, 1995). Dess and Beard (1984) also contend that corporate failure is pronounced in unstable environments, due in part to resource scarcity. In parallel, Pfeffer and Salancik (1978) maintain that firms in stable industries reduce their environmental uncertainties through cooperative agreements. Diversification, in particular, may reduce firm's dependence on a specific domain of activity. This in turn, may reduce the possibility of firm's failure (Wernerfelt and Montgomery 1988; Rumelt, 2006), implying that diversification reduces the impact of market decline in a specific market.

Industry profitability indicates a firm's ability to access of resources. Thus, the conflict between firms in profitable industries is negligible (Sheppard, 1994; 1995) due in part to the comparatively ease to obtain resources. Simply put, firms in a profitability industry are more profitable (Lieberson and O'Conner, 1972), thereby reducing the probability of firm's failure (Drucker, 1970).

In sum, researchers (e.g. Ravenscraft, 1983) suggest industry structure is positively related to firm performance, which probably transfers into prospect of firm's survival (Drucker, 1970; Sheppard, 1995). In this respect, Pfeffer and Salancik (1978) and Amihud and Lev (1981) argue that firms move into wide range of industry to reduce industry effects and thereby reduces the probability of failure.

4.2.2 Business Level Strategy

Hofer and Schendel (1978) speculate that “at the business level, strategy focuses on how to compete in a particular industry or product-market segment. Thus, distinctive competences and competitive advantage are usually the most important components of strategy at this level (p. 27, 28)”. In this vein, Hambrick, (1980: p.567) notes, a business-level strategy answers the question, "How do I compete in this business?" vis-à-vis corporate-level strategies, which answers "What business should I be in?" This implies that a firm employs distinct business-level strategy for each operating domain (Beard and Dess, 1981). Porter’s (1980) generic strategy is considered a useful topology in describing business level strategies. Nonetheless, in the resource dependency context market share and firm size are vital elements to manipulate exchange partners (see Sheppard, 1995). The rationale is as follows.

First, Boston Consulting Group (1972) argues that firms remain cost competitive by securing greater market share. Pfeffer and Salancik (1978) concur, pinpointing that a firm with large sales volume controls the industry through their market share. As Schelling (1980) observes that a firm keeps revenues high through price setting by dominating firms in a concentrated market. Buzzell, Gale and Sultan (1975) confirm this assertion and show that market share is related to a firm’s profitability and ultimately, survival (Drucker, 1970). Prescott, Kohli and Venkatraman (1986), however, illustrate that the association between market share and performance is context-specific.

Second, Pfeffer and Salancik (1978) argue that firm size adds to the firm’s ability to control its exchange partners. Pfeffer and Salancik (1978) and Moulton and Thomas (1993) support this notion. Moulton and Thomas (1993:125), for example, explain that “firm size dominates all other factors in predicting success in completing the reorganisation process”. Small firms, due to deficiencies in both financial and managerial knowledge (Thornhill and Amit, 2003), lack legitimacy and thus, are prone to failure (Baum and Oliver 1992; 1996).

4.2.3 Networking Strategy

The previous section outlines among others the significance of manipulating exchange partners through firm size. This section considers networking strategies use to access external resources. Firms manage their interdependence through networking (Jarillo, 1989) or collective (Bresser, 1988), or cooperative (Nielsen, 1988) strategies. Networking, in turn, influences the behaviour of the firm's resource providers (Bresser, 1988).

The composition of the board is noted as one of the several means firms control outside interdependencies and decrease uncertainty (Gales and Kesner, 1994). This implies that the composition of the board should be affected by environmental pressures. Conceptual literature also suggests that board composition enhance board effectiveness and thus influence firm's survival (Dalton, Daily, Ellstrand and Johnson, 1998). The discussion of the networking strategies proceeds as follows: (a) board size, (b) board interlocks, (c) outside directors, (d) female directors, and (e) joint ventures.

(a) Board Size and Resource Dependency Theory

Corporate failure indicates a firm's inability to cope with its environment (Hambrick and D'Aveni, 1988) due in part to ineffective linkage (Pfeffer, 1972). Pfeffer (1972) and Pfeffer and Salancik (1978) suggest that large boards provide more effective external linkage. Thus, board size is regarded as a degree of the firm's ability to form environmental linkages (Gales and Kesner, 1994). Environmental linkage, in turn, is necessary to access critical resources for firm's survival.

Pfeffer and Salancik's (1978) advance that "when an organisation appoints an individual to a board, it expects the individual will come to support the organisation, will concern himself with its problems, will variably present it to others, and will try to aid it" (p.163). Put simply, boards, due to their prestige, are "vehicles for co-opting important external organisations" (Pfeffer and Salancik, 1978; p.167) to enhance legitimacy to access resources (Hillman and Dalziel, 2003). This in turn reduces environmental unpredictability and the likelihood of a firms' failure (Johnson, Daily and Ellstrand, 1996).

(b) Director Interlocks and Resource Dependency Theory

Firms employ director interlock ties as a strategy to control its resource community (Boyd, 1990; Hung 1998). Thus, firms mitigate possible uncertainties by absorbing potential 'disruptive elements' (Markóczy, Sun, Shi, and Ren, 2013) through director interlocks (Mizruchi, 1996). Interlock ties improve coordination among firms, which in turn, enhances firms' ability to acquire of valuable financial and managerial resources (Pfeffer and Salancik, 1978; Bresser, 1988). Thus, greater board interlock, due to presumed coordination, enhances the firm's reputation to access resources and thus, reduces the likelihood of firm's failure (Penning, 1980; Schoorman, Bazerman and Atkin, 1981).

For instance, director interlocks between competitors provide access to operations (Hung, 1998). Penning (1980), Hung (1998) and Hillman, Cannella and Paetzold (2000) also suggest the board interlocks provide the first step in obtaining support from critical resource providers. Pfeffer (1972), Mizruchi and Stearns (1988), Streams and Mizruchi (1993) and Simmons (2012), for example, suggest that the presence of financial agents may grant access to funds. Hillman, Keim and Luce (2001) also illustrate that a firm increases stakeholders' commitment by inviting key coalitions groups to serve on board. In short, board interlocks improves the strategic decision-making process (Carpenter and Westphal, 2001) and legitimacy (Pfeffer, 1972), thereby enhancing board effectiveness to reduce the possibility of firm's failure (Sheppard, 1995).

(c) Proportion of Outside Directors and Resource Dependency Theory

Fich and Shivdasani (2006) define outside directors as non-employees board members. Proportion of outside directors (i.e. ratio of outside directors to board size) indicates the degree to which outsiders are represented on the board. Pfeffer and Salancik (1978) observe that, "One would expect that as the potential environment pressures confronting the organisation increases, the need for outside support would increase as well, leading to a larger proportion of outside directors on the board" (p.168).

Contemporary scholars predict that prestigious-resource outside directors provide access to key claimants and legitimacy (Hillman and Dalziel 2003; Peng 2004), thereby enhancing firms survival. Boyd (1990) and Hillman, Cannella, and Paetzold (2000) confirm this notion and state that resource-rich outsiders are likely to be appointed to the board during crisis.

(d) Women Representation on Board and Resource Dependency Theory

The case for board gender diversity can be made on a number of grounds. These are theoretical (e.g. agency and resource dependency perspectives), business philanthropy (Coffey and Wang, 1998), useful motives (van der Walt and Ingley, 2003) and a duty to stakeholders (Keasey, Thompson and Wright, 1997) as well as shareholders (Carver, 2002). However, for the purpose of this section, the resource dependency perspective is examined as reasons for promoting the case for women representation on board.

As discussed above, the board is a means to co-opt external resources (Pfeffer and Salancik, 1978; Ingley and van der Walt, 2001), suggesting that the board is a significant strategic resource (van der Walt and Ingley, 2003). Ingley and van der Walt (2001), for instance, suggest that the board provides a linkage to a 'nation's business elite, access to funds, connections to competitors, and industry intelligence'. The board also offers advice to CEO and contribute to, approving major business strategy decisions. For these reasons, conceptual literature advocates the inclusion of qualified women on boards.

Burke (2000), for example, contends that talented male CEOs are overstretched. This perhaps may account for the lower board quality. As well, the male pool of candidates shrinks, suggesting that male CEOs refuse offers to serve on boards. Further, Burke (2000) argues that male directors lack know-how and information and thus display inability to add to board decision process. For these reasons, Burke (2000) posits that "increasing women's board presence enriches board information, perspectives, debate and decision making" (p.193).

Campbell and Minquez-Vera (2008) posit that gender diverse board can improve board quality. In particular, Bilimoria and Wheeler (2000) argue that women directors promote a more fruitful discourse by probing the CEO more freely. Bilimoria and Wheeler (2000), Campbell and Minquez-Vera, 2008), Burke (2000) and Mattis (2000) concur, stressing that women can add value to boards. These values include but not limited to significant symbolic value for the firm. Fondas (2000) and Bilimoria and Wheeler's (2000) study supports the resource dependency notion that board gender diversity improves environment linkages, thereby bringing strategic resources to enhance firm's survival.

(e) Joint Ventures and Resource Dependency Theory

Joint venture arises when firms jointly form a new entity for strategic reasons (Kogut 1988). Firms employ joint ventures as a means to acquire information, co-opt resource providers and share technology (Ahuja, 2000). Joint ventures also promote exchange of resources among partner firms (Drees and Heugens, 2012).

Building on the resource dependency logic (Pfeffer and Salancik, 1978), joint ventures reduce uncertainty and regulate interdependency on a firms' coalition. It is argued that as complexity and uncertainty surrounding a firm's operating environment increases, the need for external support becomes inevitable, resulting to ties through ownership. Young/small firms, in particular, can enhance their resources' accessibility through joint ventures (Baum, Calabrese, and Silverman, 2000). This in turn, mitigates the effects of liability of newness/smallness and thus improves survival prospects (Baum and Oliver, 1991).

4.2.4 Summary of Corporate Failure: Resource Dependency Theory Perspective

The above analysis suggests a range of means in which a firm can ultimately safeguard the supply of critical resources needed for survival. Accordingly, I invoke Sheppard's (1995) notion that failed firms apply fewer of these proposals compared to non-failed firms. Firms employ more of these submissions from the resource dependency perspective to limit their dependence on critical coalitions of resources providers (Pfeffer, 1972; Pfeffer and Salancik, 1978; Bazerman and Schoorman, 1983). This in turn, reduces uncertainty and transaction costs (Williamson, 1985) on one hand, and enhances firm's legitimacy and its survival chances (Singh, House, and Tucker, 1986) on the other. In this spirit, firms obtain continual support from critical constituencies, so long as it maintains the required legitimacy. Failure occurs when the firm uses fewer of the proposals, and thus lack adequate resources to maintain support of critical coalitions. The expectation is that a firm critical coalition groups attempt to extract payments for past support due to the firm's inability to provide inducements (Sheppard, 1995). Accordingly, I argue that early warning signs of corporate failure first appear when the firm no longer possess sufficient resources to meet the coalitional demands for payment.

However, evidence on the degree to which resource dependency theory contributes to the board's governing effectiveness and corporate failure, in particular, is limited. This study contributes to this debate. Specifically, I examine the effects of proportion of outside directors, presence of female directors, board size and former government officials on corporate failure.

In short, agency and resource dependence theories provide complementary perspectives to study antecedents of corporate failure. The integrative model may mirror the real world and thus, overcome theoretical weaknesses (Hillman and Dalziel, 2003), suggesting a richer model of the link between boards and corporate failure (Bergh 1995). This, in turn, may improve our understanding of how boards' monitoring and resources provision functions contribute to corporate failure, beyond that provided by an exclusive dependence on financial proxies (Daily and Dalton, 1994a). Little, however, is known about models that integrate agency and resource dependence perspectives in the corporate failure context (Daily and Dalton, 1994a; Darrat, Gray and Wu, 2010). This study attempts to fill this gap. This paves the way for a case for the integration of the two theories on board performance in the next section.

4.3 A SYNTHESIS TOWARD AN INTEGRATIVE MODEL

The above analysis shows how resource dependency and agency theories share a related incentive. These theories consider roles and attributes boards have to embrace in order to add to the firm's survival (Ricart, Rodriguez and Sanchez, 2005). The agency theory focuses on the board's relationship to top management and shareholders. The resource dependency theory, however, enlarges the board's relationship to critical coalition groups. As well, the aforementioned perspectives assume the dominance of a business control problem that induces conflicts with negative consequences on firm's performance and survival prospects (Kosnik, 1987). Directors, for example, may face conflicts in discharging their monitoring duties due to their personal association with CEO (Eisenhardt, 1989; Baysinger and Hoskisson, 1990; Bainbridge, 1993).

These theories, however, differ marginally with regards to directors' role (Kosnik, 1987; Johnson, Daily and Ellstrand, 1996; Payne, Benson, and Finegold, 2009; Minichilli, Zattoni, and Zona, 2009). This divergence may, in part, be a function of the on-going debate concerning the extent to which CEOs dominate boards (Johnson, Daily and Ellstrand, 1996). Agency theory emphasizes the need for board as a monitoring mechanism, but also suggests other incentives and disciplinary mechanisms (see Fama and Jensen, 1983). The resource dependency theory considers boards as a tool to extract resources required for firm's survival (Pfeffer, 1978; Hillman and Dalziel, 2003).

Further, the two perspectives differ in identifying board roles (i.e. strategy, service, control, and resources). First, evidence on the association between boards and strategy is mixed (Johnson Daily and Ellstrand 1996; Deutsch, 2005). Evidence (e.g. Mace 1971; Clendenin, 1972; Golden and Zalac, 2001) in the wake of corporate failures, report that boards' input to strategy is limited, due in part to lack of board power (Carpenter and Westphal, 2001). Put differently, directors' contribution in formulating strategy and monitoring its effective execution is ineffective (Baysinger and Bultler, 1985; Kosnik, 1987). In parallel, others (e.g. Sheridan, Jones and Marston, 2006, Aguilera, and Cuervo-Cazurra, 2009) suggest increasing influence of institutional investors and recent corporate governance reforms have stimulated boards involvement in strategy (see also Judge and Zeithami, 1992). Ruigrok, Peck, Keller (2006) confirm this notion and show that boards constructively challenge CEOs' strategy, an area hitherto controlled by top management (Pugliese, Bezemer, Zattoni, Huse, Van den Bosch, Volberda, 2009).

Similarly, evidence on the association between boards and service role is well documented (Vance, 1983; Westphal and Stern, 2007), but results are inconclusive (Zahra and Pearce, 1989). The board service roles include advising the CEO (Lorsch and Maciver, 1989; Daily, Catherine, Daily, Dalton and Cannella 2003; Hillman and Dalziel, 2003; Huse, 2005) and enhancing firm's legitimacy (Pfeffer and Salancik, 1978). The recent financial scandals, however, provide circumstantial evidence to suggest that directors have immensely failed to discharge their service roles. As Zahra and Pearce (1989) put it "……, directors have failed to reflect changing societal values in shaping corporate identity because boards lack requisite power to bring about desired changes in the role of the corporation"(p.304).

Westphal and Stern (2007), however, show that directors engage in more 'ingratiatory behaviour', provision of advice to CEOs and lesser CEOs' performance evaluation to retain their seats in the board network. This implies that reaching an effective board composition is fraught with internal conflicts (Wincent, Anokhin and Örtqvist, 2012). Put simply, a board which is good in monitoring can inhibit its strategy abilities and vice versa.

The control role of boards is well documented in the theoretical and empirical literature (Dalton, Daily, Ellstrand and Johnson, 1998; Dalton, Daily Certo, and Reongpitya, 2003). Critics, however, suggest that some boards fail to assess the CEOs' performance and /or outline the executive remuneration strategies (Monks and Minow, 1995; Westphal and Stern 2007). Carpenter and Westphal (2001), however, find that relevant board capital is positively associated with board monitoring. Put differently, boards with appropriate capital are more likely to be effective monitors of CEO's actions and thus enhance the long term success of the firm.

The resource role requires boards to facilitate acquisition of critical resources through their external ties (Pfeffer 1972). Hillman, Cannella, & Paetzold's (2000) study supports this notion, emphasising that firms respond to significant changes in the environment by varying the board composition. Drees and Heugens' (2013) meta-analysis, however, suggests that the association between the board resource role and firm performance is unclear. Specifically, Drees and Heugens (2013) show the link between firm performance and interorganisational arrangement is positively mediated by autonomy but not legitimacy.

Altogether, I concur with Kosnik (1987) notion that ''imbedded in each theory is a qualified perspective on the governing performance of boards that, with varying degrees of explicitness, identifies the conditions and attributes believed to lead to either effective or ineffective board governance"(p.169). The agency theory, for example, assumes some degree of *homo-economicus*, which describes the CEO and his executives as self-seeking (Davis, Schoorman and Donaldson, 1997). For agency theorists, an extreme incentive for effective board monitoring is the board's equity compensation. For resource dependency view, board's performance role rest on three contingencies namely: the company life cycle, type of business and the external environment. Contemporary scholars (e.g. Haynes and Hillman, 2010) also suggest extreme incentives for effective board resource and strategy role is board capital breadth but not board capital depth.

Further, the above analysis suggests prior studies produce inconsistent findings. This does not indicate a conflict exists between theoretical predictions and empirical evidence. However, it may be due in part to numerous limitations identified in prior studies (see also Johnson, Daily and Ellstrand 1996; Daily, Dalton and Cannella, 2003). Prior studies are limited in scope, based on survival bias sample and lack consistency in operationalization dependent and independent variables. Prior studies, however, neglect the interaction effects of corporate governance proxies and performance; this in particular, is likely to cloud the interpretation of prior findings. These limitations notwithstanding, prior studies suggest that some boards are ineffective due to poor composition and poor structure. In turn, these poor board attributes allow the CEO to dominate the board decision-making processes (see Zahra and Pearce, 1989; Johnson, Catherine, Daily and Ellstrand, 1996; Zattoni and Cuomo, 2010; Zhang, 2010).

However, this raises another related limitation of past studies. Taken separately the diverse theoretical perspectives are rather one dimensional, only revealing a particular aspect of the board's role (Cornforth, 2004). Hence, contemporary researchers (e.g. Zahra and Pearce, 1989; Hung 1998; Hillman and Dalziel, 2003; Cornforth, 2004) are calling for a new conceptual framework that can help integrate the insights of these different perspectives. Kosnik's (1987) study illustrates the creative synthesis of the class managerial hegemony and agency theories. Theoretical (e.g. Zahra and Pearce, 1989; and Hillman and Dalziel, 2003) attempts also suggest that multi-theoretical models can add precision to an area fraught with conflicting empirical findings. Thus, I invoke Cornforth's (2004) notion, suggesting that a multi-paradigm paradox perspective offers a promising approach to explain the corporate failure phenomena.

Nonetheless, despite the strong theoretical underpinning of these theories, little effort has been made to articulate its managerial implications (Zahra and Pearce, 1989), particularly the corporate failure context. Put simply, no attempt has been made to use a multi-theoretical approach to conceptualise corporate governance and corporate failure for empirical testing. Although there has been much discussion on this topic, there is almost no empirical research that comprehensively tests for a relation between corporate governance and corporate failure, particularly in the UK. This research begins to fill this void.

I argue that the corporate failure context provides a prominent illustration of the intersection of the agency and resource dependency perspectives. I also argue that these theories complement each other to identify the essential board attributes and functions that might explain the corporate failure syndrome. For example, using agency logic, top management seen as self-serving and thus, will misappropriate shareholders wealth. In short, boards are ineffective in discharging their monitoring roles. Similarly, their resource function is ineffective, due to lack of inducement to critical coalition groups. Critical resource providers, in turn, may resort to insolvency/bankruptcy laws to safeguard their interest. This is because directors' fiduciary duty shifts to protecting the interests of the firm's creditors when the firm is considered insolvent (Miller, 1992; Waldera and Sullivian, 1993 and Cieri, Sullivan and Lennox, 1994). This is an incentive for creditors to invoke their legal right to dissolve the firm (Blum and Kaplan, 1976) but in reality, this is rare (Mumford, 2003).

All the two theories suggest that competing interest of creditors and shareholders as well as those between top management and shareholders must be resolved if the firm is to survive (Jensen and Meckling, 1976). Thus, filing of insolvency is a consequence of boards' inability to resolve these conflicts. Further, within our empirical setting, compliance to the UK Code is at least circumstantial evidence of board adherence to their monitoring role. This in turn, enhances board effectiveness due in part to alignment of management and shareholders interest. The expectation is that an effective board is linked to effective monitoring and in this way, facilitate resources inflow, autonomy and legitimacy from firm's constituencies. In turn, these factors may enhance the survival prospects of a firm. I turn next to our proposed integrative model of corporate failure.

4.4 AN INTEGRATIVE MODEL

Overall, the two theories (i.e. agency and resource dependency) suggest that corporate reformers' attempt to reconstruct boards with more independent directors may increase the likelihood of a firm's failure (Johnson, Daily and Ellstrand, 1996). Thus, although the two perspectives draw on diverse disciplines, they complement each other in identifying the essential board attributes that might affect corporate failure. Accordingly, I invoke Zahra and Pearce (1989) assertion that the resource dependency and agency theories suggest an integrative model that synthesises past studies and specifies relationships between board measures and corporate failure. Figure 10 depicts our integrative model. It builds on prior studies and more notably, advances particular associations between corporate governance variables and their impact on corporate failure. Three key features of the model merit attention.

First, I follow Hillman and Dalziel (2003) and in turn, limit the model to two important board functions: monitoring and resources. The rationale is threefold.

1. Board Monitoring Function: The agency perspective identifies board's control role as conceptually key to a firm survival (see; Fama, 1980; Mizruchi, 1983; Hillman and Dalziel, 2003). This view is also supported by legalistic perspective. Specifically, the legal theory suggests that BODs, particularly outside directors, prevent corporate failure of their firms by discharging their fiduciary duty of monitoring the CEO (e.g. Bainbridge, 1993; Cieri, Sullivan, Lennox, 1994; Minichilli, Zattoni and Zona, 2009) and overall firm performance (e.g. Carpenter, 1988; Vance, 1983; Stiles and Taylor, 2001).This implies that both the agency and legal perspectives consider outside directors as shareholders' primary line of resistance against self-serving CEOs (Weisbach, 1988; Stiles and Taylor, 2001). Accordingly, scholars (e.g. Lorsch and Maciver, 1989; Mizruchi 1983; Bainbridge, 1993; Baysinger and Butler, 1985), reformers (e.g. Higgs, 2003) and research (Rosenstein and Wyatt, 1990) stress that, effective boards comprise mostly of independent non-executive directors.

2. The Board Resource Function: The resource dependency theory suggests that boards provide resources (e.g. legitimacy, advice and counsel). Thus, from the resource dependency perspective, boards provide diverse resources to the firm by performing their service task (Pfeffer, 1972; Pfeffer and Salancik, 1978; Minichilli, Zattoni and Zona, 2009). Minichilli, Zattoni and Zona (2009) and Huse (2005) also outline advice, networking and strategic participation as three tasks related to board service task performance. The important implication is that the service and strategy roles are imbedded in the board resource function.

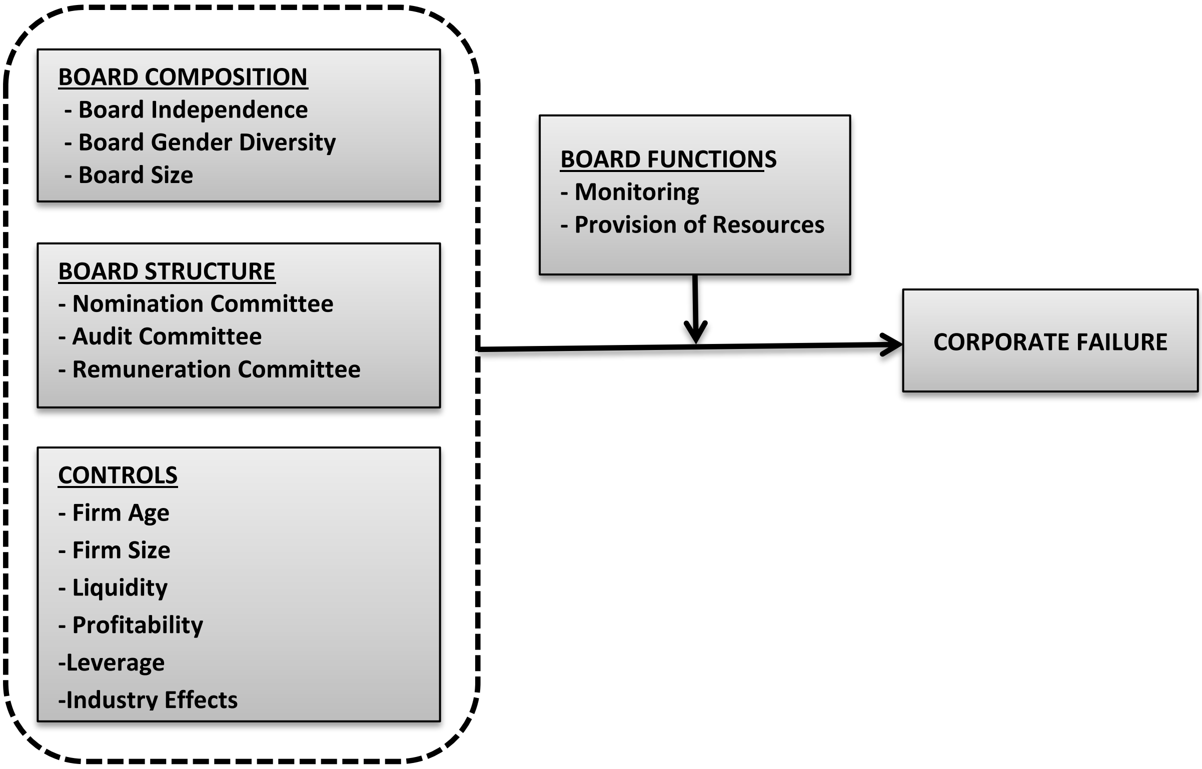
   Resource dependency theory could be seen as connected to class managerial hegemony theory. The class managerial hegemony theory (Mills, 2000) considers the role boards play in preserving the cohesion of the social elite. Davis, Yoo, and Baker (2003) confirm this notion and show that the level of connectivity among directors is well established. This is due in part to the CEO's dominance in the board selection process (Hillman, Shropshire, and Cannella, 2007). As Davis, Yao and Baker (2003:304) observe, "[A] recruitment process that relies on personal familiarity allows a handful of directors to become and remain highly central in the director network, thereby creating many ties among companies". Mizruchi (1996) views board networks as collusion, co-optation, monitoring, and social cohesion mechanisms. In particular, board networks facilitate use of competitors' strategies and pacify resource provider's management (Mizruchi, 1996).

In sum, the resource dependency and class managerial hegemony theories view interlocks as a means to control interdependencies (Pfeffer, 1972; Pfeffer and Salancik, 1978), maintain power and control for social elites (Useem, 1980; Burris, 2005). This implies that boards via their network ties enhance firms' legitimacy (Hillman and Dalziel, 2003), which in turn, reduces uncertainties (Borgatti and Foster, 2003), especially in uncertain environments (Carpenter and Westphal, 2001). As Hillman and Dalziel (2003) put it, BODs offer counsel to the CEO (Stiles and Taylor, 2001) and legitimacy to the firm (Bazerman and Schoorman, 1983; Pfeffer and Salancik, 1978; Stearns and Mizruchi, 1993; Johnson, Daily and Ellstrand, 1996). In turn, these resources reduce uncertainties to induced exchange partners for continual support to enhance firm's long term success. (Appendix 3 contains the differences of the legal, agency class managerial hegemony and resource dependency perspectives of boards).

3. Korn/Ferry's (1999) survey reports that boards monitor CEO on behalf of shareholders and provide resources to the firm. In turn, these functions are associated to the likelihood of corporate failure (Hillman and Dalziel, 2003; Brown, 2005). As Hillman and Dalziel (2003) observe, integration of the control and resource functions may overcome theoretical weaknesses and thus more precisely mirror the real world.

Second, the model recognises the multidimensional nature of corporate failure. Thus, this study departs from prior corporate failure studies, discussed in chapter 3. In this regard, the multidimensional nature of corporate failure is well documented in past theoretical literature, but neglected in empirical consideration. Finally, the model advances the interplay among board attributes and functions on corporate failure. Anchored in the agency and resource dependency theories and empirical studies, this sequence offers a means of integrating corporate governance and prediction of corporate failure research streams.

Figure 10: The Integrated Model of Board Attributes and Functions on Corporate Failure



A similar approach has been used by Zahra and Pearce, 1989; Hillman and Dalziel, 2003

The model shows that the interactions between board functions and attributes variables affect corporate failure. The vast literature describes four main board attributes: composition, structure, characteristics, and process. Hillman, Cannella and Paetzol's (2000) study suggests board composition denotes board size (i.e. number of directors), director types (i.e. inside and outside directors) and minority representation (i.e. ethnic minorities and females). Zahra and Pearce's (1989) study suggests board structure covers the several dimensions of board oversight committees (e.g. types of board committees and committee membership). Zahra and Pearce (1989) also suggest board characteristics are board personality and directors background (e.g. age, educational background, and experience). Vance (1983) suggests board process includes various dimensions of the board meetings (e.g. frequency, duration and quality of board meetings).

Zahra and Pearce's (1989) review, however, suggests composition influences directors' characteristics. Board characteristics, in turn affects board structure. Board structure reflects board processes. For these reasons, I consider board composition and structure as significant board attributes in the model. Each board attribute represents numerous relevant features that may add indirectly, through board functions, to corporate failure. Based on prior empirical studies, the model pinpoints the most important of these elements. Put differently, the model (Figure 10) outlines three board composition variables: board independence, board gender diversity and board size. For board independence, I focus on proportion of outside directors, which arguably captures the extent of outside directors' dominance of the CEO and his or her management (Wincent, Anokhin and Örtqvist, 2012). Board gender diversity refers to the representation of women on board. For board structure, the model (Figure 10) covers three board oversight committees: nomination, audit and remuneration. This implies that the model covers three critical decision dimensions of the board: appointment, accountability and remuneration. Finally, the model identifies six major controls from key decision dimensions: firm age, firm size, liquidity, profitability, industry effects and leverage.

The Model (Figure 10) depicts that the influence of boards on corporate failure may follow a direct and an interaction effects. The former considers link between board attributes and corporate failure. The interaction effects, however, show that therelationship between board attributes and corporate failure is moderated by the two board functions. To date, relevant empirical studies focus on the direct effect of board attributes on corporate failure (e.g. Chaganti, Mahajan and Sharma, 1985; Sheppard, 1994; 1995), although the interaction effect is more likely through the agency and resource dependency perspectives (Zahra and Pearce, 1989). The interaction effects consider the interplay between board attribute and functions and the influence these exert on corporate failure. The subsequent paragraphs explain the direct and the interactions effects in turn.

4.4.1 Direct Effect of Board Attributes on Corporate Failure

Board Composition: The agency and resource dependency theories underscore the significance of board composition and corporate failure (see Appendix 3). For instance, using the agency theory, board composition mirrors the degree to which the CEO controls the board and vice versa (Wincent, Anokhin and Örtqvist, 2012). Scholars (e.g. Hermalin and Weisbach 1991; Kesner, Victor and Lamont, 1986; Daily and Dalton, 1995; Erkens, Hung, Matos 2012) suggest that greater proportion of outside directors strengthens board's power and independence over the CEO, and in this way, enhances the board monitoring function. Thus, agency approach observes outside directors as essential for the monitoring function. Borrowing from the class managerial hegemony perspective, board composition shows whether selective recruitment of directors is done to preserve capitalist. Lastly, the resource dependency lens (Pfeffer and Salancik, 1978) suggests board composition reflects the characteristics of the firm's environment, enhancing the firm's ability to access resources required to control uncertainty and thus avoid corporate failure.

Board Structure: Agency scholars suggest that the internal structure of the board is a major element of corporate failure. Thus, efficient board structure is vital to facilitate directors' commitment to firm strategies, and in reducing the CEO's power (Faleye, Hoitash and Hoitash, 2011). As in Figure 10, a board structure refers to the separation of key decisions among committees, implying that board structure impacts directors' decision-making styles and communication with CEO. In turn, these may impact on the quality of boards' decisions and ultimately, the likelihood of a firm's failure.

4.4.2 Interaction Effect of Board Attributes and Functions on Corporate Failure

Board Composition: Evidence suggests that greater board composition enhances the board functions: control function (see, Kosnik 1987; Beasley, 1996; Peasnell, Pope, and Young 2005) and resources (see Mace, 1971; Patton and Barker, 1987). Put diffidently, the board composition may affect directors' ability to monitor the CEO on behalf of shareholders as well as provide resources for firm's survival (Patton and Barker, 1987). Pfeffer and Salancik (1978), for example, assert that outside directors are crucial in securing resources for the firm. For boards' control function, Zahra and Pearce's (1989) review pinpoints that larger boards, due to presumed diversity, are not prone to CEO's dominance. Mahadeo, Soobaroyen and Hanuman (2012) find that board size is significantly and positively correlated to educational background. Thus, larger boards can accommodate board members with diverse education, skills and values background. Recent evidence (see Kim, Cha, Cichy, Kim and Tkach, 2012) suggests that directors' involvement in strategy and the board size have a positive influence on financial performance. Contemporary scholars (e.g. Hillman and Dalziel, 2003) argue that board dependence will negatively impact the relationship among a board's ability to monitor and actual monitoring. In contrast, board dependence is desirable for the resource provision function (Dalton, Daily, Johnson and Ellstrand, 1999). In short, an effective board composition is essential to successful performance of the board resource and control function, which in turn influences the probability of corporate failure.

Board Structure: Kogan and Wallach (1964) argue that the size of the decision-making group is negatively related to its propensity to absorb risks. The rationale is that larger boards, due to presumed free rider issues, are less effective than smaller board (Jensen, 1993). Yermack, (1996) confirms this notion. For this reason, the legalistic and agency perspectives require boards to delegate their authority to oversight committees. As in Figure 10, effective board structure is a major condition for effective control board function. Klein (1998), for example, contends that the audit committee facilitate the timely issue of reliable accounting information and thus helps lessen the agency problem. Wild (1994) confirms this notion and shows that the audit committee enhances managerial accountability to principals. The remuneration committee similarly may lessen the principal agency problem by motivating top management to pursue a mutual interest with shareholders. The inclusion of nomination committee is consistent with board governance literature which identifies the value of an independent nomination committee that screens potential candidates. Using the agency and the legalistic perspectives clear selection criteria may strengthen directors' independence and knowledge base. This in turn, may minimise the moral hazard problem, agency problems and overcome the view suggested by the class managerial hegemony perspective, thereby enhancing the survival prospects of a firm.

4.5 CHAPTER SUMMARY

This chapter provides an overview of corporate failure and corporate governance theories. Perhaps and more importantly, it discusses the link between corporate failure and two main theories: Agency and Resource Dependency. An integrative model that stimulates the empirical study in corporate failure prediction, the object of this study, is set out in the relevant section. As Kosnik (1987) observes, although the agency perspective on boards is integrated in a better developed and structured model of corporate control, these theories are complementary in identifying the essential board attributes that might affect corporate failure. Thus, the theoretical basis of the thesis contains the fusion of the two theories to explain the corporate failure syndrome. This approach provides the opportunity to study the corporate failures in the UK. I turn next to the hypotheses based on theoretical arguments (i.e. using agency and resource dependency theories) in the next chapter.

CHAPTER FIVE
DEVELOPMENT OF HYPOTHESES

5.0 INTRODUCTION

Chapter one highlights the motivation and research problem of the study. Chapter two outlines corporate governance and corporate insolvency frameworks in the UK. It also discusses the five main thematic areas; leadership, effectiveness, accountability, remuneration, and board-shareholder relationship, that underpin the UK corporate governance Code. Chapter three reviews the extant literature on corporate failure prediction and highlights the ad hoc selection of variables approach, in particular. Chapter four presents the underlying theories to motivate hypotheses about board attributes and the occurrence of corporate failure. Specifically, the corporate failure phenomenon is explained from the agency and the resource dependency perspectives in the context of two board functions (i.e. control and resources). The central tenet of chapter four is that a multi–theoretical model can deepen our understanding of the corporate failure phenomenon.

In this chapter, I pull together work covered in chapters 1, 2, 3 and 4 by generating hypotheses. The chapter proceeds as follows. Section 5.1 provides a summary of the motivation for developing hypotheses using a multi-theoretical approach. Section 5.2 presents the hypotheses. Section 5.3 concludes.

5.1 THE RATIONALE OF DEVELOPING HYPOTHESES FROM A MULTI-THEORETICAL APPROACH

In this section, I provide a summary of the motivation for developing hypothesis via a multi-theoretical approach. First, section 5.1.1 briefly presents the link between corporate failure and the monitoring function of boards using the agency theory. Section 5.1.2 follows with a brief outline of the link between corporate failure and the resource function of boards using the resource dependency theory.

5.1.1 Agency Theory and the Monitoring Function

Agency theory describes bankruptcy/insolvency as the legal resolution of severe shareholder-creditor conflicts regarding the financial management decisions of the firm (D'Aveni, 1989b). Black (1976), for example, argues that in times of crisis, shareholders may influence top management to distribute all the firm's resources in the form of dividend. It is argued that boards, due to their presumed independence, can enhance the firm's survival by resolving the diverse interests of creditors and shareholders (Jensen and Meckling, 1976).

As well, the divorce of ownership and control in listed firms has induced acute top management-shareholder conflict regarding the firm's strategic orientation (Eisenhardt, 1989; Baysinger, Kosnik and Turk, 1991; Mizruchi, 2004). Baysinger, Kosnik and Turk, (1991), for example, contend that professional managers seek personal wealth and less interested in enhancing the shareholders' value. Agency scholars, therefore, advocate enhanced controls to reduce the shareholder-top management conflict (Jensen and Meckling, 1976). This in turn, lessens the agency loss (Eisenhardt, 1989) via reducing the moral hazards and adverse selection problems (Williamson, 1985; Gomez-Mejia, and Wiseman, 2007), and ultimately, enhancing the survival of the firm. Scholars propose incentives that tie executives' rewards to shareholders' value as well as monitoring of CEO's agenda as mechanisms required to reduce the agency problem (Jensen and Meckling, 1976; Combs, Ketchen, Perryman and Donahue 2007).These duties fall first to the board and outside directors, in particular (Combs, Ketchen, Perryman and Donahue 2007). For this reason, this study limits its scope to the BODs. Monitoring by BODs and outside directors, particularly, reduce the agency problems, and, in this way, reduce the likelihood of a firm's failure (Fama, 1980; Zahra and Pearce, 1989; Hillman and Dalziel, 2003).

5.1.2 Resource Dependency Theory and the Provision of Resource Function

The resource dependency theory suggests that corporate failure is an indication of a firm's lack of legitimacy to access critical resources from its constituents (Pfeffer and Salancik, 1978; D'Aveni, 1989a: b). Put simply, a firm's survival is legitimated by its critical resources providers (Thompson 1967; Pfeffer and Salancik 1978; D'Aveni, 1989). This suggests that firm interdependence with exchange partners reduce its independence and increase uncertainty (Eisenhardt, 1989; Rivas, 2012). In turn, uncertainty obscures the firm's control of resources (Rivas, 2012) thereby, reducing shareholders' value (Combs, Ketchen, Perryman and Donahue, 2007).

To mitigate this, firms can take actions to reduce environmental uncertainty (Alchian, 1950; Pfeffer and Salancik, 1978; Rivas, 2012) and thus, enhance firm's legitimacy (Pfeffer and Salancik 1978) and survival (Cyert and March, 1963; Singh, House and Tucker, 1986).

Pfeffer (1972) suggests two diverse strategies namely: internal and external. The internal strategy requires firms to improve the efficacy of the internal processes to manipulate their exchange partners (Rivas, 2012). However, this is beyond the scope of this study. A second strategy is to ensure constructive interactions with its environment through the board. This implies that BOD links the firm with its external environment, thereby reducing uncertainty (Rivas, 2012), and enhancing firm's long-term viability (Mizruchi and Stearns, 1988; Gales and Kesner, 1994; Hillman and Dalziel, 2003). Pfeffer and Salancik (1978:167), for example, describe boards as "vehicles for co-opting important external organisations" to enhance firm's access to managerial expertise (Rivas, 2012) and financial resources (Mizruchi and Stearns, 1988). In turn, these resources help increase autonomy (Oliver, 1991), diminish firm's uncertainty (Pfeffer, 1972), and ultimately enhance the firm's survival (Sing, House, Tucker, 1986).

5.2 BOARD ATTRIBUTES AND CORPORATE FAILURE

This section presents how board attributes (i.e. board composition and structures) can intervene in the corporate failure process. Section 5.2.1 outlines the nexus between board composition and corporate failure. Section 5.2.2 addresses board structure and corporate failure.

5.2.1 Board Composition and Corporate Failure

In this section, I briefly review the literature with respect to board composition and relate them to corporate failure. Drawing from our conceptual model, I limit our discussion to board independence, board gender diversity and board size.

Board Independence: Insider or Outsider Dominated Board?

By definition, outside directors are all non-employee directors (Daily and Dalton, 1992), with inside directors being classified as those employee-directors (Byrd and Hickman, 1992). Fama and Jensen (1983) suggest boards can reduce information asymmetry via inclusion of few inside directors in addition to the CEO. Bainbridge (1993), Baysinger and Butler (1985) Daily and Dalton (1994b), however, suggest that interdependent directors may be less effective monitors of the CEO. Put differently, Baysinger and Hoskisson (1990) contend that inside directors' loyalty to the CEO may consider CEO evaluation as a sensitive issue. This implies that effective boards arguably consist of a high proportion of outside directors

(Mizruchi, 1983; Zahra and Pearce, 1989). In parallel, the class managerial hegemony perspective argues that the board's ineffectiveness in monitoring and constructively challenging CEO's decisions is induced by outside directors' dependence on CEO, due to the board recruitment process. Put simply, the literature seems to converge on the notion that the individual directors' independence of the CEO is essential for board's ability to fulfil the control function (Johnson, Daily and Ellstrand, 1996; Chancharat, Krishnamurti and Tian, 2012).

Empirical evidence regarding the performance implications of board independence, however, is not persuasive on this point (Daily and Dalton, 1994a; Hillman and Dalziel, 2003; Kumar and Sivaramakrishnan, 2008; Chancharat, Krishnamurti, Tian, 2012). Baysinger and Hoskisson (1990), Baysinger, Kosnik, and Turk, (1991), and Kroll, Walters and Son (2007) document the potential benefits of inside-dominated boards. Kroll, Walters and Son's (2007) findings suggest that the boards of small firms with initial public offering should comprise of majority of original top management team (TMT) members, rather than independent outsiders. They argue that such board members possess valuable tacit knowledge of the firms and are in the best position to provide oversight. In addition, empirical evidence (e.g. Chaganti, Mahajan and Sharma 1985; Baysinger, Kosnik and Turk, 1991; Goodstein and Boeker, 1991; Byrd and Hickman 1992; Daily and Dalton 1994a; Gales and Kesner 1994) shows that a large number of outsiders representing diverse interests may politicise the board process (Mace, 1971). This in turn may dilute effective leadership (Barnard, 1968), resulting in top management team conflict (Chaganti, Mahajan and Sharma 1985) and reduce the firm's economic flexibility. Further, top management, when faced with such conflicts, may seek ways of avoiding the pressures, rendering the board ineffective (Sethi, Cunningham, and Swanson, 1979), due to their lack of expertise, independence and satisfactory time to monitor the CEO (Zahra and Pearce, 1989; Chaganti, Mahajan and Sharma 1985). Klein (1998) confirms this notion and reports a negative relation between firm performance and the proportion of outsiders on committees focused on advising. This implies that insiders play an important informational role. In sum, Mace (1971) argues that outside directors are mere nod through with no influence over the firm's fate, thus this is the essence of corporate failure.

Another stream of research shows a positive association between the proportion of outside directors and firm financial performance (e.g. Faleye, Hoitash and Hoitash, 2011), negotiating takeover premiums (e.g. Byrd and Hickman, 1992), CEO turnover (Borokhovich, Parrino, and Trapani, 1996), and adoption of anti-takeover mechanisms (Brickley, Coles, and Terry, 1994). Faleye, Hoitash and Hoitash (2011) for example, find that monitoring quality improves when majority of independent directors serve on at least two principal monitoring committees. Peng's (2004) findings, based on 405 publicly listed firms in China, suggest that outsider directors do make a difference in sales growth, and little impact on return on equity (ROE). Recently, Duchin, Masusaka and Osbaz (2010) examine the impact of SOX rules requiring increase in the number of outside directors on boards. They find that outside directors are associated with significantly better performance when their cost of acquiring information is low, and vice versa. This in part may explain failure of previous studies (e.g. Chaganti, Mahajan, and Sharma, 1985; Hermalin and Weisbach 1991; Daily and Dalton 1992; Klein, 1998; Bhagat and Black, 2001) to find an effect of outside directors on performance.

Using the resource dependency lens, outside representation on boards is viewed as efforts to prevent performance declines and failure itself. I can speculate that during financial decline firms seek more support from outside constituencies (Pfeffer and Salancik, 1978; Sutton and Callahan, 1987), through the network of contacts of outside directors (Borch and Huse, 1993). Thus, resource dependency perspective suggests that number of outside directors on board is an indication of the board's leadership efforts to lobby support from resources providers.

Outside directors, due to due diverse background and independence, offer independent alternative views to the board (Zahra and Pearce, 1989) and linkages to external stakeholders that control the firm's access to resources (Goodstein, Gautam, and Boeker, 1994). Put simply, outside directors reduce the likelihood of firm's failure by complementing the board's knowledge base and resource access (Pfeffer, 1972). Thus, higher representation of outside directors on board enhances strategic decision making (Baysinger and Hoskisson, 1990; Judge and Zeithaml, 1992; McNulty and Pettigrew, 1999), which in turn, enhances firm's survival (see Baysinger and Butler, 1985; Rosentein and Wyatt, 1990; Ezzamel and Watson, 1993). For example, several outside representatives on board facilitate access to valued resources, inter firm commitment and thus, enhance legitimacy (Pfeffer and Salancik, 1978). In turn, legitimacy reduces uncertainty and, in this way, enhances survival prospects of a firm. Hambrick and D'Aveni (1992), Stearns and Mizruchi (1993) and Kroll, Walters and Son, (2007) confirm this notion. For instance, Kroll and Walters and Son (2007) use dataset from 524 initial public offerings and find that outside directors may not monitor executives but provide resources that firms' TMTs need for effective execution of their strategies. In this respect, class managerial hegemony theory suggests that board interlock protects the interests of members in the board network and ultimately, impact negatively on firm performance (Koenig and Gogel, 1981). Empirical evidence in the UK and USA (Useem, 1982) and France (Nguyen-Dang, 2012) confirms this notion.

The above analysis indicates that evidence on proportion of outside directors (board independence) is mixed due in part to multiple theoretical perspectives, diverse operational definitions for board independence and performance (see Johnson, Daily and Ellstrand, 1996). For instance, board independence is defined as: (1) percentage or ratio of inside directors to total directors (e.g. Baysinger, Kosnik and Turk, 1991; Sheppard, 1994; Borokhovich, Parrino, and Trapani, 1996; Faleye, Hoitash and Hoitash, 2011), (2) absolute number of outside directors (e.g. Gales and Kesner, 1994), (3) independent-interdependent distinction (e.g. Wade O'Reilly and Chandratat 1990; Daily and Dalton, 1995), (4) Securities and Exchange Commission (SEC's) regulation 14A (e.g. Pearce and Zahra, 1991).

However, in the UK, the issue of the non-executive directors on board is addressed extensively in the Code, and thus the issue is seen to be important. The Cadbury and subsequent amendments recommend that half of the board, as well as the chairman, should be outside directors (Code, 2010: B.1.2). Thus, the code invokes Pfeffer and Salancik (1978) insightful perspective that outside directors offer expertise, control and resources to enhance the board process thereby enhancing the firm's survival. Accordingly, I reiterate the notion that, outside-dominated boards are effective boards (Lorsch and Maciver, 1989; Mizruchi, 1983; Zahra and Pearce, 1989), grounded in both the agency and the resource dependency theories on the other. Agency theory, however, cautions that some outside directors are not crucial in reversing the downward spiral (see Baysinger and Hoskisson, 1990), but monitors of the CEO's agenda to protect shareholders rights (Fama and Jensen, 1983; Jensen and Meckling, 1976). The expectation is that outsider dominated boards will exhibit a positive relationship with effective board control (Johnson, Daily, and Ellstrand, 1996) and resource provision function (Pfeffer, 1972; Pearce and Zahra, 1991; Fich, 2005) and, in this way, reduce the likelihood of a firm's failure. Thus, agency and resource dependence theories lead to the same prediction, with respect to outside directors and corporate failure. Accordingly,

H1a. *Ceteris paribus,* there is a negative relationship between the proportion of outside directors on a firm's board and corporate failure.

H1b. *Ceteris paribus,* the lower the level of (i) monitoring and (ii) resources, the stronger is the negative relationship between the proportion of outside directors on a firm's board and corporate failure.

Board Gender Diversity: Male or Female dominated?

Female representation on boards is a major concern for legislators in Europe, due to the persistent lack of women in decision making roles (Singh and Vinnicombe 2003). For this reason, the composition of boards is taking a legalistic perspective as the UK government motivated by Davies (2011) requires FTSE firms to have a minimum 25% of female directors by 2015 (see Sealy and Vinnicombe, 2012). Norwegian and Spanish laws require a 40 per cent quota for women on all boards by the end of 2005 and at the beginning of 2015, respectively (Rose 2007; Adams and Ferreira, 2009). Thus, recent board reforms seem to suggest that female directors may enhance board effectiveness by providing diverse perspectives to the board process.

Pfeffer and Salancik (1978) argue that board linkages provide resources, counsel, legitimacy, and communication channels, but scholars (e.g. Hillman, Cannella, and Paetzold 2000; Hillman and Dalziel, 2003; Terjesen, Sealy and Singh 2009) suggest the resource role's impact on performance is mediated by directors' human capital. Thus, today's increasingly uncertain business environment requires governance from individuals who can provide a breadth and depth of resources including diversity, prestige, legitimacy, and financing (D'Aveni, 1990). For this reason, investors are increasingly including board gender diversity as an investment criterion (Daily, Dalton and Cannella, 2003), indicating that the absence of female director on a board signals negative publicity. As well, board gender diversity is linked to firm diversification strategy and network effects of linkages to other boards with female directors (Hillman, Shropshire and Canella, 2007). In particular, women can enrich the boardroom dynamics by bringing different values and perspectives (Ruigrok, Peck, Tacheva, Greve and Hu, 2006). Fondas and Sassalos (2000) concur, emphasising that women are more able to influence the board decision process due to their broader experiences and different "voices". From the class managerial hegemony perspectives women directors are arguably not considered part of the 'old boy' network, and thus, less likely to rubber-stamp to CEO's decision (see Pearce and Zahra, 1991). Adams and Ferreira (2009) confirm this notion, emphasising that more women on monitoring committees is linked to firing of poorly performing CEOs.

Accordingly, empirical evidence associates board gender diversity with better performance (e.g.Shrader, Blackburn, and Iles, 1997; Carter, Simkins and Simpson 2003; Erhardt, Werbel and Shrader 2003; Campbell and Minguez-Vera 2008; Campbell and Minguez-Vera, 2010; Carter, Simkins, D'Souza and Simpson, 2010). For instance, Campbell and Minguez-Vera (2008) examine a sample of Spanish firms, and find that board gender diversity has a positive effect on firm value as measured by Tobin's Q. Similarly, Carter and Simkins and Simpson (2003) have evidence from 797 Fortune 1000 firms to suggest that compared to firms with all-male boards, firms with at least two women on the board performed better on Tobin's Q and ROA. Erhardt, Werbel and Shrader (2003) correlation and regression analyses of 127 large US companies indicate board gender diversity is positively associated with various measures of accounting profit. As well, Shrader, Blackburn, and IIes (1997) examine data from the Wall Street Journal for 200 large firms, and find positive relationships between the firm's total percentage of women managers, and Return on Shareholders Fund (ROS), ROA, ROI and return on equity (ROE). Recent evidence from Carter, Simkins, D'Souza and Simpson (2010) suggests that gender diversity has a positive effect on financial performance primarily through the audit function. This suggests that today's firms must recruit from a relatively larger talent pool, and subsequently recruit more qualified applicants regardless of gender (Shrader et al, 1997).

Critics however, contend that women representation on board can potentially be a drawback in terms of performance. For example, Adams and Ferreira (2009) find a negative relationship between the proportion of women on the board and Tobin's Q in an analysis of US firms. As well, Carter, D'Souza, Simkins and Simpson (2010) show that there is no statistically significant relationship between the board gender diversity and numerous other accounting measures of performance. Carter, D'Souza, Simkins and Simpson (2010) posit that the gender and ethnic minority diversity of the board and firm financial performance appear to be endogenous. Farrell and Hersch (2005) find positive but insignificant evidence between gender diversity and ROA or market returns to shareholders (see also Shrader, et al, 1997). Rose (2007) finds no significant link between firm performance as a measure by Tobin's Q and female board representation on Danish Listed Firms. In sum, critics argue that gender diversity is not a value enhancing strategy.

Overall, the results of the extant literature on board gender diversity and performance differ due to diverse methodologies and inconsistency in operationalization of performance. However, the negative and/or no significant results suggest that women serve on boards to reflect the present generation of stakeholders (Terjesen, Sealy and Singh, 2009). In this spirit, Jensen (1993) argues that the board should not be modelled after the democratic political model that represents other constituencies in addition to shareholders. The positive and significant results cement the argument that female representation on boards result in better governance which causes the business growth (Carter, D'Souza, Simkins and Simpson 2010). In sum, the evidence on board gender diversity and performance to date is vexing. In particular, evidence on board gender diversity in the corporate failure prediction context is distinctively lacking.

This study posits that an analysis of female representation on board in the corporate failure prediction context may provide a different and stronger test of the link between gender diversity and firm performance. The Code (2010) states that, the board appointment should be made, on merit, against objective criteria and with due regard for the benefits of board gender diversity. The expectation is that male dominated boards will exhibit a negative relationship with effective board control and resource provision and thus increase the likelihood of a firm's failure. I formally posit this as:

H2a. *Ceteris paribus,* there is a negative relationship between the presence of female directors on a firm's board and corporate failure.

H2b. *Ceteris paribus,* the lower the level of (i) monitoring and (ii) resources, the stronger is the negative relationship between the presence of female directors on a firm's board and corporate failure.

Board Size: Small or Large?

Board size reflects board's ability to resist CEO control (Eisenberg, Sundgren and Wells, 1998), thereby, reducing agency problems to facilitate the firm's legitimacy to access critical resources for survival. Pfeffer and Salancik (1978) note, boards are vehicles for co-opting important external organisations with which firms are interdependent, for enhancing the flow of resources and reducing uncertainty. Thus, large boards are viewed as effective due in part to the greater linkage. Put differently, during financial distress, firms with smaller boards (Chaganti, Mahajan and Sharma, 1985; Gales and Kesner, 1994) are seen as ineffective due to lessened ability of directors to co-opt resources from its environment (Pfeffer, 1972). Alexander, Fennell, and Halpern (1993) and Dalton, Daily, Johnson and Ellstrand (1999), and Cheng (2008) confirm this notion and report a positive relationship between board size and financial performance. In particular, Cheng's (2008) results suggest that larger boards have lower variability of financial performance. In times of crisis, such as those faced by distressed firms, larger boards will be effective since they are expected to avoid making risky decisions (Chanchart, Krishnamurti and Tian 2012) and, in this way, signal firm's access to critical resources (Lorsch and Mciver, 1989; Pfeffer and Salancik, 1978).

Fischer and Pollock (2004), however, have evidence that smaller boards are more effective in monitoring CEO, due to reduced coordination and free-rider problems (Yermack, 1996; Chanchart, Krishnamurti and Tian 2012). Fich and Slezak (2008) also show that smaller boards with higher ratio of outside directors and with larger ownership stakes of inside directors are more effective at avoiding bankruptcy. In this spirit, Jensen (1993) suggests boards should be kept small (seven or eight members) so they can function more efficiently and not controlled by the CEO. This implies that increasingly board size is window dressing strategy to create a favourable signal but not a genuine change in the way the board functions (Ezzamel and Watson, 2005).

In sum, empirical evidence on the relationship between board size and firm performance is mixed. Nevertheless, smaller boards are susceptible to managerial domination (Zahra and Pearce, 1989), implying that smaller boards are 'manageable' from the CEOs' perspective (Chaganti, Mahajan, and Sharma, 1985). From this point, CEOs may pursue corporate strategies inconsistent with shareholders' interest, thereby reducing firms' long-term survival (Miller, 1990). In the corporate failure context, board size is used as a device to access resource as well as an indicator of board control over the CEO (Pearce and Zahra, 1991). Larger board is valuable for the breath of its 'services' (Chaganti, Mahajan, and Sharma, 1985; Dalton, Daily, Johnson, and Ellstrand, 1999), thus surviving firms have larger boards. Accordingly,

H3a. *Ceteris paribus,* there is a negative relationship between the board size and corporate failure.

H3b. *Ceteris paribus,* the lower the level of (i) monitoring and (ii) resources, the stronger is the negative relationship between the board size and corporate failure.

5.2.2 Board Structure and Corporate Failure

In this section, I briefly review the literature with respect to board structure and relate them to corporate failure. Drawing from our conceptual model, I limit our discussion to three main board oversight committees namely: nomination, audit and remuneration.

Nomination Committee Effectiveness and Corporate Failure

The significance of board diversity has been increasingly recognized especially after the recent financial fiascos and high profile failures (Kaczmarek, Kimino, and Pye, 2012). Nomination committees (NCs) play a significant role to strengthen the board composition via the director selection process (Cadbury, 1992). In other words, NCs help to ensure the "right" candidates are selected on the board (Ruigrok, Peck, Tacheva, Greve and Hu, 2006). In this vein, the ability of outside directors to perform their monitoring role is linked to their independence, which in turn is related to the board recruitment process (Conyon and Peck, 1998).

Vafeas (1999b) contends that director appointments are made by shareholders, in theory. However, shareholders merely approve director candidates selected by the board, in practise (Bainbridge, 2002). Consistent with class managerial hegemony perspective, Hart (1995) contends that interdependent directors may not perform their duties in the manner compatible with shareholder interests. Thus, the recruitment process clearly affects new appointees' ability to accurately assess the performance of the CEO (Conyon and Peck, 1998). The NC is a crucial institutional mechanism to overcome the limitations of the board selection process (Ruigrok, Peck, Tacheva, Greve and Hu, 2006; Kaczmarek, Kimino, and Pye, 2012). The rationale is three-fold. First, NCs reduce the CEO influence on the selection process and thus, enhance board members' independence (Westphal and Zajac 1995 and Westphal, 1998). Second, NCs resolve the power asymmetry between boards and management (Ruigrok, Peck, Tacheva, Greve and Hu 2006). Third, NCs improve the board's effectiveness (Vafeas, 1999b) by raising directors' qualifications and independence. Evidence shows that the absence of nominating committees is associated with more affiliated outside directors, who lack the confidence to evaluate CEO performance, due to potential conflicts of interest (Shivdasani and Yermack, 2002). In turn, poor CEO evaluation may result in excessive cash compensation for CEOs (Westphal and Zajac 1995) thereby resulting in a firm's failure.

The existence of the NC effectively delegates the director selection process to an independent group, powerful enough to recruit independent thinkers who possess the necessary expertise to accomplish their role. Conversely, the NC is not a separate organ reporting directly to the shareholders, implying that NC's decisions are ratified by the board. For this reason, Finkelstein, Hambrick, and Cannella (1996) suggest that the board nomination process may be affected by the distribution of power between the CEO and the board. This suggests that the mere presence of the NC is not sufficient to mitigate the agency problem and/or enhance survival of a firm. For instance, an inside director serving on the NC may resist the appointment of independent thinkers. Put differently, NCs consisting of independent NEDs are more likely to safeguard shareholders' interest (Ruigrok, Peck, Tacheva, Greve and Hu (2006) by assuring that new appointees possess the necessary independence and expertise to strengthen the board effectiveness (Bilimoria and Piderit, 1994). ICSA (2007) also highlights three key attributes the NC needs to discharge its responsibilities properly. First, the NC should consist of at least three independent NEDs but four or five for large boards. Second, the NC should meet at least twice in the financial year. Third, the board chairman shall not chair the committee on issues regarding his/her succession.

Legal and agency theories (Jensen and Meckling, 1976; Fama and Jensen, 1983; Jensen, 1993) suggest that firms can reduce the agency conflicts by raising the effectiveness of board NC. This is because effective NCs enhance the boards' ability to ratify CEOs' decisions by screening new board applicants on the basis of their independence (Bacon and Brown, 1975). In sum, the expectation is that NC reduces the likelihood of a firm's failure by enhancing the board monitoring role. Little, however, is known about the effects of NC on corporate failure. To this end, based on the predictions from legal and agency theories, this study argues that the nomination committee may enrich our understanding on the corporate failure syndrome. I therefore posit our hypothesis regarding nomination committee as follows:

H4a. *Ceteris paribus,* there is a negative relationship between the board nomination committee effectiveness and corporate failure.

H4b. *Ceteris paribus,* the lower the level of monitoring the stronger is the negative relationship between the board nomination committee effectiveness and corporate failure.

H4c. *Ceteris paribus,* there is a negative relationship between the board nomination committee presence and corporate failure.

H4d. *Ceteris paribus,* there is a negative relationship between the board nomination committee independence and corporate failure.

H4e. *Ceteris paribus*, there is a negative relationship between the board nomination committee meetings and corporate failure.

H4f. *Ceteris paribus,* there is a negative relationship between the board nomination committee size and corporate failure.

H4g. *Ceteris paribus*, there is a negative relationship between the board nomination committee chairman and corporate failure.

Audit Committee Effectiveness and Corporate Failure

Accounting studies (e.g. Cohen, Krishnamoorthy, Wright, 2002; Hermanson, 2000) explore mechanisms of transparency (e.g. financial reporting) and accountability (e.g. audit committees), which seek to reduce conflicts between CEO and shareholders (Brennan and Solomon, 2008). In this respect, researchers use the agency lens and posit that full disclosure to shareholders is a vital mechanism to reduce the agency problem (see Healy, Hutton and Palepu 1999; Healey and Palepu, 2001). Evidence suggests a positive relationship between corporate governance and transparency (e.g. Beeks and Brown, 2006; Cheng, Courtenay, and Krishnamurti, 2006), but the governance variable vary from external to internal mechanisms (Brennan and Solomon, 2008).

Recently, Audit Committees (henceforth ACs) is noted as a standard mechanism of corporate governance internationally (Turley and Zaman, 2004), which reduce information asymmetries (Pincus, Rusbarsky and Wong, 1989) and protect shareholders' interest (Klein, 1998; Méndez and Garcia, 2007), due in part to its role in the financial reporting process. Put simply, effective ACs demand higher transparency and thus, improve the quality of financial statements.

Turley and Zaman (2004) identify the potential contributions of the ACs. First, ACs strengthen the external and internal audit function as well as the risk management process (see also Klein, 1998). This suggests that ACs may enhance firm's survival by assessing risks and threats facing the firm in attaining its goals. Second, ACs improve accuracy of financial data and the quality of the audit process by strengthening the independence of the internal and external auditors (see also, McMullen, 1996). The quality financial and audit process lessens the likelihood of financial statement fraud (Cohen, Krishnamoorthy and Wright, 2002). Finally, AC may enhance financial performance by improving CEO monitoring.

Critics (e.g. Turley and Zaman 2004; Chan and Li 2008), however, contend that regulators worldwide are worried with ACs' effectiveness and impact to the governance process. This notion is heightened by the recent financial reporting scandals and corporate failures. Thus, these unprecedented failures provide at least anecdotal proof to cement concerns about the adequacy of the monitoring provided by ACs (Turley and Zaman 2004). In this regard, Cohen, Krishnamoorthy and Wright (2002) and Guy and Zeff (2002) posit that most AC members lack critical attributes (e.g. independence, expertise and experience) to discharge their board oversight responsibilities. The adoption of ACs may be symbolic (Kalbers and Fogarty, 1998) and thus, have no substantive value (DeZoort, 1997) on the firm's long term viability. In short, AC's existence does not promote greater board monitoring (Menon and Deahl, 1994).

Consequently, the US Sarbanes-Oxley Act (2003) and Smith (2003) in the UK and others suggest proposals to strengthen corporate governance through enriched roles for AC (Turley and Zaman, 2007). These proposals highlight four main attributes: (1) activity (Menon and Deahl, 1994, Collier and Gregory 1999), (2) independence (Klein, 1998), (3) size (Pucheta-Martinez and Fuentes 2007), and (4) financial expertise member (SOX, 2002; Smith, 2003), as potential indicators of AC impact in practice. Beasley, Carcello, Hermanson, and Lapides (2000) confirm this notion, emphasising that higher AC meeting and independence reduce the occurrence of fraud. Beasley (1996), Hudaib and Cooke (2005) also find that independent NEDs reduce the likelihood of fraud and earnings management by demanding high quality from external auditors. Put otherwise, interdependent directors are not considered as independent thinkers and thus may lessen the AC effectiveness (Menon and Deahl, 1994). Likewise, Carcello and Neal (2003) find a positive link between AC independence and accounting reporting quality. Further, meeting frequency is considered as a signal of audit committee diligence (Menon and Deahl, 1994). In this spirit, it is argued that a larger audit committee, probably due to increase in resources and financial expertise members, are more likely to discover potential misstatements (Pincus, Rusbarsky, and Wong, 1989) and, in this way, demand high quality audit (Kalbers and Fogartry,1993). Hatherly (1999) suggests that the level of interaction between the AC and auditors undermines the AC's value as an effective vehicle for pursuing shareholders' interests, is germane here. Likewise, Xie, Davidson and DaDalt (2003) find that financial expertise is an important factor to limit executives in engaging in earnings management. Bedard and Gendron's (2010) review of 103 AC studies suggests that the effectiveness of AC is linked to its presence, members' independence and expertise but not its size and meetings.

From the above analysis, it is reasonable to expect the level of agency cost to be positively related to the effectiveness of the AC, in an Anglo-Saxon environment. Thus, the AC functions is viewed as monitoring mechanism which is employed in high agency cost situations to improve the quality of information flows between principal and agent (Pincus, Rusbarsky and Wong 1989). Spira (2003) notes, ACs are presumed, with a lesser amount of evidence, to be an effective monitoring device, thereby enhancing the prospects of the firm's survival.

Nonetheless, empirical evidence is limited, leaving plenty of scope for further investigation. In particular, despite the much discussion on AC and corporate failure, there is no empirical research that tests for a relation between the two. This research is an attempt to fill this gap. Thus, I argue that an examination of the impact of ACs in the corporate failure context may offer insights and evidence on the value of ACs in companies (Turley and Zaman, 2004). I therefore posit this as:

H5a. *Ceteris paribus,* there is a negative association between the board audit committee effectiveness and corporate failure.

H5b. *Ceteris paribus,* the lower the level of monitoring the stronger is the negative relationship between the audit committee effectiveness and corporate failure.

H5c. *Ceteris paribus,* there is a negative relationship between the board audit committee presence and corporate failure.

H5d. *Ceteris paribus*, there is a negative relationship between the board audit committee independence and corporate failure.

H5e. *Ceteris paribus*, there is a negative relationship between the board audit committee meetings and corporate failure.

H5f. *Ceteris paribus*, there is a negative relationship between the board audit committee size and corporate failure.

H5g. *Ceteris paribus*, there is a negative relationship between the board audit committee expertise and corporate failure.

Remuneration Committee Effectiveness and Corporate Failure

Greenbury (1995) proposes that defining suitable reward packages is one of the significant monitoring functions of directors. Thus, the formation of remuneration committee (henceforth RC) is consistent with agency theory, which advocates the separation of management and control (Fama and Jensen, 1983), thereby reducing the likelihood of a firm's failure. RC's primary function is to assess the inside directors' performance and determine their reward (Klein, 1998), taking into account the shareholders' interest (Bosch, 1995). In this regard, RCs may provide fair and equitable remuneration packages required to attract, retain and motivate directors to manage the firm effectively (Code, 2010).

Accordingly, RCs can reduce the agency cost that arises if executives are responsible for determining their own remuneration (Cotter and Silvester, 2003). Fama and Jensen (1983) and Jensen and Meckling (1976) contend that professional managers are self-serving and that monitoring and reward structures are meant to reduce the severe principal-agent conflict. Hence, a positive association between executive compensation and firm performance and lowers the probability of failure is expected using the agency lens. Conyon and Peck (1998), however, find that the presence of RC is not associated with lower levels of top management pay. Ezzamel and Watson (1998) claim that CEOs must be paid at least the competitive rate to retain them in the firm. Put differently, CEO pay upward bias is expected for CEOs who earned below the market rate (Barkema and Gomez-Mejia, 1998). The important implication of this is that the mere presence of the RC is not sufficient to mitigate the agency problem in the Anglo-Saxon environment. Ezzamel and Watson (2002) confirm this notion and show that remuneration committees award reward packages comparable to competitors, for two reasons. First, they contend that outside directors may not be genuinely independent from top management. This implies that outside directors on the RC may desire to maintain a favourable relationship with the CEO. Second, RCs may prevent the possibility that CEO exit to major competitors by paying the competitors and thus, avoid adverse signals. This implies that RCs' recommendations may favour the CEO, thereby, negatively affecting the wealth of shareholders.

Therefore, Greenbury (1995) and others (e.g. Higgs, 2003; ICSA, 2010) set out specific guidelines regarding RC to ensure its impact on executive compensation. First, the RC shall be made up of at least three independent NEDs. The expectation is that independent NEDs act as objective decision thinkers who may ensure that the CEO's reward is set at right levels (Bowen, 1994). Fama and Jensen (1983) note that outside board members reduce agency problem by acting as arbiters in disagreements between internal management and residual claimants, particularly, setting executive compensation, is important here. Conyon and Peck (1998), for example, find a positive link between the proportion of outside directors on an RC and both the level of CEO pay and the link between top management pay and performance. Newman and Mozes (1999), however, suggest that the relation between CEO pay and performance is more favourable toward the CEO among the firms that have inside directors on the RC.

In sum, compensation practices are more favoured toward the CEO, and at shareholders expense, when the RC is ineffective. The on-going public concerns about executives large pay increases, enormous gains from share options (Greenbury 1995) and high profile failures partly cement this notion. Newman and Mozes (1999) stress the importance of the RC in CEO compensation. Little, however, is known about the effect of RC on corporate failure. This study begins to fill the vacuum. Consistent with the agency logic, I can speculate that RC should be effective to enhance its oversight responsibilities. I hypothesize the following:

H6a. *Ceteris paribus*, there is a negative association between the board remuneration committee effectiveness and corporate failure.

H6b. *Ceteris paribus*, the lower the level of monitoring the stronger is the negative relationship between the remuneration committee effectiveness and corporate failure.

H6c. *Ceteris paribus*, there is a negative relationship between the board remuneration committee presence independence and corporate failure.

H6d. *Ceteris paribus,* there is a negative relationship between the board remuneration committee independence and corporate failure.

H6e. *Ceteris paribus*, there is a negative relationship between the board remuneration committee chairman’s independence and corporate failure.

H6f. *Ceteris paribus*, there is a negative relationship between the board remuneration committee size and corporate failure.

H6g. *Ceteris paribus*, there is a negative relationship between the board remuneration committee meetings and corporate failure.

5.3 CHAPTER SUMMARY

This chapter sets out hypotheses of the study. Specifically, it proposes governance variables, which may be vital in avoiding corporate failure. As well, it reviews prior studies by scholars, frequently cited and considered to have added significantly to the literature on corporate governance and corporate failure.

In most cases, however, the direction of the link between corporate governance and performance and/or corporate failure is not clear. Nevertheless, the sequence in which these governance characteristics may influence decline, or be influenced by decline, is still regarded as unchartered waters**.** This is because, all the limited studies in this direction failed to validate their respective predictive models and/or variables with either ex-ante and or ex-post data. Overall, the extant corporate governance and performance literature suggests several dimensions of corporate governance which may have links to organisational decline. Consequently, the study identifies hypotheses for empirical testing, which in turn set the scene for the research methodology, in the next chapter.

CHAPTER SIX
THE RESEARCH DATA AND METHODOLOGY

6.0 INTRODUCTION

The aim of this chapter is to provide the empirical setting of the study. In particular, it describes data collection and the estimation method. I collect data from several sources using a number of methods. I employ logistic regression analysis due to the binary nature of the dependent variable: failed or non-failed firms.

The chapter is organised as follows. Section 6.1 describes the philosophical approach behind the research. Section 6.2 describes the data. Section 6.3 outlines the time horizons. Section 6.4 presents the sample design. Section 6.5 describes the variables of the study. Section 6.6 sets out the statistical technique. Section 6.7 concludes.

6.1 THE PHILOSOPHICAL APPROACH OF THE STUDY

Trigg (1985) contends that the philosophical stance is the indispensable starting point for all social science research. This is because "*where you stand can influence what you see*" (Fischer, 1998; p.128). However, prior studies in prediction of corporate failure employ statistical techniques in search of predictors (e.g. financial proxies), without a clear philosophical base. Thus, the literature in corporate failure is dominated by ad hoc selection of variables approach, without any theoretical underpinning. The saying "*never mind the concepts, look at the techniques*" (Sayer, 1992: p. 2,) seems applicable for the majority of failure prediction research. The few exceptions include Lyandres and Zhdanov (2013).

Nonetheless, the empiricism approach integrates most of the features of positivism namely: scientism, phenomenalism, empiricism, value freedom, instrumental knowledge (Easterby-Smith, Thorpe and Lowe, 1991; Stiles, 2003). Thus, positivism approach seems to be implicit philosophical doctrine, adopted by prior corporate failure studies. This, in part, is attributed to its epistemological position, which suggests an application of natural sciences' methods to the analysis of social reality (Blaikie, 2007). The positivist approach proposes that the subject under investigation should be measured via objective methods rather than being inferred subjectively (Swartz, Money, Remenyi, and Williams, 1998). The positivism approach is anchored in the epistemological assumptions that "belief in an external reality constituted of facts that are structured in a law-like manner" (Evered and Louis, 1991). This suggests that the positivist approach is about constructing 'objective' realities based on observable phenomena (Wainwright and Forbes, 2000). Thus, positivism approach stresses on the use of formal propositions, hypothesis testing, random sampling, aggregation, precision and quantifiable measures of variables (Stiles, 2003). The rationale is to construct a set of hypothetical statements that can be generalizable to universal knowledge (Evered and Louis, 1991). In other words, positivism seeks for fundamental laws, causal explanations, and reduces the whole into its simplest elements to facilitate in-depth analysis (Easterby-Smith, Thorpe and Lowe, 1991; Remenyi, Williams, Money, and Swartz, 1998), thereby generating clear results that fulfil the requirements of generalizability and reliability (Stiles, 2003).

Critics (e.g. Morgan, 1983) suggest, however, that positivism is the least appropriate in the social sciences. Easterby-Smith Thorpe and Lowe, (1991), for example, contend that positivism refines what is already 'known' and, in this way, overlook critical variables not embodied within the quantitative approach. In other words, its results are less useful vis-à-vis alternative methods. Others claim it fails to adequately manage the subjective variety of individual life and thus, not appropriate to the social world (Giddens, 1974).

Consequently, researchers opt for interpretive or phenomenological approach, which seeks to translate the dialogue that connects the inner and outer worlds of the human experience (Wainwright and Forbes, 2000), as a viable alternative that overcomes the short comings in the positivism approach. Delanty (1998) provides six key features of the interpretativist tradition namely: (1) Interpretation of meanings, (2) Anti-scientism, (3) Value-freedom, (4) Humanism, (5) Linguistic constructivism, and (6) Inter-subjectivity. In short, interpretive epistemological foundation is anchored in Evered and Louis' (1991) notion that knowledge originates from continuous human experience, which is non-logical. This implies that interpretive studies require direct, experiential contact with the object under investigation (Stiles, 2003). Put simply, the interpretive approach selects a more qualitative approach to data collection and interpretation. Proponents of the interpretive approach cite Bowen's (2005) notion that qualitative research *"yields data that provide depth and detail to create understanding of phenomena and live experience"* (p.2), as its main strength.

The above analysis indicates that both the positivism and phenomenology approaches have their strengths and weaknesses. Accordingly, there is a near consensus in the literature to embrace a middle ground (see Easterby-Smith Thorpe and Lowe, 1991; Miles and Huberman, 1994; Stiles, 2003; May, 2011). As Easterby-Smith, Thorpe, and Lowe (2008) note, the interpretative and positivist approaches are ontologically and epistemologically different; however, in actual research this incompatibility is distorted.

In turn, these arguments suggest that choosing between the interpretive and positivism approaches is not straightforward. The interpretive approach, however, is not practically feasible due to the difficulties of obtaining data through interviews from directors of failed firms. For this reason, the study adopts the positivism approach. I turn to the discussion of the data collection methods, variables and the statistical method adopted for the study in accordance with the central tenets of the positivism approach.

6.2. DATA SETS OF THE STUDY

Data collection for failed firms requires a definition of the term "corporate failure" and specification of the population from which firms are drawn (Ohlson, 1980). Consistent with major UK studies (e.g. Charitou, Neophytou and Charalambous, 2004), the legal definition is used in the study. Thus, a firm is defined as having failed, if it filed for insolvency under the UK Insolvency Act of 1986.

The population period is restricted to 1st January 1999 to 31st December 2011, for three reasons. First, I seek to collect at least five years' corporate governance data post Cadbury (1992). This is because corporate governance was formalised in the UK after Cadbury. Second, I build on the recent UK study's sample period; 1988-1999 (see Charitou, Neophytou and Charalambous, 2004; and Neophytou and Molinero, 2004). Third, I choose the sample period for practical reasons (see Ohlson, 1980). Keasey and Watson (1991) stress that model derivation should be close as possible to the period over which prediction are to be made, due in part to data stability and stationarity issues (see Moyer, 1977; Mensah,1984).

Our sample of failed firms is constructed as follows. First, I identify a list of 4,233 insolvent and/or inactive firms and dates of insolvency (if available) from Financial Analysis Made Easy (50 firms) and Thomson One Banker (4,183 firms) databases. This approach is inevitable due to the lack of funding to obtain the list of insolvent firms and dates as well as reasons for filing insolvency from the Stationary Office, Companies House, and Insolvency Office in the UK.

Next, I confirm the status of each firm and extract the date of insolvency from the Companies House Website (http://www.companieshouse.gov.uk). The goal is to ensure that the failed firms consist of companies in administration, company voluntary arrangement (CVA), receivership, liquidation and dissolution (see chapter 2 for an extensive discussion on these five routes). The reason for insolvency filing, however, is not available in the Companies House Website. This implies that our sample may include companies that may have filed for insolvency intentionally (e.g. to avoid takeover). This, however, is noted as a limitation, but this compares favourably with the lead studies (e.g. Altman 1968, Taffler, 1983). Hambrick and D'Aveni (1992) and Daily and Dalton (1994a: b) are, however, a few notable exceptions.

I identify the control sample (i.e. non-failed firms) from the Financial Analysis Made Easy (FAME) database. The non-failed firms are relatively large and within the top 500 publicly quoted firms in the London Stock Exchange Market. The criteria for the selection of the non-failed-firms are not materially different from the failed. For example, the status of each of the non-failed firms is confirmed from the Companies House Website. The objective is to ensure that companies in the non-failed sample are solvent within the sample period, 1st January, 1999 to 31st December, 2011.

The next stage is to collect published financial and non-financial data to facilitate the models development and hypotheses testing, in particular. The data on corporate governance is extracted manually from each company's annual reports, available from the Thomson One Banker and Northcote databases. I collect company financial information from Worldscope using the Thomson One Banker database. The FAME database is used to complement financial information data.

The criteria for inclusion or exclusion of a firm's data are as follows. First, consistent with prior studies (e.g. Shunway, 2001; Wu, Gaunt and Gray, 2010) I exclude companies from specially regulated industry (e.g. banks, insurance companies, utilities, and other financial institutions). Thus, I invoke Gilbert, Menon and Schwartz's (1990) notion that industries are structurally different, hence combining them with entities from specially regulated industry in model development is problematic (see also Ohlson, 1980).

Second, I exclude private entities. Agarwal and Taffler (2007) observe that the financial and corporate governance profiles of privately owned firms differ significantly to those of listed firms. This suggests that it would be invalid to derive a model with both private and public listed firms. From this point, our sample consists of publicly quoted and unquoted companies under the UK Companies Act of 2006. This criterion is unavoidable because failing firms delist to private or public unquoted prior to filing for insolvency (see Charitou, Neophytou and Charalambous, 2004). The motivation for excluding the former is due in part to the perceived compromised corporate governance mechanisms in such entities. For instance, private entities may consider or judge most of the provisions of the UK's Combined Code as less relevant in their case. Furthermore, the data available for research on corporate governance in privately-held firms is limited (Uhlaner, Wright, Huse, 2007), relative to listed firms.

Third, I omit the following: (i) foreign firms, (ii) firms with accounting year gap, (iii) firms with accounting period exceeding 12 months or less, and/or (iv) have demerged within the sample period. The rationale for excluding foreign firms is to avoid effects of exchange rate fluctuations in translating the original currencies to the British Pound. The second and third criteria are necessary to ensure consistency of accounting period for sample firms. The fourth criterion is critical to avoid double counting of common dataset prior to the demerger.

Fourth, I include entities with at least five years: (i) full financial statements and (ii) annual report, prior to the date of petition of insolvency. The goal is to omit entities less than five years and thus obtain five years data prior to the date of bankruptcy for in-depth analysis. This implies that I omit data on and/or after the insolvency date. Thus, the study avoids back-casting, one of the dominant problems in the extant literature of corporate failure prediction (see Ohlson, 1980; Balcaen, and Ooghe, 2006). Further, I omit failed firms without data on employees and/or turnover. The aim is to avoid predicting failure at a stage when it is already known by its major stakeholders. I also include only entities with complete data for computation of financial ratios and corporate governance proxies. Thus, I omit the entire year's data due to missing data for at least a variable. Similarly, I delete outliers based on an initial descriptive analysis report. Finally, I discard the 1% lowest and highest observations on the basis of total assets. The intention is to obtain robust statistics.

The above criteria reduce the final sample to 358 firms and 1748 firm-years observations, consisting of 95 failed firms and 263 non-failed firms. Appendix 4 reports a brief profile of each firm in terms of name, insolvency history, lead time, standard industry classification code, firm size and data examination period. Overall, the financial statements and the insolvency petition dates show a lead time in days of 568.73, 434.00 and 298.00 for mean, median and mode, respectively. Table 4 sets out the composition of the final sample of failed firms in terms of year and insolvency status in the examination period. In particular, Table 4 depicts that 46.32% of the failed companies have been dissolved, whereas 35.79% and 17.89% are in liquidation and receivership, respectively.

Table 4: Composition of Failed Firms in terms of Year and Status

Status/Year	99	00	01	02	03	04	05	06	07	08	09	10	11	Total	%
Liquidation	0	1	0	3	0	3	2	2	3	0	12	6	2	34	35.79
Receivership	0	1	2	0	1	0	0	0	0	3	0	9	1	17	17.89
Dissolved	3	4	2	4	5	5	4	5	2	3	2	5	0	44	46.32
Total	3	6	4	7	6	8	6	7	5	6	14	20	3	95	

6.3 TIME HORIZONS OF THE STUDY

Zavgren (1985) observes that temporal distance in the corporate failure context is a significant factor, which may impact other variables under study. Hence, I follow El Hennawy and Morris (1983), Hambrick and D'Aveni (1992), Sheppard (1994) and in turn, stratify the dataset into five cross sectional sub-samples on the basis of year prior to failure or otherwise (i.e. from year t - 5 to t - 1, where t is the year of a firm’s failure).Table 5 reports the number of observations of 353, 351, 350, 346, and 346 for year t - 1 to t - 5. This in turn, results in total observations of 1,748 firm-year observations, 462 failed and 1286 non-failed firm-year obsevations.

Table 5: Composition of Sample in Terms of YEAR, PANEL and GROUP

	YEARS PRIOR TO FAILURE					
	t-1	t-2	t-3	t-4	t-5	Total
PANEL A-Estimation Sample						
Failed	47	47	47	45	45	231
Non-failed	130	129	129	128	128	644
Total	177	176	176	173	173	875
PANEL B-Holdout Sample						
Failed	46	46	48	46	45	231
Non-failed	130	129	128	127	128	642
Total	176	175	176	173	173	873
PANEL C-Combined Sample						
Failed	93	93	95	91	90	462
Non-failed	260	258	257	255	256	1286
Total	353	351	352	346	346	1748

The rationale for application of the cross-sectional analysis is twofold. First, this recognises that corporate failure is a process, rather than a sudden event. In this respect, I allow a five year lag period for thorough analysis (see Hambrick and D'Aveni, 1992). Second, the cross sectional analysis facilitates prediction prior to potential failure. Thus, the cross-sectional analysis provides insight into the failure process. Put simply, the analysis may uncover potential ways in which firms change as they approach failure. This is because data at *t* - 1, *t* - 2, *t* - 3, *t* - 4, and *t* - 5 reflects firms' governance and financial conditions in years one, two, three, four and five prior to the date of insolvency petition (or target year) or otherwise (lead time).

Sheppard (1994) contends, however, that these changes may be data and sample specific. To overcome this limitation, the data set under each year is randomly sampled into two sub-samples: estimation and holdout[7]tests (see Sheppard 1994; Zmijewski, 1984; Hambrick and D'Aveni, 1988). Table 5 shows the number of firms for years one through five and also indicates a total observation for each panel and group. In particular, the estimation sample (Panel A) is 875 firm-year observations, 231 failed and 644 non-failed firm-year observations. A further scrutiny in terms of year indicates failed (non-failed) firms of 47(130), 47(129), 47(129), 45(128), and 45(128) for years one to five respectively. In the same vein, the holdout sample (Panel B) is 873 firm-year observations, consisting of

[7]Holdout sample denotes an out-of-sample data. The aim of validating the estimated model with a holdout sample and jackknife procedure is to insure models' predictive validity.

231(642) failed (non-failed) firm-year observations. The detailed analysis in terms of year indicates failed (non-failed) firms of 46(130), 46(129), 48(128), 46(127), and 46(128) for years one to five, respectively. Finally, the combined sample (Panel C) consists of the estimation and holdout samples resulting in 1748 firm-year observations made up of 462 failed and 1286 non-failed firm-year observations. I turn to the justification for the sample design in the next section.

6.4 SAMPLE DESIGN OF THE STUDY

The paired sample approach is pervasive and dominant in the extant corporate failure prediction literature (e.g. Rosner, 2010; Platt and Platt, 2012). This is a non-random sample approach, where a number of failed firms are matched with the same number of non-failed firms on the basis of size, industry, and year among others.

This judgemental method and particularly matching by size and industry has several limitations. Martin (1977) and Zmijewski (1984), for example, argue that non-random sample approach leads to sample selection bias, thereby resulting in asymptotic bias parameter and probability estimates (Menski and Lerman, 1977). On one hand, matching on the basis of firm size leads to more small firms in the non-failed sample. Barnes (1990), however, is of the view that random sample leads to a sample mostly including of non-failed firms. On the other hand, matching on the basis of industry leads to more firms from recession-hit industries in the failed sample (Lennox, 1999). In sum, the estimation samples of failed and non-failed firms are not illustrative of the overall population of firms (Ooghe and Joos, 1990).

Likewise, it is not possible to investigate the effects of industry or firm size on the probability of corporate failure (Jones, 1987). As well, this non-random sample approach may result in relatively small sample. In turn, small sample may result in over-fitting and thus, impacts on the stability of the models (Platt and Platt, 1990). The important implication of this is that the estimated model's predictive accuracy is misleading (Hambrick and D'Aveni, 1988) and, in this manner, limits the model's applicability (Casey and Bartczak, 1985). This in part may account for why the investment community does not appear to depend on the existing prediction failure models (Morris, 1997).

Zmijewski's (1984) study, however, finds that both the paired and random sample approaches register similar qualitative results. For this reason, Ohlson (1980) and Taffler (1983) contend that the appropriate criterion for matching is not obvious, but the present study opts for the random sample approach, primarily to avoid the over-sampling issues and misclassification biases associated with the matched technique discussed above (see also Martin, 1977; Taffler, 1982; Frydman, Altman, and Kao, 1985; Jones and Hensher, 2004). Put differently, no attempt is made to match failed and non-failed firms by firm age, size and industry (see also Peel and Peel, 1988; Agarwal and Taffler, 2007), rather I follow Watson (2007), Wu, Gaunt and Gray (2010), Drees and Heugens, (2012) and in turn, examine these confronting firm demographics. Thus, I concur with Peel, Peel and Pope's (1986) notion that "*a superior methodology would appear to be to use variables as predictors, rather than to use them for matching purposes*" (p.7). We, also acknowledge that other sample approaches (e.g. stratified random sample) are problematic to handle without having a full access to information in respect of all members of the population (Sheppard, 1994).

6.5 VARIABLES OF THE STUDY

The aim of this section is to define the measures used in the study. The dependent, independent, and control variables are defined accordingly in the relevant sub-sections.

6.5.1 Dependent Variable of the Study

The dependant variable is failure, as defined above, is the filing of insolvency petition. **Failure** (STAT1) is a binary variable that takes the value of "1", if the firm is classified as failed and "0" otherwise. This measure is the standard definition in corporate failure prediction studies (e.g. Hambrick and D'Aveni, 1992; Charitou, Neophytou, Charalambous, 2004).

6.5.2 Independent Variables of the Study

The independent variables are as follows: proportion of outside directors, presence of female director on board, board size, nomination committee effectiveness, audit committee effectiveness, and remuneration committee effectiveness. I define each in turn.

Measurement of Board Independence

To test hypothesis one, the main variable of interest is **proportion of outside directors (BODC),** a proxy for board independence, which is calculated as the number of outside directors divided by board size (Weisbach, 1988; Chancharat, Krishnamurti, and Tian, 2012). Consistent with prior studies (e.g. Kang, Cheng, and Gray 2007), I define an outside director as non-employee directors. Put differently, board independence is calculated as independent and non-independent non-executive directors divided by the board size (Dalton, Daily, Johnson, and Ellstrand, 1999).The use of this measure as a proxy for board independence is well-established in the literature due in part to agency theory proposition, which requires outside directors to be independent due to their monitoring function (Fama, 1980).

Measurement of Board Gender Diversity

To test hypothesis two, the core variable of interest is **presence of female director on board (FMALE)**, a proxy for board gender diversity, a binary variable equal to "1", if there is at least a woman on the board, otherwise "0" (Hillman, Shropshire and Cannella Jr 2007; Rose, 2007). This measure is one of the standard measures of board gender diversity (see Campbell and Minguez-Vera, 2008). The rationale for the use of this variable is anchored in agency theory. Particularly, agency theory suggests that boards with at least a woman director on board are less likely to be 'rubber-stamp' to CEO decisions (Adams and Ferreira 2009). This suggests that board gender diversity yields different perspectives of looking at corporate financing, investment and dividend decisions and, in this way, impacts positively on firm performance and ultimately, reduces the likelihood of corporate failure.

Measurement of Board Size

To test hypothesis three, the central variable of interest is **board size** (BODS), which is a count of the number of directors (Yermack, 1996; Certo, Daily and Dalton, 2001; Coles, Daniel and Naveen, 2008). This measure has been widely used in prior research (e.g. Chaganti, Mahajan and Sharma 1985; Yermack 1996; Conyon and Peck, 1998; Coles, Daniel and Naveen, 2008), but the existing evidence is inconclusive. There is, however, a near consensus in the literature that large boards are more effective (Alexander, Fennell, and Halpern, 1993) for the resource dependence (Pfeffer, 1972; Pfeffer and Salancik, 1978; Johnson, Daily and Ellstrand, 1996; Hillman and Dalziel, 2003), and the control roles (Zahra and Pearce, 1989) and, in this way, negatively related to the likelihood of a firm's failure (Dalton, Daily, Johnson and Ellstrand, 1999)

Measurement of Nomination Committee Effectiveness

To test hypothesis four, the primary variable of interest is **nomination committee effectiveness** (NCE), a proxy for board effectiveness, is a composite index consisting of the nomination committee's presence (NCP), independence (NCI), chairman independence (NCCI), size (NCS) and frequency of meetings (NCM1). Thus, NCE Index is constructed as follows:

$$NCE\ index = NCP + NCI + NCCI + NCS + \ NCM1$$

This index is inspired by Cadbury (1992), prior studies (e.g. Hart, 1995; Vafeas, 1999; Ruigrok, Peck, Tacheva, Greve and Hu, 2006) and recent reforms (Higgs, 2003), which require firms to maintain nomination committees based on these five main constructs.

I define the five main constructs as follows. First, NCP is a binary variable with "1" denoting presence of appointment committee and "0" otherwise (Cadbury, 1992; Conyon and Peck, 1998; Ruigrok, Peck, Tacheva, Greve and Hu, 2006). Second, NCI is a dummy variable, where "1" means all members of the nomination committee are independent non-executive directors and "0" otherwise (Hart, 1995; Conyon and Mallin, 1997). Third, NCCI is a binary variable, where "1" means the committee's chair is an independent non-executive director or independent chairman of the board, save when the chairman's successor is being sought, and "0" otherwise (Conyon and Mallin, 1997; Code, 2010). Finally, NCS and NCM1 are both continuous variables, but NCS is coded "1", when nomination committee consists of at least three independent NED and "0" otherwise (see ICSA, 2007), due to the composite measure NCE (see Ruigrok, Peck, Tacheva, Greve and Hu, 2006). Likewise, NCM1 is coded "1", when nomination committee members meet at least twice and "0" otherwise (see ICSA, 2007).

Measurement of Audit and Risk Committee Effectiveness

To test hypothesis five, the basic variable of interest is **audit and risk committee effectiveness** (ACE), a proxy for board accountability, which is a composite index consisting of audit committee's presence (ACP), independence (ACI), expertise (ACX), size (ACS), and frequency of meetings (ACM1). In line with Smith (2003), Pucheta-Martinez and De Fuentes (2007) and Zaman, Hudaib and Haniffa (2011), ACE Index is constructed as follows:

$$ACE\ index = ACP + ACI + ACS + ACX + ACM1$$

I define the five main constructs as follows. ACP is a binary variable of "1" meaning presence of audit committee and "0" otherwise (Beasley, 1996). Second, ACI is coded "1", when the committee members are independent non-executive directors (exclusive of independent non-executive chairman) and "0" otherwise (see; Smith 2003; Zaman, Hudaib and Haniffa 2011). In addition, ACS, ACX and ACM1 are continuous variables but ACX takes a value of "1", when at least a member of the audit committee has accounting, finance or professional accounting qualifications and "0" otherwise (Chan and Li, 2008), due to the composite measure for ACE (see Zaman, Hudaib, Haniffa, 2011). Likewise, ACS takes a value of "1" if there are three or more independent NED membership throughout the year and "0" otherwise (Beasley, 1996; Chan and Li, 2008). As well, ACM1 is treated as a dummy variable with value "1", when three or more meetings are held by the audit committee and "0" otherwise (see Zaman, Hudaib and Haniffa 2011; Smith 2003; Mendez and Garcia, 2007). Mendez and Garcia (2007), for example, suggest that meeting frequency measures the degree and intensity of audit committee's activity and thus, high frequency is an indicator of audit committee's firm control and diligence.

Measurement of Remuneration Committee Effectiveness

To test hypothesis six, the principal variable of interest is **remuneration committee effectiveness** (RCE), which is a composite index consisting of remuneration committee's presence (RCP), independence (RCI), size (RCS), chair independence (RCCI), and frequency of meetings (RCM1). Thus, RCE Index is constructed as follows:

$$RCE\ index = RCP + RCI + RCCI + RCS + RCM1$$

This is inspired by the Greenbury (1995), which requires firms to maintain remuneration committee based on these five main constructs.

I define the five main constructs as follows. First, RCP is a binary variable of "1" meaning presence of remuneration committee and "0" otherwise (Conyon, 1997; Conyon and Peck, 1998). Second, RCI is coded "1", when the committee members are independent non–executive directors (inclusive of independent non-executive chairman) and "0" otherwise (Conyon, Gregg and Machin 1995; Daily, Johnson, Ellstrand and Dalton, 1998). Third, RCS is a binary variable with "1" denoting membership of at least three independent NED and "0" (Daily, Johnson, Ellstrand and Dalton 1998). The Code (2010), however, requires at least two members for smaller companies; hence a control variable of size is relevant in the model estimation. Fourth, RCCI is coded "1", when its chairman is independent NED but not the chairman of the board and "0" otherwise (Greenbury, 1995; Daily, Johnson, Ellstrand, Dalton, 1998). Finally, RCM1 is coded "1", when the committee members meet at least twice and "0" otherwise (see ICSA, 2010; Vafeas, 1999a). Vafeas (1999a), for example, suggests that boards are able to turn around poorly performing firms by meeting more often. I turn to the operationalization of the board functions in the subsequent paragraphs.

Measurement of Board Monitoring Function

In relation to the interaction effects, the frequency of board meetings and CEO performance evaluation are used as proxies for board monitoring function. I justify and define each in turn.

Frequency of board meeting: Vafeas (1999a) argues that "***outside directors are likely to demand more board meetings to enhance their ability to monitor management***" (p.116). Thus, consistent with agency theory boards that meet more frequently are more likely to perform their monitoring duties (see also Conger, Finegold and Lawler, 1998). Vafeas (1999a) explores this assertion and finds that firm's performance improves following years of higher frequency of board meeting. This, however, may suggest that board meetings are not proactive measure for improving firm's governance and performance, but consider as a fire-fighting device (Jensen, 1993). As well, class managerial hegemony theory suggests that board meetings are too artificial to result in effective monitoring. In sum, the impact of frequency of board meetings, a proxy for board monitoring, is a contestable empirical question. Following Fich and Slezak (2008), frequency of board meeting is measured by the number of formal meetings (excluding telephone meetings) held by the entity in a financial year.

Turning to CEO performance evaluation, Tosi and Gomez-Mejia (1994) posit that a fundamental monitoring device is the formal evaluation of the CEO's performance. Young, Stedham, and Beekon (2000) concur, stressing that outside directors are "***more inclined to hold CEOs accountable for their performance through the adoption of a formal CEO evaluation process"*** **(p.280)**. Young, Stedham, and Beekon (2000) define formal evaluation process as one that is based on explicit criteria. Thus, they neglect its implementation. The present study focuses on implementation of the written procedure of the formal evaluation process. Hence, I code as “0”, “1” and “2” if the annual report indicates that the entity undertook an (a) informal, formal and external evaluation of the CEO’s performance, respectively.

Measurement of Board Resource Function

I use director interlock, as a proxy for board resource function, due to resource dependency theory’s (see Pfeffer and Salancik, 1978; Bazerman and Schoorman, 1983) notion, suggesting that interlocked directors may reduce the effects of environmental uncertainty, which in turn, facilitates resource exchange agreements. Pfeffer (1972), Mizruchi and Stearns (1988) and Dalton, Daily, Johnson, and Ellstrand (1999) confirm this notion.

Class managerial hegemony perspectives, however, suggest that interlocked directorates can “***reduce board effectiveness by generating entrenchment, lack of legitimacy, self-protection, lack of monitoring, connivance, excessive compensation” (Nguyen-Dang, 2012:p.9).*** Devos, Prevost, and Puthenpurackal (2009) confirm this notion. In sum, the impact of board interlock, a proxy for board resources, is an empirical question.

I follow Sheppard (1994) and in turn, limit our analysis to direct director interlock. Thus, I invoke Pennings’ (1980) notion that an “***indirectly linked director’s attention is much more diffused than that of a directly linked director***” (p.37-38). I use three proxies for board interlock. First, board interlock denotes a dummy of “1”, if both the entity’s chairman and senior NED serve on at least a board and “0” otherwise. Second, board interlock denotes a dummy of “1”, if all the entity’s lead directors (measured by the trinity-i.e. Chairman, CEO, and senior NED) serve on at least a board and “0” otherwise. The CEO’s interlock inclusion overcomes a major gap in the interlocking studies. Put differently, prior studies omit executive interlock (see Rivas, 2012). Finally, I consider board political connections (hereafter former government official) which denote a dummy of “1”, if any of the lead directors possesses any type of political appointment (e.g. Member of Parliament) over a year and “0” otherwise. Rivas (2012) proposes that former government officials on board increase firm’s ability to co-opt resources to decrease environmental insecurity and, thus, enhanced firm’s survival (Hillman, Zardkoohi, and Bierman, 1999; Hillman, 2005).

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6.5.3 Control variables of the study

I include control variables that may affect the corporate failure process besides the corporate governance proxies. These are financial (i.e .liquidity, profitability, leverage) and demographics (i.e. industry effects, firm size and age). I justify and define each in turn.

Measurement of Liquidity

Working Capital/Total Asset Ratio (WCTA): The liquidity ratio is calculated by dividing working capital of a firm by its total assets. This measures the net liquid resources of the firm relative to the total capitalization (Altman, 1968), a measure which is widely used in lead studies (e.g. Hensher and Jones, 2007; Wu, Gaunt and Gray, 2010; Premachandra, Chen, and Watson, 2011).

Measurement of Profitability

Earnings before Interest, Taxes, Depreciation and Amortisation /Total Assets (PROF): This ratio is calculated by dividing earnings before interest, taxes, depreciation and amortisation of a firm by its total assets. It measures the true efficiency of the firm's capital employed due in part to the non-consideration of all non-cash movement items (Altman, 1968). This ratio is one of the standard approaches to the measurement of profitability which is extensively used by prior studies (see, El Hennawy and Morris, 1983; Wu, Gaunt and Gray, 2010; Du Jardin and Severin, 2011). More importantly, this ratio is appropriate for predicting corporate failure because a firm's ultimate survival is based on the earning power of its assets. In theory, insolvency follows, when the total liabilities exceed the earning power of the firm's resources (Altman, 1968).

Measurement of Financial Leverage

Total Liabilities/Total Assets (TLTA): This ratio is calculated by dividing total liabilities of a firm by its total assets. Inclusion of this ratio is motivated by Jensen and Meckling’s (1976) notion, suggesting that higher leverage increases debt holders’ need to monitor CEOs. In this regard, agency theory suggests that a firm’s gearing position is appropriate for predicting a firm’s failure. This is because a firm’s going concern is based in part on its capital structure. Thus, the probability of a firm’s failure is greater for a highly geared firm. As a result, this measure has been widely used in prior research (e.g. Shumway, 2001; Chava and Jarrow, 2004; Lyandres and Zhdanov, 2013).

Measurement of Industry Effects

Carter, Simkins, D'Souza and Simpson (2010) contend that agency problems may differ across industries. Put simply, the need for executive monitoring may differ in different industries. Chava and Jarrow (2004) concur, emphasising that "***different industries face different levels of competition and, therefore, the likelihood of bankruptcy can differ for firms in different industries" (p.538).*** Evidence from prior studies (e.g. El Hennawy and Morris, 1983; Chava and Jarrow, 2004) confirms this notion, implying that industry effect is an important component in the prediction of corporate failure.

The vast literature, however, has largely overlooked industry effects (Chava and Jarrow, 2004). I include a number of industry dummies based on the current Standard Industrial Classification Manual, which defines industries in accordance with the composition and structure of the economy (El Hennawy and Morris, 1983; Chava and Jarrow, 2004).

Measurement of Company Size

Firm Size (LOGDA): This is operationalized as the natural logarithm of book value of year-end total assets divided by Gross Domestic Price index-Deflator (Altman, et al, 1977; Ohlson, 1980). The index assumes a base value of 100 for 2010. The procedure assures a real-time implementation of the model. Logarithmic transformation is applied to help normalise the distribution of the variable (see Altman et al, 1977; Ohlson 1980). Inclusion of firm size is motivated by argument from agency theory (Jensen and Meckling, 1976; Fama, 1980), which suggests that agency costs are more substantial in larger firms due to the free rider problems (Yermack, 1996).

In parallel, large size helps a firm to function more efficiently (Argenti, 1976), due in part to economies of scale, which in turn, enhances a firm's ability to manage environmental turbulence (Aldrich, 1979) and probable turnaround (Hambrick and D'Aveni, 1988). This implies large size reduces business failure rate (Hannan and Freeman, 1984; Sutton, 1997). Moulton and Thomas (1993) and Sine, Mitsuhashi, and Kirsch (2006) confirm this notion. In sum, small firms are prone to higher failure rates due in part to key constraints (e.g. raising capital) and legitimacy problems with external stakeholders (Baum and Oliver 1992, 1996).

Measurement of Firm Age

Firm age is the difference between the financial data year end and the date of incorporation, a variable that has been used by several studies (e.g. Wiklund, Baker and Shepherd, 2010). I include firm age to counter potential alternative explanation for corporate failure from the perspective of ecological scholars (e.g. Thornhill and Amit, 2003). For instance, Stinchcombe (1965) argues that the concept of liability of newness accounts for the high failure rate in young ventures vis-à-vis their more mature counterparts (see also Sine, Mitsuhashi, and Kirsch, 2006). Thornhill and Amit (2003) cement this hypothesis, implying that young firms lack the required legitimacy (i.e. creditworthiness) to access critical resources and thus are more likely to fail.

Agarwal and Sarkar (2002), however, argue that the liability of newness varies according to the stage of the industry life cycle. Advocates of liability of adolescence (e.g. Bruderl and Schussler 1990) confirm this notion. As Henderson (1999) notes, the liability of newness and adolescence scholars differ as to when the firm is likely to fail. In sum, the impact of firm age on corporate failure is an empirical question.

6.6 STATISTICAL TECHNIQUE

The aim of this section is to describe the statistical technique used in the study. The section is organised as follows. Sub-section 6.6.1 describes the logit model. The rationale for the choice of logit as the statistical technique for the study is the focus of sub-section 6.6.2.

6.6.1 The Logit Model

I employ multivariate logistic regression analysis (LOGIT) as the primary analytical technique to test the hypotheses of the study. The logit function has a number of properties, which make it suitable for probability function and corporate failure prediction in particular. For instance, it overcomes the constant marginal effect and the difficulty of interpreting probabilities greater than one and less than zero associated with the linear probability model (LPM). In addition, unlike the Multiple Discriminant Analysis (MDA), it does not assume multivariate normality and equal covariance matrices (Ohlson, 1980). From this point, scholars prefer the logit to the discriminant analysis, even if the assumptions of the latter are met. The reasons are twofold. First, it is extremely flexible due in part to its mathematical convenience (Green, 2004), which produces the estimated probability between 0 and 1

(Ohlson, 1980). Second, logit analysis produces consistent and unbiased coefficient estimates (Green, 2004). Following Gujarati (2004), the logistic cumulative distribution function (CDF) is:

$$\mathcal{P}_i = \frac{1}{1+e^{-Z_i}} = \frac{e^{\mathrm{z}}}{1+\mathrm{e}^{\mathrm{z}}} \tag{6.1}$$

where $Z_i = \beta_0 + \beta_1 X_1$

Where $\mathcal{P}$ is the probability of corporate failure occurrence for observation i. β_0 and β_1 are the intercept term and the estimated coefficient of variable X_1 , respectively (see Hosmer and Lemeshow, 1989; Pampel, 2000; Chi and Tang 2006). Equation 6.1 suggests that, as $Z_i \rightarrow +\infty$, $\mathrm{e}^{-\mathrm{z}}$ tends to zero and as $Z_i \rightarrow -\infty$, $\mathrm{e}^{-\mathrm{z}}$ increases indefinitely (Gujarati, 2004). The cumulative logistic function, Z_I, ranges from $-\infty$ to $+\infty$. P_i ranges from 0 to 1 and also nonlinearly related to $Z_i(i.e. X_i)$. Further, if P_i is the probability of corporate failure occurrence, then (1 - P_i), the probability of non-failed, is:

$$1 - \mathcal{P}_{\mathrm{i}} = \frac{1}{1+e^{Z_i}} \tag{6.2}$$

Accordingly, I write

$$\frac{\mathcal{P}_i}{1-\mathcal{P}_{\mathrm{i}}} = \frac{1+e^{Z_i}}{1+e^{-Z_i}} = e^{Z_i} \tag{6.3}$$

Where Pi / (1 - Pi) is simply the odd ratio in favour of failed. For instance, if Pi = 0.9, it shows that odds are 9 to 1 in favour of the corporate failure. Further, the natural log of Equation 6.3 is:

$$\mathrm{Log}(\mathcal{P}_{\mathrm{i}}|1 - \mathcal{P}_{\mathrm{i}}) = \beta_0 + \beta_1 X_i + u_i \tag{6.4}$$

Where u_i is the error term. Equation 6.4 depicts that the dependent variable is the logarithm of the odds, $\{\mathrm{Log}(\mathcal{P}_{\mathrm{i}}|1 - \mathcal{P}_{\mathrm{i}})\}$, which is the logarithm of the ratio of two probabilities of the occurrence of corporate failure (Chi and Tang 2006). The log of the odds ratio is linear in its parameters, may be continuous, and may range from -∞ to +∞ (Hosmer and Lemeshow, 2000). The probabilities, however, are not linear. Hence, I cannot use the familiar OLS procedure to estimate the parameters (Gujarati 2004), but rather the maximum likelihood method. Figure 11 depicts the logistic cumulative distribution function, which is very similar to the standard normal cumulative distribution function.

Figure 11: Graph of the Logistic Function

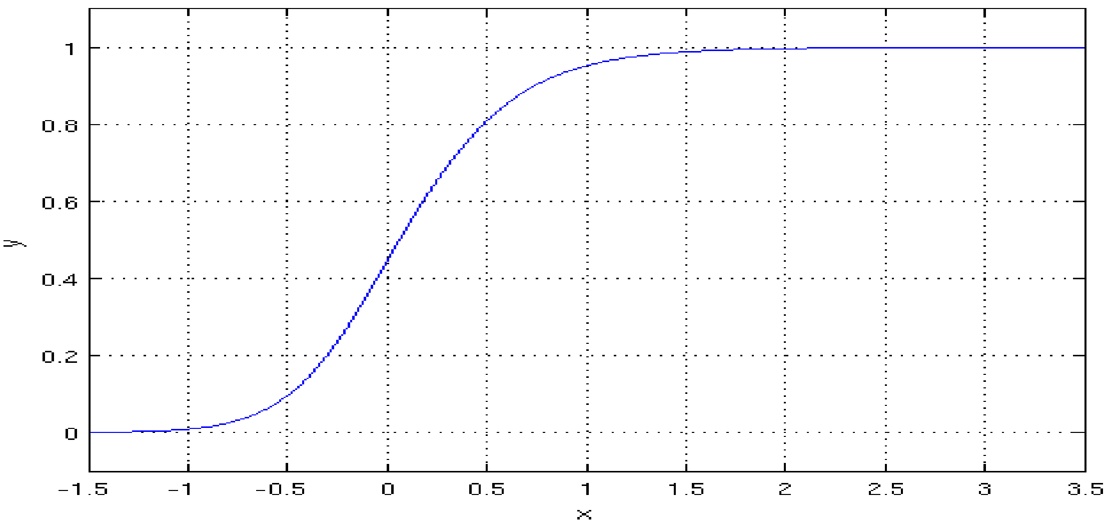

Figure 11 shows that the logit function is always positive, i.e. lies between zero and one, approaches zero as $X \rightarrow -\infty$ and approaches one as $X \rightarrow \infty$ (Hosmer and Lemeshow, 2000). Thus, if the logit is positive, it means that when the value of the independent variable increases, the odds that the dependent equals one increases and vice versa. In this regard, the interpretation of the logit model in equation 6.4 is as follows: β_1 the slope, measures the change in L for a unit change in X. Thus, I use X to denote the full set of explanatory variables. From this point, scholars may add more binary and continuous independent variables as dictated by the underlying theory (Gujarati, 2004). The intercept β_0 is the value of the log odds in favour of corporate failure if the financial and non-financial indicators are zero. The coefficient from logit model, however, is difficult to interpret due in part to the change in the unobservable L associated with a change of one unit in the independent variables. Hosmer and Lemeshow (2000), for example, suggest that proper interpretation of the logit model's coefficient is based on researchers' ability to place meaning on the difference between two logit. A more useful measure is the marginal effects (see Uysal, 2011). I turn next to the justification for the choice of the logit technique.

6.6.2 Rationale for the Choice of Logit

It is recognised that, in addition to the logit, there are alternative techniques, such as probit, neural networks and multivariate discriminant analysis (MDA) models that can be used to answer the research problem. Lachenbruch and Goldstein (1979) and Lo (1986), for example, assert that MDA is a robust technique, which can tolerate some deviations. Lo (1986), however, contend that logit analysis is more robust and, in this way, considered more reliable than discriminant analysis when dealing with samples which are not normally distributed. This nothwistanding, the review in chapter three, suggests that there is no single method, which is consistently superior method (Aziz and Dar, 2006). I employ logit for six reasons.

First, logit is suitable for this study due in part to the research problem, which involves the classification of firms into two groups on the basis of a set of financial and non-financial characteristics of the firm. Particularly, logit employs the coefficient of a combination of continuous and categorical independent variables to predict the probability of occurrence of a dichotomous dependent variable (Dielman, 2001). In comparison to discriminant analysis, logit handles categorical independent variables easily.

Second, logit estimation produces a nonlinear transformation of the input data that decreases the influence of outliers. This in turn, suggests that it produces reliable results (e.g. Martin, 1977; Ohlson, 1980; Mensah, 1983; Casey and Bartczak, 1985; Charitou, Neophytou and Charalambous 2004). Third, logit is a straightforward statistical test (Anderson, Hair, Tatman and Black, 2006), which reduces the fundamental estimation problem to the following statement: given that a firm belongs to a predetermined population, what is the probability that the firm fails within some pre-set time (Mensah 1983; Ohlson, 1980). Fourth, logit permits the statistical significance of each of the variables in the model to be evaluated independently (Mensah, 1983). Advocates of logit approach cite this as its major strength over the numerous architects of the Artificial Intelligent Expert system. Fifth, no assumption is made about the distributions of the independent variables. Nonetheless, the independent variables should not be highly correlated with one another. For this reason, I assess the correlation of our explanatory variables via Spearman and Pearson's correlation matrix for each year.

Sixth, no assumptions have to be made regarding prior probabilities of bankruptcy and/or the distribution of predictors (Ohlson, 1980). The costs of misclassification are user-specific (Mensah, 1983), unlike the MDA. This permits the user to calculate the cost of misclassification and to select the preferred model based on the facts of any given situation.

Thus, adjusting the probability cut-off provides a means of incorporating the costs of misclassification (Jones, 1987). In this respect, I follow lead studies (e.g. Keasey and Watson, 1986; Gilbert, Menon and Schwartz, 1990; Charitou, Neophytou and Charalambous 2004) and in turn, assume an equal probability of group membership, for two reasons. First, the study models are intended for general application by a wide range of user groups. Second, I seek to avoid sample specific results, which in turn might overstate the power of the prediction models. This suggests consistency in the results of the estimation, holdout and combined samples for meaningful analysis.

However, large sample size is required for logit analysis to provide sufficient numbers in both categories of the response variable. Furthermore, the more explanatory variables, the larger the sample size required. With small sample sizes, the Hosmer–Lemeshow test has low power and is unlikely to detect subtle deviations from the logit model. Hosmer and Lemeshow (2000) recommend sample sizes greater than 400. In this regard, I employ a holdout sample and Jackknife procedures test as well as combined sample to test the robustness of out training models. I turn next to data analysis of the study.

6.7 DATA ANALYSIS

Data analysis proceeds in two stages: univariate and multivariate. The univariate analysis examines the predictive ability of independent variables one at a time. I employ two sample t-tests for differences in means five year cross-sectional pooled data as well as cross-sectional means, an approach which has been employed by prior studies in the corporate failure context (e.g. Beaver, 1966; Gales and Kesner, 1994; Hambrick, and D'Aveni, 1992; Rosner 2010; Platt and Platt, 2012). In addition, I conduct univariate logit analysis for each year and the cross-sectional pooled data to assess the predictive power and association of each independent variable on the likelihood of firm's failure. I use log likelihood chi-square, pseudo r-squared and overall predictive accuracy to measure a variable's predictive power. This approach has been employed by recent studies in the prediction of corporate failure in the UK (e.g. Charitou, Neophytou, Charalambous, 2004).

The multivariate analysis examines the principal research question: whether corporate governance measures are related to corporate failure in the UK. Specifically, I address two issues: RQ1: whether board attributes are related to corporate failure, and RQ2: whether the interactions between board attributes and functions are related to corporate failure. Following Sheppard (1994), I perform three phases of LOGIT runs: cross-sectional pooled data, cross-sectional and multi-period LOGIT models. I turn next to the discussion of each phase.

6.7.1 Pooled Cross Sectional LOGIT Model

I follow prior studies (e.g. Sheppard, 1994; Wu, Gaunt and Gray, 2010) by using pooled cross-sectional data to examine the association between corporate governance measures and the likelihood of corporate failure. As discussed in section 6.3, I randomly split the data into estimation and holdout samples and merge both for combined sample.

The pooled cross-sectional logit model (herafter pooled) is equivalent to Sheppard (1994) but differs slightly from Wu, Grant and Gray (2010). In this regard, Wu, Grant and Gray (2010) include one firm-year observation for each failed firm but all firm-year observations for the non-failed firms. As well, the pooled logit is similar to the hazard model in Shumway (2001), Beaver, McNicholas and Rhie (2005), Xu and Zhang (2009), save the inclusion of maximum five firm-year observations for each failed and non-failed firm. This indicates that there are multiple observations of the same firm in each sample, implying that residuals may be correlated across time and across firms. For this reason, I use "robust" standard errors estimation and adjust errors by firm clustering in the training and combined samples of the models (see Petersen, 2009; Darrat, Gray, and Wu, 2010). The jackknife procedure is employed in the holdout test, an approach which is extensively used to test reliability of prediction models (e.g. Aziz, Emanuel and Lawson, 1988; Platt and Platt, 1990; Sheppard, 1994; Huyhebaert, Gaeremynck, Roodhooft, & Van de Gucht, 2000).

Further, I assess the adequacy of the pooled logit model with a range of measures: Log likelihood ratio test, log likelihood chi-squared, classification accuracy, McFadden's r-squared, Hosmer-Lemeshow statistics and Receiver Operating Characteristics Area (ROC area). By rule of thumb, a model shows adequate fit by recording large p-value for the Hosmer and Lemeshow's test, a significant chi-squared and higher McFadden's r-squared, ROC, classification accuracy. These measures are widely used to assess prediction models (e.g. Chava and Jarrow, 2004; Agarwal and Taffler, 2007; Wu, Grant and Gray, 2010).The pooled logit model is estimated using the form:

$$\text{Log}\frac{P(FAILURE_{it})}{P(1 - FAILURE_{it})} = \beta_1 + \beta_2\ Corporate\ Governance_{i,t-1} + \beta_3\ Controls_{i,t-1} + \epsilon_{it-1} \quad (6.5)$$

Where P (FAILURE $_{it}$) is the likelihood of a firm's failure at year t. The dependent variable is set to 1 for failed firm-year observations. Specifically, if a firm failed in year t, it contributes five years data prior to failure to the pooled model. Non-failed firms also contribute five years data prior to target year. In this regard, the insolvency years of failed firms is used as a benchmark in selecting the non-failed firms.

Critics may, however, argue that the pooled logit does not consider failure as a process, due to the aggregation of data. Specifically, the pooled approach considers failure as a catastrophic event instantaneously occurring at a point in time by several concurrent factors. This contradicts general intuition (Balcaen and Ooghe, 2006), suggesting that the pooled approach does not consider leading indicators of the downward spiral of a firm. Further, the pooled approach can report the association of governance and accounting proxies on corporate failure, but the principal question of when these variables are prevalent is beyond its scope. This limitation is addressed by cross-sectional logit models, the discussion of which I turn to.

6.7.2 Cross-sectional Logit Models

The pooled logit model provides a snapshot of the profile of failed and non-failed firms' corporate governance. I can speculate that as failure approaches firms may exhibit several corporate governance deficiencies due in part to the firms' lack of resources and growth prospects to entice the directors to be committed to the firms turnaround strategies. I argue that a cross-sectional analysis may uncover significant events leading to failure. In this regard, there is a vast literature on one annual account models prior to failure. These static models are based on an unrealistic assumption, which suggests that consecutive annual accounts are independent, repeated measurements (Balcaen and Ooghe, 2006; Du Jardin and Séverin, 2011). For this reason, I follow Hambrick and D'Aveni (1992), Sheppard 1994; Charitou, Neophytou, Charalambous (2004), Lara, Osma, and Neophytou (2009), Beaver, Correia, and McNichols, (2012) and in turn, develop logit models for each of the five years prior to failure. In turn, the cross-sectional models provide a five year window to examine the hypotheses. Put differently, these cross sectional models assess the probability of failure in t - 1, t - 2, t - 3, t - 4 and t - 5. Accordingly, when considering one year (t -5) prior to failure, the cross-sectional logit model takes the form:

$$Y_{i,t} = \beta_0 + \beta_1 X_{1i,t-5} + \beta_2 X_{2i,t-5} + \epsilon_{i,t-5} \quad (6.6)$$

Where X_{1t-5} denotes the value of independent variables lagged by five years preceding corporate failure or target year. Further, this five-year lag is consistent with lead (e.g. Hambrick and D'Aveni, 1992; Pompe and Bilderbeek, 2005; Jones and Henser, 2004; Henser and Jones, 2007), suggesting that prediction of failure is possible as far as five years prior to the event (see Du Jardin and Séverin, 2011).

The cross-sectional models' results may be sample specific but not due to passage of time (Sheppard, 1994). As well, the cross-sectional logit model may fail to provide a holistic view of the changes in corporate governance mechanisms as failure approaches. Put differently, a change model may provide insightful findings concerning the changes in failing firms' governance relative to their non-failed counterparts. I turn next to the discussion of the change logit models.

6.7.3 Multi-period LOGIT Models

I can speculate that as failure approaches: (1) boards may adopt accepted corporate governance structures; however, (2) firms may exhibit severe corporate governance deficiencies due in part to directors' unwillingness to serve on such boards, due in part to the stigma of bankruptcy. Prior studies examine changes in corporate governance using a 5-year period prior to failure (Daily and Dalton, 1995). This approach does not consider time lapse in the downward spiral to facilitate thorough analysis of alterations in corporate governance and financial indicators. For this reason, I first examine changes in governance and financial indicators in the four to five (4/5) year period to corporate failure on one hand (see 6.7), and changes one to two (1/2) years prior to failure, on the other hand (see 6.8). In sum, the multi-period LOGIT model estimation is accomplished in two steps. Equations 6.7 and 6.8 present the multi-period model equations, respectively.

$$Step\ 1{:}\ Y_{i,t} = \beta_0 + \beta_1 X_{1,it-4/5} + \epsilon_{i,t-4/5} \quad (6.7)$$

$$Step\ 2{:}\ Y_{i,t} = \beta_0 + \beta_1 X_{1,it-1/2} + \epsilon_{i,t-1/2} \quad (6.8)$$

Where $X_{1t-4/5}$ ($X_{1t-1/2}$) indicates the value of independent variables lagged by five to four (two to one) years preceding corporate failure. The 4/5(1/2) year period model examines both failed and non-failed data in *t*-4 (t-1) and *t*-5 (*t*-2). Thus, a failed firms contribute maximum two firm-year observations to both the 4/5 year period model (i.e. year 4 and 5 prior to failure) and and 1/2 year period model (i.e. year 1 and 2 prior to failure). Non-failed firms also contribute maximum two firm-year observations each to both the 4/5 year period model (i.e. year 4 and 5 prior to target year) and 1/2 year period model (i.e. year 1 and 2 prior to target year).This approach is adopted from Sheppard (1994) because among others it allows two years to elapse for change to occur in the firms' governance and financial performance. I turn next to a summary of the analysis and proposed models, in particular, in the next section.

6.7.4 Summary of Models

Appendix 5 (see page 292) shows the abbreviations, meanings and expected signs of the measures of the study. I test the six main hypotheses using two main models:

1. DIRECT MODEL: The association between board attributes and corporate failure.

$$STAT1 = \beta_0 + \beta_1 BODC_{i,t-1} + \beta_2 FMALE_{i,t-1} + \beta_3 BODS_{i,t-1} + \beta_4 NCE_{i,t-1} + \beta_5 ACE_{i,t-1} + \beta_6 RCE_{i,t-1} + \beta_7\, WCTA_{i,t-1} + \beta_8\, PROF_{i,t-1} + \beta_9\, TLTA_{i,t-1} + \beta_{10} LOGDA_{i,t-1} + \beta_{11}\, FAGE_{i,t-1} + \beta_{12} INDY_{i,t-1} + \varepsilon_{i,t-1} \quad (6.9)$$

2. INTERACTION TERMS MODEL: The association between the interactions between board attributes and functions on corporate failure.

$$STAT1 = \beta_0 + \beta_1 BODC_{i,t-1} + \beta_2 FMALE_{i,t-1} + \beta_3 BODS_{i,t-1} + \beta_4 NCE_{i,t-1} + \beta_5 ACE_{i,t-1} + \beta_6 RCE_{i,t-1} + \beta_7 BCON_{i,t-1} + \beta_8\, BRES_{i,t-1} + \beta_9 BODC * BCON_{i,t-1} + \beta_{10} BODC * BRES_{i,t-1} + \beta_{11} FMALE * BCON_{i,t-1} + \beta_{12} FMALE * BRES_{i,t-1} + \beta_{13} BODS * BCON_{i,t-1} + \beta_{14} BODS * BRES_{i,t-1} + \beta_{15} NCE * BCON_{i,t-1} + \beta_{16} ACE * BCON_{i,t-1} + \beta_{17} RCE * BCON_{i,t-1} + \beta_{18} WCTA_{i,t-1} + \beta_{19}\, FLOW_{i,t-1} + \beta_{20}\, TDTA_{i,t-1} + \beta_{21} LOGDA_{i,t-1} + \beta_{22}\, FAGE_{i,t-1} + \beta_{23} INDY_{i,t-1} + \varepsilon_{i,t-1} \quad (6.10)$$

6.8 CHAPTER SUMMARY

This chapter is dedicated to the research methodology and data collection of the study. The philosophical stances, data, time horizon, sample design, measures and the statistical technique are discussed logically in relevant sections. The positivism approach is adapted for the study, due in part to the difficulties in collecting data from boards of failed firms. Data for the research is extracted mainly from failed and non-failed UK listed firms within the period 1st January, 1999 to 31st December, 2011. The sample period is chosen to facilitate collection of data at least five years' corporate governance data post Cadbury (1992). Data collected is stratified into five cross-sectional sub-samples. The aim is to allow a five year time lag to facilitate prediction prior to potential failure. Financial and non-financial data (e.g. corporate governance attributes) are extracted from Thomson One Banker and FAME databases. I opt for the random sampling technique since the pervasive paired sampled technique gives bais estimates. Further, I randomly split each year's data to estimation and holdout to facilitate a robust estimation and validation of models. I outline the definitions and justified the dependent, independent and control variables in the relevant sections. Finally, the logit approach is chosen for the study due in part to its numerous advantages and the binary nature of the dependant variable, in particular. The chapter ends with a discussion on the testing procedures of the hypotheses. I turn next to the discussion of results in the next chapter.

CHAPTER SEVEN
ANALYSIS AND RESULTS

7.0 INTRODUCTION

The previous chapter sets out the research methodology and description of data. It also highlights the logit as the statistical method for this study due in part to the binary nature of the dependent variable. I use STATA 12 to run logit tests and present the findings in this chapter. I restate the sub-problems of this study. First, I examine how the composition and structure of corporate board relates to firm's failure. Second, I examine how the interactions between board attributes and functions of corporate board relate to firm's failure. I present the results in line with the hypotheses development in chapter five.

The chapter proceeds as follows. Section 7.1 presents the descriptive statistics. Section 7.2 discusses the multicollinearity tests. Section 7.3 deals with the univariate analysis. Section 7.4 outlines the results of the multivariate logit analysis. Section 7.5 reports the results of the hypotheses. Section 7.6 concludes.

7.1 DESCRIPTIVE STATISTICS

I calculate mean, standard deviation, minimum, lower quartile (Q1), median, upper quartile (Q3), maximum and three main normality tests (i.e. Skewness-kurtosis, Shapiro-Wilk and Shapiro-Francia) for the pooled data of all the predictive variables used in the prediction models for the sample period, 1999 to 2011. As Xu and Zhang (2009) and Beaver, McNicholas and Rhie (2005) observe, descriptive statistics calculated this way are more indicative of the condition in the later sample years. From this point, the sample sizes vary over time: 353, 351, 352, 352, and 346 observations for t – 1, t – 2, t - 3, t – 4 and t – 5 time periods, respectively. Tables 6 and 7 display the descriptive statistics.

Table 6: Descriptive Statistics of the Predictive Variables. This table shows the descriptive statistics (i.e. mean, standard deviations (S.D), minimum, lower quartile (Q1), median, upper quartile (Q3), maximum and three main normality tests; Skewness-kurtosis, Shapiro-Wilk and Shapiro-Francia) for the cross-sectional distribution of the time series averages of all the independent variables used in the prediction models for the sample period from 1999-to 2011. The definition of variables is in Appendix 5.

Variable	Mean	S.D.	Min	Q1	Med	Q3	Max	Skewness-Kurtosis Test				Shapiro-Wilk Test		Shapiro-Francia Test	
								Skewness	Kurtosis	P-value	No adjust	Wilk	P-value	Francia W	P-value
COMPOSITION															
bodc	0.54	0.16	0.00	0.43	0.56	0.67	1.00	-0.536	3.172	(0.000)	(0.000)	0.978	(0.000)	0.977	(0.000)
fmale	0.35	0.48	0.00	0.00	0.00	1.00	1.00	0.636	1.405	(.)	(.)	0.999	(0.579)	1.000	(1.000)
bods	7.44	2.27	2.00	6.00	7.00	9.00	20.00	0.830	4.849	(0.000)	(0.000)	0.970	(0.000)	0.970	(0.000)
STRUCTURE															
nce	3.17	2.13	0.00	1.00	4.00	5.00	7.00	-0.206	1.727	(.)	(0.000)	0.967	(0.000)	0.969	(0.000)
ncp	0.75	0.43	0.00	0.00	1.00	1.00	1.00	-1.148	2.317	(0.000)	(0.000)	0.998	(0.092)	1.000	(0.000)
nci	0.33	0.49	0.00	0.00	0.00	1.00	3.00	1.090	3.841	(0.000)	(0.000)	0.979	(0.000)	0.996	(0.000)
ncci	0.53	0.50	0.00	0.00	1.00	1.00	1.00	-0.112	1.013	(.)	(.)	0.999	(1.000)	1.000	(0.000)
ncs	0.63	0.48	0.00	0.00	1.00	1.00	1.00	-0.518	1.268	(.)	(.)	0.999	(0.999)	1.000	(1.000)
ncm1	0.39	0.49	0.00	0.00	0.00	1.00	1.00	0.450	1.203	(.)	(.)	0.999	(0.939)	1.000	(1.000)
ace	3.61	1.49	0.00	3.00	4.00	5.00	6.00	-0.724	2.414	(0.000)	(0.000)	0.976	(0.000)	0.978	(0.000)
acp	0.95	0.21	0.00	1.00	1.00	1.00	1.00	-4.256	19.110	(.)	(0.000)	0.979	(0.000)	1.000	(0.000)
aci	0.71	0.45	0.00	0.00	1.00	1.00	1.00	-0.928	1.862	(0.000)	(0.000)	0.999	(0.417)	0.996	(0.000)
acs	0.59	0.49	0.00	0.00	1.00	1.00	2.00	-0.337	1.189	(.)	(.)	0.980	(0.000)	0.991	(0.000)
acx	0.77	0.43	0.00	1.00	1.00	1.00	2.00	-1.173	2.709	(.)	(0.000)	0.981	(0.000)	0.991	(0.000)
acm1	0.59	0.49	0.00	0.00	1.00	1.00	1.00	-0.351	1.123	(0.000)	(.)	0.999	(1.000)	1.000	(0.000)
rce	3.75	1.48	0.00	3.00	4.00	5.00	5.00	-0.968	2.834	(0.000)	(0.000)	0.978	(0.000)	0.981	(0.000)
rcp	0.96	0.21	0.00	1.00	1.00	1.00	1.00	-4.444	20.747	(.)	(0.000)	0.977	(0.000)	1.000	(1.000)
rci	0.70	0.46	0.00	0.00	1.00	1.00	1.00	-0.862	1.743	(.)	(0.000)	0.999	(0.575)	1.000	(1.000)
rcci	0.72	0.45	0.00	0.00	1.00	1.00	1.00	-0.956	1.914	(0.000)	(0.000)	0.999	(0.357)	1.000	(0.000)
rcs	0.67	0.47	0.00	0.00	1.00	1.00	1.00	-0.712	1.506	(.)	(.)	0.999	(0.891)	1.000	(0.000)
rcm1	0.72	0.45	0.00	0.00	1.00	1.00	1.00	-0.962	1.926	(0.000)	(0.000)	0.999	(0.344)	1.000	(1.000)
FUNCTIONS															
dcpe	0.54	0.58	0.00	0.00	0.00	1.00	2.00	0.512	2.321	(0.000)	(0.000)	0.995	(0.000)	0.999	(0.657)
bodm	8.71	3.38	0.00	6.00	9.00	11.00	44.00	1.793	16.150	(0.000)	(0.000)	0.911	(0.000)	0.910	(0.000)
bint	0.82	0.38	0.00	1.00	1.00	1.00	1.00	-1.679	3.820	(0.000)	(0.000)	0.997	(0.001)	1.000	(0.000)
bint2	0.65	0.48	0.00	0.00	1.00	1.00	1.00	-0.623	1.388	(.)	(.)	0.999	(0.975)	1.000	(1.000)
bint3	0.23	0.42	0.00	0.00	0.00	0.00	1.00	1.264	2.598	(0.000)	(0.000)	0.997	(0.003)	1.000	(0.000)

Table 6 Continuation

Variable	Mean	S.D.	Min	Q1	Med	Q3	Max	Skewness-Kurtosis Test				Shapiro-Wilk Test		Shapiro-Francia Test	
								Skewness	Kurtosis	P-value	No adjust	Wilk	P-value	Francia W	P-value
Financials															
wcta	0.10	0.26	-1.56	-0.03	0.08	0.21	1.35	-0.009	7.122	(0.000)	(0.000)	0.942	(0.000)	0.941	(0.000)
Prof	0.10	0.19	-3.16	0.07	0.12	0.17	0.61	-6.076	75.930	(0.000)	(0.000)	0.607	(0.000)	0.605	(0.000)
tlta	0.61	0.26	0.00	0.46	0.61	0.74	2.43	1.017	7.285	(.)	(0.000)	0.949	(0.000)	0.948	(0.000)
FIRMS															
logda	5.46	1.92	0.65	4.21	5.38	6.87	10.19	-0.067	2.538	(0.000)	(0.000)	0.994	(0.000)	0.995	(0.000)
fage	36.90	33.44	1.00	9.00	22.00	62.00	124.00	0.894	2.531	(0.000)	(0.000)	0.862	(0.000)	0.865	(0.000)

1748 Firm –Years Observations.

Table 7: Composition of Sample Firms in Industry, Group and Year

	INDUSTRY CLASSIFICATION														
	1		2		3		4		5		6		SUB-TOTAL		
STATUS	NF	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF	F	PERCENT
YEAR END															
2011	0	0	19	0	8	0	1	0	0	0	0	0	28	0	7.82
2010	1	0	36	0	36	0	3	0	1	0	2	1	79	1	22.35
2009	0	2	1	2	1	5	0	1	0	0	0	0	2	10	3.35
2008	0	3	0	4	0	2	0	3	0	0	0	0	0	12	3.35
2007	0	0	23	4	21	4	2	1	2	1	2	1	50	11	17.04
2006	1	0	13	3	18	3	6	1	1	0	0	0	39	7	12.85
2005	1	1	8	3	9	1	5	0	0	0	2	0	25	5	8.38
2004	0	0	7	5	9	4	2	0	1	0	0	0	19	9	7.82
2003	1	0	6	4	12	1	1	3	0	0	1	0	21	8	8.10
2002	0	0	0	4	0	1	0	0	0	1	0	0	0	6	1.68
2001	0	0	0	5	0	4	0	0	0	0	0	0	0	9	2.51
2000	0	0	0	3	0	2	0	0	0	0	0	0	0	5	1.40
1999	0	0	0	4	0	3	0	1	0	0	0	0	0	8	2.23
1998	0	0	0	3	0	1	0	0	0	0	0	0	0	4	1.12
SUB-TOTAL	4	6	113	44	114	31	20	10	5	2	7	2	263	95	100.00
TOTAL	10		157		145		30		7		9		358		

KEY: *Industry classification: 1=Healthcare, 2=Consumer, 3=Industrial, 4=Technology, 5=Telecommunication, 6=Basic Materials. Status: NF-non-failed, F-failed*

The section proceeds as follows. Subsection 7.1.1 presents the demographics of the 358 firms in the study. Subsections 7.1.2 and 7.1.3 deal with board composition and structure of the sample firms, respectively. Subsection 7.1.4 describes the board functions, whereas the financial position is the focus of subsection 7.1.5. Subsection 7.1.6 reports the normality tests.

7.1.1 The Demographics of the Firms

The defining features of the 358 sample firms from the London Stock Exchange are the heavy skew in the distributions of firm size and age. On average the sample firms record an assets size of £5.46 million with a range of £0.65 to £10.19 million. This is slightly above Figures reported by Neophytou and Molinero (2004), but not Clarke, Ferris, Jayaraman, and Lee (2006) in the UK and US, respectively.

Firm age takes a value between 1 and 124, but has a cross-sectional average of 37 (median 22.0). In addition, 25% (75%) of the sample firms are at least 9 (62) years old, implying that the sample firms are relatively stable. This compares favourably to the 40% reported by Thornhill and Amit (2003) using Canadian dataset.

Table 7 contains the composition of the sample firms. It reports that the sample firms are mainly from six major fields of economic activities namely: Healthcare (10 firms), Consumer (157 firms), Industrial (145 firms), Technology (30 firms), Telecommunication (7 firms), and Basic Materials (9 firms). This suggests that majority (85%) of the companies in the sample are consumer (44%) and industrial (41%) firms.

7.1.2 The Board Composition

On average, the majority of directors (54%) on boards in the UK are non-employee directors, with three-quarters of 67%. This is slightly below the 58% and 69% reported in the US (Klein, 1998) and Australian (Kiel and Nicholson, 2003), respectively.

Turning to board gender diversity, 35% of firms in the sample have at least a female on their board. This is consistent with recent Figures reported by Sealy and Vinnicombe (2012). It also compares favourably to the 14%, 10% and 8% reported in the US by Hagendorff and Keasey (2012), Carter, Simkins, and Simpson (2003) and Adams and Ferreira (2009), respectively. Lastly, more than 75% of UK firms have a board size variable equal to nine. The distributions, however, are skewed; the minimum is 2, whereas the extreme case is 20. However, this is consistent with prior findings (e.g. Kiel and Nicholson, 2003).

7.1.3 The Board Structure

On average, 75%, 95%, and 96% of UK firms have nomination, audit, and remuneration committees, respectively, during the sample period, 1999-2011. These Figures are slightly below Klein's (1998) record for nomination (77.10%), audit (99.60%) and compensation (97.90%) committees' presence in the US. Another significant feature of board nomination (67%), audit (29%) and remuneration (30%) committees' composition is the predominance of non-independent directors.

On board standing committee meetings, on the average 39%, and 72% of the sample firms' nomination and remuneration committees, respectively, meet at least twice a year, relative to 59% of board audit committees that meet three times a year. Table 6 reports that majority of the sample firms' nomination (53%) and remuneration (72%) committees are chaired by an independent NED.

In addition, almost all boards have at least three independent NEDs serving on board standing committees. Specifically, table 6 shows an average of 63%, 59%, and 67% for nomination, audit and remuneration committees, respectively. Turning to board standing audit committee expertise, three-quarters of the sample firms have a financial and/or accounting expert serving on the board accountability committee. Overall, three-quarters of UK firms have a nomination, audit and remuneration committees' effectiveness variable equal to five, suggesting effective corporate board structure in the UK.

7.1.4 The Board Function

Table 6 indicates that the majority (54%) of the sample firms evaluate the CEO's performance annually. The distribution, however, is heavily skewed, while the average is 54%, the minimum, first-quarter and medium are all zero. The frequency of board meetings, also, is heavily skewed. For instance, firms on the average meet 8.71 times a year, but the range is 0 to 44 times, with a medium of 11 times.

Likewise, there is a heavy skew in the board government experience interlock. Put differently, the average is 0.23 but it ranges from zero to one, with a zero for minimum, first-quarter, medium, and third-quarters. On NED board interlock, on average 82% of outside directors of sample firms serve on at least a corporate board. The inclusion of the CEO, however, indicates a sharp drop to 65%, implying that 35% of the CEOs of the sample firms had no corporate board affiliations.

7.1.5 The Financials

Overall, the descriptive statistics of the financial variables (i.e. liquidity, profitability and capital structure) compare favourably with Figures reported in Japan (e.g. Xu and Zhang, 2009) and in the US (e.g. Shumway 2001). The liquidity ratio, however, is far below the figure reported by Shumway (2001).

The mean and medium values of financial leverage are both 0.61, suggesting that the sample firms are highly geared. The mean (median) values of liquidity and profitability are respectively, 0.10 (0.08) and 0.10 (0.12), implying that the sample firms hold less amount of liquid assets and are also less profitable. Table 6 depicts that the 25% (75%) of sample firms record -0.03 (0.21), 0.07 (0.17), and 0.46 (0.74) for liquidity, profitability and leverage, respectively, relative to the maximum of 1.35, 0.61 and 2.43. This indicates high skewness in the distribution of financial variables. This has set the scene for normality testing in the next section.

7.1.6 Normality Tests

I employ Skewness-Kurtosis[8] test, Shapiro-Wilk test[9], and Shapiro-Francia[10] test in STATA 12 for normality testing (see Royston, 1991). Park (2008) defines Skewness as the third standardized moment that measures the extent of symmetry of probability distribution. Thus, if Skewness is more than zero, the distribution is skewed to the right, implying more observations on the left and vice versa. Similarly, Kurtosis measures the thinness of tails of

[8] Perhaps and more importantly, Skewness-Kurtosis test is conceptually similar to the Jarque-Bera test (Park 2008), which is computed from Skewness and Kurtosis and asymptotically follows the chi-squared distribution with two degrees of freedom. By rule of thumb, normality is implied, when the Skewness and Kurtosis of a predictive variable are close to 0 and 3, respectively

[9] By rule of thumb, normality is implied, when the Shapiro-Wilk statistics is close to one. Shapiro-Wilk test, however, is valid for sample sizes ranging from 7 to 2000 (Shapiro and Wilk, 1965 and Royston, 1992)

[10] Stata (2005) recommends sample sizes 5 to 5000 for the Stata .sfrancia command.

probability distribution; it is based on the fourth central moment. Likewise, Shapiro and Wilk (1965) propose that Shapiro-Wilk W is the ratio of the best estimator of the variance to the usual corrected sum of squares estimator of the variance. Shapiro and Wilk (1972) and Royston (1983) develop the Shapiro-Francia W test, which is an approximation test that modifies the Shapiro-Wilk W. Table 6 contains the numerical results of the normality test, whereas Appendix 6 (see page 298) shows the P-P plots generated in STATA 12.

Largely, the numerical and graphical results show that the distribution of the observations of the operationalized variables differed from normal distribution. Precisely, the Shapiro-Wilk and Shapiro-Francia tests and both the Skewness-Kurtosis tests reject the null hypothesis that all the predictive variables are normally distributed at the 0.01 significance level. The graphical presentation in Appendix 6 supports the numerical findings but not firm size. In addition, the Shapiro-Wilk and Shapiro-Francia results are not consistent and thus, do not reject the null hypothesis of normality for some predictive variables (e.g. presence of female, nomination committees' size and meeting).

In contrast, both the Skewness-Kurtosis (S-K) adjustment and no adjustment show consistent results. This suggests that both S-K and the graphical method provide sufficient evidence that all the predictive variables are not normally distributed except firm size. This implies that the data violates the normality assumption; hence the use of Multivariate Discriminant Analysis may produce unreliable results (see Ohlson, 1980).

Lo (1986), however, shows that discriminant analysis and logit models produce similar results. Chava and Jarrow (2004), and Beaver, McNichol and Rhie (2005) seem to favour survival analysis over logit, but the cross sectional data is not suitable for the former (Sheppard, 1994). Consequently, the logit analysis is employed to test the hypotheses, as noted earlier in chapter 6. Thus, I invoke Lo's (1986) notion that logit analysis is more robust than discriminant analysis when dealing with samples which are not normally distributed. I turn next to the discussion of the multicollinearity tests.

7.2 MULTICOLLINEARITY TESTS

This section examines the possible degree of multicollinearity among the independent variables. Table 8 shows results of the variance inflation factors (VIF). Additionally, table 9 provides the Pearson and Spearman correlations between variables used in prediction of corporate failure, for the pooled data. (For the sake of brevity see Appendix 7 through to 11, pages 299-303, for the Spearman and Pearson correlation matrixes of the variables for sample firms for t – 1 through to t – 5). The discussion of the results of multicollinearity test is structured logically in three subheadings namely: board attributes, functions and corporate failure.

Table 8: Collinearity Diagnostic Test

Independent Variable	VIF	1/VIF
Ace	4.18	0.24
Rce	4.17	0.24
Nce	3.68	0.27
Logda	3.44	0.29
Dcpe	2.61	0.38
bint2	1.88	0.53
Bint	1.79	0.56
Bods	1.73	0.58
Tlta	1.56	0.64
Wcta	1.49	0.67
Fmale	1.23	0.81
Prof	1.16	0.86
Bodm	1.12	0.89
Fage	1.11	0.90
bint3	1.07	0.93
Mean VIF	2.15	

Table 9: Correlation Matrix: This table shows the unconditional correlations coefficients and significant levels between variables employed in the corporate failure prediction. Pearson correlation is shown below and to the left of the diagonal; above and left is Spearman correlation. The lower diagonal refers to Pearson correlations, while the upper diagonal refers to Spearman rank correlations. To conserve space the p-values are available on request. * denotes significance at 0.01 levels.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. stat1		-0.35*	-0.14*	-0.37*	-0.47*	-0.42*	-0.14*	-0.28*	-0.44*	-0.34*	-0.53*	-0.32*	-0.34*	-0.41*	-0.39*	-0.46*
2. bodc	-0.36*		0.23*	0.25*	0.54*	0.41*	0.29*	0.37*	0.50*	0.33*	0.53*	0.26*	0.34*	0.50*	0.28*	0.44*
3. fmale	-0.14*	0.22*		0.35*	0.32*	0.20*	0.18*	0.16*	0.24*	0.25*	0.35*	0.16*	0.22*	0.31*	0.22*	0.26*
4. bods	-0.36*	0.24*	0.34*		0.50*	0.47*	0.19*	0.24*	0.42*	0.41*	0.57*	0.25*	0.34*	0.52*	0.34*	0.47*
5. nce	-0.48*	0.56*	0.31*	0.47*		0.73*	0.65*	0.69*	0.78*	0.71*	0.73*	0.31*	0.51*	0.59*	0.43*	0.64*
6. ncp	-0.42*	0.44*	0.2*	0.44*	0.77*		0.40*	0.49*	0.53*	0.45*	0.59*	0.37*	0.39*	0.48*	0.45*	0.50*
7. nci	-0.12*	0.29*	0.16*	0.16*	0.62*	0.39*		0.42*	0.46*	0.26*	0.35*	0.15*	0.31*	0.28*	0.21*	0.25*
8. ncci	-0.28*	0.38*	0.16*	0.2*	0.69*	0.49*	0.41*		0.49*	0.31*	0.42*	0.24*	0.39*	0.30*	0.28*	0.35*
9 .ncs	-0.44*	0.52*	0.24*	0.37*	0.79*	0.53*	0.45*	0.49*		0.44*	0.64*	0.27*	0.46*	0.58*	0.34*	0.55*
10. ncm1	-0.34*	0.34*	0.25*	0.38*	0.69*	0.45*	0.24*	0.31*	0.44*		0.53*	0.17*	0.33*	0.43*	0.29*	0.50*
11. ace	-0.55*	0.56*	0.34*	0.51*	0.74*	0.63*	0.32*	0.45*	0.65*	0.51*		0.38*	0.72*	0.80*	0.62*	0.80*
12. acp	-0.32*	0.33*	0.16*	0.23*	0.32*	0.37*	0.15*	0.24*	0.27*	0.17*	0.49*		0.33*	0.22*	0.33*	0.27*
13. aci	-0.34*	0.37*	0.22*	0.29*	0.52*	0.39*	0.28*	0.39*	0.46*	0.33*	0.75*	0.33*		0.51*	0.31*	0.42*
14. acs	-0.41*	0.50*	0.31*	0.47*	0.60*	0.48*	0.25*	0.30*	0.57*	0.42*	0.78*	0.22*	0.51*		0.32*	0.52*
15. acx	-0.39*	0.31*	0.22*	0.32*	0.44*	0.45*	0.20*	0.28*	0.34*	0.29*	0.66*	0.33*	0.31*	0.32*		0.39*
16. acm1	-0.46*	0.46*	0.26*	0.43*	0.65*	0.50*	0.23*	0.35*	0.55*	0.50*	0.78*	0.27*	0.42*	0.52*	0.39*	
17. rce	-0.59*	0.55*	0.29*	0.45*	0.76*	0.64*	0.35*	0.51*	0.66*	0.50*	0.84*	0.50*	0.69*	0.65*	0.47*	0.62*
18. rcp	-0.31*	0.34*	0.15*	0.22*	0.31*	0.36*	0.15*	0.23*	0.25*	0.17*	0.47*	0.92*	0.31*	0.21*	0.31*	0.26*
19. rci	-0.34*	0.36*	0.18*	0.23*	0.52*	0.40*	0.30*	0.44*	0.46*	0.30*	0.63*	0.32*	0.78*	0.44*	0.28*	0.37*
20.rcci	-0.61*	0.34*	0.20*	0.30*	0.44*	0.42*	0.12*	0.23*	0.38*	0.35*	0.53*	0.32*	0.36*	0.39*	0.38*	0.41*
21. rcs	-0.40*	0.51*	0.27*	0.40*	0.68*	0.53*	0.36*	0.44*	0.66*	0.42*	0.71*	0.27*	0.55*	0.73*	0.34*	0.52*
22. rcm1	-0.42*	0.4*	0.23*	0.41*	0.66*	0.55*	0.29*	0.42*	0.53*	0.48*	0.62*	0.32*	0.40*	0.46*	0.39*	0.58*
23. dcpe	-0.47*	0.45*	0.31*	0.45*	0.74*	0.51*	0.21*	0.32*	0.51*	0.53*	0.63*	0.21*	0.38*	0.53*	0.34*	0.63*
24.bodm	0.00	0.08*	0.02	0.03	0.2*	0.17*	0.09*	0.15*	0.18*	0.15*	0.16*	0.07*	0.12*	0.08*	0.09*	0.18*
25. bint	-0.32*	0.40*	0.17*	0.22*	0.45*	0.45*	0.21*	0.35*	0.36*	0.27*	0.44*	0.29*	0.34*	0.28*	0.28*	0.38*
26. bint2	-0.28*	0.50*	0.22*	0.28*	0.49*	0.41*	0.24*	0.34*	0.42*	0.30*	0.45*	0.21*	0.35*	0.33*	0.27*	0.40*
27. bint3	-0.14*	0.07*	0.02	0.14*	0.14*	0.13*	0.16*	0.07*	0.14*	0.07*	0.11*	0.03	0.09*	0.09*	0.08*	0.07*
28. wcta	0.01	-0.02	-0.12*	-0.14*	-0.10*	-0.08*	-0.06*	-0.06	-0.06	-0.08*	-0.08*	0.01	-0.06	-0.04	-0.09*	-0.08*
29. prof	-0.38*	0.08*	0.09*	0.17*	0.21*	0.16*	0.05	0.17*	0.2*	0.15*	0.28*	0.19*	0.18*	0.21*	0.2*	0.21*
30. tlta	-0.05	0.11*	0.12*	0.18*	0.18*	0.15*	0.08*	0.10*	0.12*	0.12*	0.13*	0.02	0.05	0.09*	0.11*	0.15*
31.logda	-0.59*	0.53*	0.34*	0.61*	0.71*	0.60*	0.23*	0.37*	0.56*	0.56*	0.72*	0.33*	0.45*	0.59*	0.44*	0.66*
32. fage	-0.15*	0.02	-0.09*	0.09*	0.02	0.07*	-0.08*	-0.02	0.03	0.03	0.08*	0.02	0.04	0.06	0.04	0.09*

TABLE 9: CONTINUATION

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1. stat1	-0.57*	-0.31*	-0.34*	-0.61*	-0.40*	-0.42*	-0.48*	-0.03	-0.32*	-0.28*	-0.14*	0.02	-0.38*	-0.06	-0.58*	-0.16*
2. bodc	0.49*	0.26*	0.32*	0.32*	0.50*	0.38*	0.46*	0.09*	0.37*	0.49*	0.07*	-0.06	0.04	0.15*	0.53*	0.04
3. fmale	0.30*	0.15*	0.18*	0.20*	0.27*	0.23*	0.32*	0.00	0.17*	0.22*	0.02	-0.18*	0.05	0.15*	0.33*	-0.07*
4. bods	0.50*	0.24*	0.27*	0.34*	0.46*	0.43*	0.50*	0.06	0.25*	0.30*	0.17*	-0.2*	0.15*	0.17*	0.63*	0.09*
5. nce	0.75*	0.30*	0.51*	0.44*	0.67*	0.64*	0.75*	0.21*	0.43*	0.48*	0.14*	-0.13*	0.19*	0.21*	0.71*	0.00
6. ncp	0.61*	0.36*	0.40*	0.42*	0.53*	0.55*	0.53*	0.17*	0.45*	0.41*	0.13*	-0.09*	0.16*	0.17*	0.61*	0.07*
7. nci	0.37*	0.15*	0.33*	0.15*	0.36*	0.29*	0.24*	0.09*	0.22*	0.25*	0.15*	-0.07*	0.08*	0.10*	0.25*	-0.08*
8. ncci	0.49*	0.23*	0.44*	0.23*	0.44*	0.42*	0.32*	0.18*	0.35*	0.34*	0.07*	-0.06*	0.14*	0.12*	0.36*	-0.04
9. ncs	0.66*	0.25*	0.46*	0.38*	0.66*	0.53*	0.53*	0.19*	0.36*	0.42*	0.14*	-0.07*	0.14*	0.15*	0.57*	0.03
10. ncm1	0.53*	0.17*	0.30*	0.35*	0.42*	0.48*	0.54*	0.15*	0.27*	0.3*	0.07*	-0.12*	0.15*	0.15*	0.57*	0.02
11. ace	0.81*	0.36*	0.61*	0.51*	0.70*	0.62*	0.69*	0.15*	0.42*	0.45*	0.11*	-0.14*	0.25*	0.19*	0.75*	0.07*
12. acp	0.37*	0.92*	0.32*	0.32*	0.27*	0.32*	0.22*	0.06*	0.29*	0.21*	0.03	0.02	0.2*	0.03	0.30*	0.04
13. aci	0.68*	0.31*	0.78*	0.36*	0.55*	0.40*	0.39*	0.12*	0.34*	0.35*	0.09*	-0.08*	0.19*	0.08*	0.45*	0.01
14. acs	0.68*	0.21*	0.44*	0.39*	0.73*	0.46*	0.55*	0.07*	0.28*	0.33*	0.09*	-0.08*	0.20*	0.12*	0.61*	0.06
15. acx	0.44*	0.32*	0.28*	0.38*	0.34*	0.39*	0.36*	0.08*	0.28*	0.27*	0.08*	-0.11*	0.20*	0.13*	0.43*	0.06
16. acm1	0.63*	0.26*	0.37*	0.41*	0.52*	0.58*	0.66*	0.18*	0.38*	0.4*	0.07*	-0.11*	0.19*	0.19*	0.68*	0.10*
17. rce		0.37*	0.74*	0.69*	0.79*	0.73*	0.65*	0.21*	0.44*	0.48*	0.14*	-0.09*	0.24*	0.15*	0.70*	0.03
18. rcp	0.52*		0.31*	0.34*	0.25*	0.34*	0.21*	0.10*	0.33*	0.22*	0.03	0.00	0.17*	0.03	0.30*	0.05
19. rci	0.76*	0.31*		0.36*	0.55*	0.39*	0.35*	0.16*	0.36*	0.37*	0.1*	-0.08*	0.2*	0.11*	0.41*	-0.03
20. rcci	0.70*	0.34*	0.36*		0.37*	0.40*	0.43*	0.03	0.33*	0.3*	0.11*	-0.05	0.26*	0.09*	0.5*	0.09*
21. rcs	0.79*	0.25*	0.55*	0.37*		0.50*	0.54*	0.14*	0.38*	0.45*	0.12*	-0.05	0.16*	0.08*	0.58*	0.05
22. rcm1	0.75*	0.34*	0.39*	0.40*	0.50*		0.57*	0.31*	0.34*	0.35*	0.11*	-0.02	0.14*	0.14*	0.58*	0.03
23. dcpe	0.59*	0.20*	0.34*	0.40*	0.52*	0.55*		0.17*	0.32*	0.4*	0.08*	-0.15*	0.2*	0.24*	0.74*	0.05
24. bodm	0.20*	0.12*	0.16*	0.02	0.15*	0.28*	0.15*		0.06*	0.09*	0.04	-0.10*	-0.06	0.15*	0.16*	-0.08*
25. bint	0.48*	0.33*	0.36*	0.33*	0.38*	0.34*	0.31*	0.08*		0.62*	0.17*	-0.06	0.06*	0.12*	0.4*	0.01
26. bint2	0.49*	0.22*	0.37*	0.30*	0.45*	0.35*	0.38*	0.08*	0.62*		0.18*	-0.08*	0.04	0.21*	0.44*	0.00
27. bint3	0.14*	0.03	0.10*	0.11*	0.12*	0.11*	0.07*	0.02	0.17*	0.18*		0.00	0.04	-0.02	0.08*	0.01
28. wcta	-0.04	0.00	-0.07*	-0.04	-0.02	0.00	-0.09*	-0.16*	-0.06	-0.05	0.01		0.00	-0.49*	-0.21*	0.15*
29.prof	0.27*	0.19*	0.20*	0.24*	0.18*	0.15*	0.17*	-0.04	0.08*	0.06*	-0.03	-0.03		0.04	0.18*	0.05
30. tlta	0.10*	0.02	0.08*	0.06*	0.05	0.11*	0.19*	0.19*	0.10*	0.18*	-0.02	-0.56*	0.04		0.24*	-0.08*
31. logda	0.68*	0.33*	0.42*	0.50*	0.56*	0.57*	0.69*	0.14*	0.39*	0.44*	0.08*	-0.12*	0.31*	0.16*		0.16*
32. fage	0.06*	0.03	0.00	0.09*	0.06	0.04	0.04	-0.07*	0.01	0.02	0.03	0.10*	0.11*	-0.09*	0.18*	

7.2.1 Board Attributes

Largely, the results suggest numerous issues of multicollinearity in the first instance. Simply put, most of the corporate governance variables are highly correlated, implying that these variables reflect the same governance information of an entity. For instance, there are significant positive correlations between nomination (nce), audit (ace) and remuneration (rce) committees' effectiveness: the Pearson (Spearman) rank correlations range from 0.74(0.73) to 0.84(0.75). These variables measure board structure. The levels of tolerance from the VIF collinearity test, however, are all above 0.20, with the prevalent VIF of 4.18. This suggests that multicollinearity is not an issue (see Menard, 1995) as the first glance of the correlation matrix might seem.

There are, also, no multicollinearity issues with board composition variables. The Pearson and Spearman correlations of the three variables namely: proportion of outside directors, presence of female directors, and size of board, are not highly correlated. The prevalent absolute value of the correlation is 0.34 (0.35), which occurs between board size and presence of female directors. As anticipated, board size has a significant and positive relationship to both presence of female directors and proportion of outside directors.

Similarly, the results indicate significantly positive and high correlations between firm size and the main independent variables (i.e. proportion of outside directors, size of board, nomination, audit and remuneration committees' effectiveness) but not presence of female director. The dominant absolute value of the correlation is 0.72 (0.75), which occurs between firm size and audit committee effectiveness, suggesting the presence of multi-collinearity. The level of tolerance from the VIF collinearity test, however, suggests otherwise, at 0.29. Finally, as predicted, board attributes variables are statistically significant and positively correlated with firm's profitability and financial leverage but negatively correlated with firm's liquidity.

7.2.2 Board Functions

The multi-collinearity test on board functions reveals four significant issues that merit attention. First, frequency of board meetings has marginally significant positive correlations with proportion of outside directors, board size, nomination, audit and remuneration committees' effectiveness, but not the presence of female directors.

Second, the correlations between CEO's performance evaluation (dcpe) and nomination, audit and remuneration committees' effectiveness are quite high: the Pearson (Spearman) rank correlations are 0.74 (0.75), 0.63 (0.69) and 0.59 (0.65), respectively. This suggests the presence of multi-collinearity between CEO's performance evaluation and board monitoring committees. Therefore, I exclude the CEO's performance evaluation and, in this way, opt for frequency of board meetings and its interactions with board attributes in testing the interaction terms of corporate governance on corporate failure.

Third, non-executive director interlock is positively and significantly associated with board interlock (i.e. CEO inclusive) but marginally significant with former government official. The Pearson (Spearman) rank correlations are 0.62 (0.62) and 0.17 (0.18). These variables measure board resource function. Table 8 also, shows that the tolerance level (0.93) of former government official is quite high, relative to the 0.56 and 0.53 recorded by non-executive director and board interlocks, respectively. For this reason, I exclude the aforementioned interlocks and opt for the former government official measure in testing the intereaction effects of corporate governance on corporate failure.

Fourth, table 9 indicates that there is limited multicollinearity issue between board monitoring and resource function variables. The Pearson and Spearman correlations of the two board monitoring variables (i.e. CEO's performance evaluation, frequency of board meetings) and the three board resource function measures (i.e. non-executive director interlock, board interlock and former government official), are not highly correlated. The highest value of the correlation is 0.38 (0.40), which occurs between board interlock and CEO's performance evaluation. Nonetheless, the three board resource variables have a statistically significant and positive relationship to both the board monitoring variables.

7.2.3 Corporate Failure

For *t* - 1, *t* - 3, *t* - 4 and pooled firms' sample (see Appendix 7, 9, 10 and table 9), corporate failure is significantly negative correlated with proportion of outside directors, presence of female directors, size of board, CEO's performance evaluation, board interlocks, profitability, financial leverage, firm size, firm age, nomination, audit and remuneration committees' effectiveness. Corporate failure, however, exhibits an insignificantly positive correlation with frequency of board meetings but negative correlation with firms' liquidity position, in *t* - 1. In contrast, corporate failure exhibits an insignificantly positive correlation with liquidity and frequency of board meetings, but negative correlation with firm's gearing position, in *t* - 3, *t* - 4 and the pooled firms' sample.

For *t* - 2 and *t* - 5 firms' sample (see Appendix 8 and 11, pages 300-303), corporate failure is significantly and negatively related to proportion of outside directors, presence of female directors, board size, CEO's performance evaluation, directors' interlock, profitability, firm size, age, nomination, audit and remuneration committees' effectiveness, but not frequency of board meetings, liquidity and leverage. The result on frequency of board meetings, however, is at variance with predictions from theory. The prevalent absolute value of the correlation is 0.01 (0.03), which occurs between frequency of board meeting and corporate failure in *t* - 1. This may suggest that corporate failure is not related to frequency of board meetings. I turn next to the univariate analysis.

7.3 UNIVARIATE ANALYSIS

This section examines the possible differences between the two mutually exclusive groups, failed and non-failed. The aim is twofold. First, univariate analysis provides a preliminary assessment of the hypotheses. Second, I assess the predictive power of each variable using univariate logistic regression analysis. Accordingly, the univariate analysis is organised under two sub-sections. Sub-section 7.3.1 presents the profile analysis, and sub-section 7.3.2 reports the univariate logit analysis.

7.3.1 Profile Analysis of Failed and Non-failed Firms

I calculate descriptive statistics (i.e. mean, standard deviations, minimum and maximum) of the two mutually exclusive groups of firms; failed and non-failed firms. The aim is to identify potential differences in the mean values among the two groups. Thus, I seek preliminary evidence on how the composition and structure of corporate board relates to firm's failure. To achieve this aim I use t-test[11] to compare the means of the failed and non-failed groups. Table 10 reports the means, standard deviations and t -statistics for sample firms for years one (*t* – 1), two (*t* – 2), three (t – 3), four (*t* – 4), and five (*t* – 5) prior failure as well as the pooled coss-sectional data. Figures 12 to 27 also display the trend of variables used in the study (see Appendix 12, pages 304-307), the analysis of which I turn.

Table 10 shows several differences between failed and non-failed firms' corporate governance proxies and financial indicators. The boards of failed firms are significantly lower (6.08 directors versus 7.93), with less proportion of outsider directors (0.45 versus 0.57) fewer female directors (0.23 versus 0.39), ineffective board structures, lesser board monitoring (0.09 versus 0.71) and fewer director interlocks (0.62 versus 0.89). Figures 11 to 20 also depict that boards of failed firms reveal a decreasing trend in several variables (e.g. presence of female directors, liquidity and profitability) as far as three years prior to failure, whereas that of the non-failed counterparts increase (see Appendix 12, pages 304-307). Failed firms, for example, record a deteriorating profitability from years four to one prior to failure of 0.34, -0.01, -0.03, -0.10. These results are consistent with predictions of theory (i.e. agency, and resource dependency) and prior findings (e.g. Charitou, Neophytou and Charalambous, 2004; Platt and Platt, 2012).

[11] I compute standard t-test for the continuous variables, whereas the prtest (test of proportion) is computed for the binary variables, using STATA 12

Table 10: Profile Analysis of Sample Firms

YEAR	*t* - 1		*t* - 2		*t* - 3		*t* - 4		*t* - 5		POOLED DATA	
VARIABLES	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Board Independence	0.585	0.140	0.577	0.140	0.570	0.147	0.574	0.144	0.559	0.150	0.573	0.144
	(0.456)	(0.143)	(0.453)	(0.145)	(0.442)	(0.149)	(0.436)	(0.162)	(0.440)	(0.167)	(0.445)	(0.153)
	7.59***		7.24***		7.21***		7.55***		6.29***		16.02***	
Gender Diversity	0.438	0.497	0.415	0.494	0.377	0.486	0.361	0.481	0.355	0.480	0.390	0.488
	(0.194)	(0.397)	(0.237)	(0.427)	(0.274)	(0.448)	(0.231)	(0.424)	(0.233)	(0.425)	(0.234)	(0.424)
	4.19***		3.06***		1.81*		2.27**		2.13**		6.03***	
Board Size	7.854	2.050	7.942	2.227	7.977	2.317	7.863	2.314	7.996	2.356	7.926	2.252
	(5.634)	(1.693)	(5.935)	(1.607)	(6.263)	(1.613)	(6.176)	(1.644)	(6.411)	(1.835)	(6.082)	(1.694)
	9.36***		7.97***		6.64***		6.40***		5.79***		16.04***	
Nomination Committee	4.088	1.842	3.946	1.920	3.809	1.926	3.635	1.927	3.418	1.850	3.781	1.905
	(1.484)	(1.704)	(1.430)	(1.766)	(1.453)	(1.815)	(1.484)	(1.822)	(1.422)	(1.774)	(1.455)	(1.769)
	11.93***		11.06***		10.35***		9.27***		8.90***		22.94***	
Audit Committee	4.219	1.183	4.171	1.194	4.086	1.186	4.051	1.204	3.969	1.198	4.100	1.194
	(2.204)	(1.395)	(2.247)	(1.412)	(2.263)	(1.482)	(2.297)	(1.410)	(2.211)	(1.285)	(2.245)	(1.394)
	13.42***		12.67***		11.93***		11.39***		11.75***		27.36***	
Remuneration Committee	4.358	1.036	4.341	1.059	4.276	1.096	4.235	1.126	4.156	1.154	4.274	1.095
	(2.323)	(1.483)	(2.280)	(1.462)	(2.274)	(1.498)	(2.330)	(1.469)	(2.333)	(1.402)	(2.307)	(1.458)
	14.40***		14.46***		13.71***		12.74***		12.15***		30.16***	
CEO Evaluation	0.854	0.522	0.783	0.564	0.704	0.550	0.647	0.589	0.539	0.579	0.706	0.571
	(0.086)	(0.282)	(0.097)	(0.297)	(0.095)	(0.329)	(0.110)	(0.348)	(0.078)	(0.269)	(0.093)	(0.305)
	13.50***		11.17***		10.14***		8.19***		7.28***		21.97***	
Board Meeting	8.704	2.829	8.817	3.172	8.790	2.837	8.745	2.754	8.539	2.994	8.719	2.918
	(8.957)	(4.147)	(8.731)	(4.399)	(8.484)	(3.640)	(8.319)	(3.645)	(8.967)	(6.005)	(8.690)	(4.429)
	-0.65		0.20		0.83		1.16		-0.87		0.16	
NED Interlock	0.904	0.295	0.907	0.291	0.903	0.297	0.878	0.327	0.879	0.327	0.894	0.308
	(0.645)	(0.481)	(0.677)	(0.470)	(0.653)	(0.479)	(0.571)	(0.498)	(0.544)	(0.501)	(0.619)	(0.486)
	5.78***		5.26***		5.61***		6.26***		6.72***		13.25***	

KEY: Failed firms' descriptive statistics in parentheses. ***,** and * denote t-statistics significant at 1%, 5% and 10%, respectively

TABLE 10: -CONTINUATION

YEAR	*t* – 1		*t* - 2		*t* - 3		*t* - 4		*t* - 5		POOLED DATA	
VARIABLES	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
BOD Interlock	0.754	0.429	0.740	0.439	0.732	0.444	0.710	0.455	0.699	0.459	0.728	0.445
	(0.441)	(0.499)	(0.462)	(0.501)	(0.453)	(0.500)	(0.407)	(0.494)	(0.378)	(0.488)	(0.429)	(0.495)
	5.69***		4.88***		4.89***		5.14***		5.39***		11.56***	
Former Gov't Official	0.277	0.448	0.279	0.449	0.268	0.444	0.267	0.443	0.246	0.432	0.267	0.443
	(0.108)	(0.311)	(0.108)	(0.311)	(0.158)	(0.367)	(0.154)	(0.363)	(0.156)	(0.365)	(0.136)	(0.344)
	3.32***		3.35***		2.16***		2.17**		1.78*		5.72***	
Liquidity	0.101	0.210	0.106	0.214	0.092	0.223	0.096	0.205	0.096	0.223	0.098	0.215
	(0.030)	(0.404)	(0.106)	(0.316)	(0.136)	(0.312)	(0.163)	(0.292)	(0.082)	(0.405)	(0.103)	(0.350)
	2.15**		0.02		-1.46		-2.38**		0.39		-0.37	
Profitability	0.140	0.077	0.137	0.079	0.137	0.084	0.140	0.096	0.145	0.087	0.140	0.085
	(-0.104)	(0.352)	(-0.028)	(0.400)	(-0.009)	(0.244)	(0.036)	(0.207)	(0.001)	(0.301)	(-0.021)	(0.311)
	10.54***		6.32***		8.39***		6.38***		6.92***		16.94***	
Leverage	0.611	0.200	0.621	0.219	0.633	0.228	0.614	0.233	0.622	0.246	0.620	0.226
	(0.684)	(0.369)	(0.590)	(0.290)	(0.543)	(0.276)	(0.530)	(0.271)	(0.616)	(0.398)	(0.593)	(0.328)
	-2.38**		1.06		3.07***		2.82***		0.18		1.98**	
Firm Size	6.251	1.499	6.171	1.524	6.156	1.595	6.098	1.606	6.045	1.649	6.144	1.574
	(3.457)	(1.494)	(3.649)	(1.449)	(3.576)	(1.485)	(3.642)	(1.404)	(3.523)	(1.483)	(3.569)	(1.459)
	15.44***		13.86***		13.77***		12.93***		12.81***		30.73***	
Firm Age	41.462	34.863	40.523	34.959	39.677	34.940	39.169	34.807	38.273	34.746	39.827	34.827
	(30.280)	(27.858)	(29.559)	(27.843)	(28.158)	(27.690)	(28.154)	(27.858)	(27.611)	(27.743)	(28.760)	(27.696)
	2.79**		2.73***		2.89***		2.72***		2.63***		6.17***	
Observations		260		258		257		255		256	1286	
		(93)		(93)		(95)		(91)		(90)	462	

KEY: Failed firms' descriptive statistics in parentheses. ***,** and * denote t-statistics significant at 1%, 5% and 10%, respectively

The test of difference between the mean of liquidity ratio of failed and that of non-failed firms, however, suggests mixed results. First, there is no significant relationships between liquidity position of failed and non-failed firms for years two, three, five and the pooled sample. Thus, this study cannot reject the null hypothesis for years two, three and five. Second, failed firms exhibit statistically significantly higher liquidity position for year four prior failure (0.16 verses 0.10). Failed firms, however, exhibit statistically significantly lower liquidity position for year one prior failure (0.03 verses 0.10). This suggests that the liquidity position is crucial in the penultimate year of firm's failure. Overall, the failed firms record a deterioriating liquidity position from year four to one prior failure of 0.16, 0.14, 0.11 and 0.03.

The means of the CEO performance evaluation, nomination and remuneration committees' effectiveness as well as proportion of outside directors for the non-failed firms show an increasing trend from years four to one prior to failure, whereas that of their failed counterparts remain relatively stable (see Appendix 12, Figures 20-23). As expected non-failed firms exhibit statistically significant higher assets size (6.14 verses 3.57) and firm age (39.8 verses 28.76) than failed firms. This verifies prior findings (e.g. Ohlson, 1980; Gales and Kesner, 1994; Thornhill and Amit 2003).

The results show no significant differences between the frequency of board meeting of failed and non-failed firms. The means of the frequency of board meetings for the non-failed firms, however, show a decreasing trend from years four to one prior to failure, whereas those of their failed counterparts increase (see Appendix 12, Figure 23). Thus, this study cannot reject the null hypothesis. This indicates that boards of non-failed firms are relatively inactive, implying board meeting is used as a fire-fighting device (Jensen, 1993; Vafeas, 1999a).

The test of difference between the mean of leverage position of failed and that of non-failed firms suggests mixed results. First, non-failed firms exhibit significant higher financial leverage ratio for years three, four and pooled sample data in relation to their non-failed counterparts. Second, and in contrast, failed firms exhibit statistically significant higher financial leverage ratio in the penultimate year to failure, relative to their non-failed counterparts (0.68 versus 0.61). Third, the results show no statistical significance between the means of financial leverage of failed and non-failed firms for years two and five prior failue.

Finally, the failed firms record an increasing financial leverage from years four to one prior failure of 0.53, 0.54, 0.59 and 0.68; whereas the non-failed counterparts' gearing position remains relatively stable at 0.61, 0.63, 0.62 and 0.61 (see also Appendix 12, Figure 24). This confirms prior empirical findings (e.g. Daily and Dalton, 1994a; Charitou, Neophytou and Charalambous, 2004), suggesting that financial leverage is positively related to the likelihood of corporate failure.

Overall, the profile analysis indicates that failed firms are characterised by lower governance attributes with increasing financial leverage and weakening profitability and liquidity position compared to their non-failed counterparts. The findings, however, are constrained by limitations of the statistical analysis employed (i.e. t-test). First, t-test compares group means, assuming the predictive variable of interest follows a normal probability distribution (Park, 2008). In this respect, the analysis reported in sub-section 7.1.6 indicates that the data violates the normality assumption, implying that the findings may not be reliable. Second, the t-test fails to answer the question of how each variable contributes to failure (Sheppard, 1995). For these reasons, I turn to the univariate logit analysis, in the next section.

7.3.2 Univariate Logit Analysis

Table 11 reports extract of the univariate logit results. Specifically, table 11 contains the marginal effects, t - statistics, McFadden's r–squared (hereafter, pseudo r-squared) and overall accuracy for t - 1, t – 2, t - 3, t – 4 and t - 5 sample periods, as well as the pooled data. Following Uysal (2011), I report the marginal effects of the univariate logit model due in part to difficulty of interpreting the coefficient of logit estimations.

Table 11: Univariate Analysis Results

YEAR variables	*t* - 1 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t* - 2 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t* - 3 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t* - 4 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t* - 5 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	Pooled Marginal effects T-Statistics Pseudo r-squared Overall accuracy
Independence	-1.003***	-0.961***	-0.928***	-0.951***	-0.804***	-0.925***
	-8.22	-7.83	-7.77	-8.14	-6.60	-17.11
	0.125	0.114	0.112	0.126	0.090	0.112
	76%	75%	75%	77%	76%	76%
Gender Diversity	-0.218***	-0.157***	-0.093*	-0.121**	-0.113***	-0.141***
	-4.33	-3.12	-1.83	-2.29	-2.15	-6.12
	0.046	0.024	0.008	0.014	0.012	0.019
	74%	74%	73%	74%	74%	74%
Board Size	-0.101***	-0.088***	-0.076***	-0.075***	-0.068***	-0.082***
	-11.43	-9.18	-7.31	-6.93	-6.18	-17.88
	0.214	0.162	0.114	0.111	0.093	0.135
	78%	76%	74%	74%	75%	76%
Nomination Committee	-0.090***	-0.089***	-0.087***	-0.085***	-0.088***	-0.088***
	-17.90	-15.39	-13.77	-11.40	-10.60	-29.94
	0.264	0.241	0.214	0.185	0.176	0.214
	80%	79%	78%	79%	79%	79%
Audit Committee	-0.125***	-0.124***	-0.124***	-0.125***	-0.133***	-0.126***
	-18.02	-16.44	-15.44	-14.39	-14.82	-35.26
	0.299	0.276	0.251	0.242	0.261	0.265
	80%	79%	78%	79%	78%	79%
Remuneration Committee	-0.129***	-0.129***	-0.127***	-0.124***	-0.125***	-0.127***
	-17.43	-17.82	-17.69	-16.27	-15.18	-37.96
	0.323	0.326	0.301	0.278	0.262	0.297
	81%	80%	80%	81%	80%	80%
CEO Evaluation	-0.419***	-0.415***	-0.419***	-0.374***	-0.394***	-0.413***
	-21.84	-13.67	-11.11	-8.37	-6.74	-23.31
	0.367	0.284	0.239	0.176	0.149	0.234
	82%	76%	73%	74%	74%	74%
Meeting	0.005	-0.001	0.006	-0.009	0.005	0.000
	0.65	-0.20	-0.83	-1.16	0.87	-0.16
	0.001	0.000	0.002	0.003	0.002	0.000
	74%	74%	73%	74%	74%	74%

*, ** and *** stand for significance at 10%, 5% and 1%, respectively.

Table 11: Continuation 1 of 1

YEAR variables	*t* - 1 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t*- 2 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t*- 3 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t*- 4 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	*t*- 5 Marginal effects T-Statistics Pseudo r-squared Overall accuracy	ALL Marginal effects T-Statistics Pseudo r-squared Overall accuracy
NED Interlock	-0.289***	-0.275***	-0.287***	-0.290***	-0.302***	-0.289***
	-6.47	-5.74	-6.26	-7.33	-8.13	-15.07
	0.073	0.061	0.069	0.089	0.103	0.078
	76%	74%	75%	76%	77%	76%
BOD Interlock	-0.247***	-0.218***	-0.219***	-0.228***	-0.237***	-0.228***
	-6.35	-5.34	-5.37	-5.70	-6.03	-12.84
	0.074	0.056	0.056	0.065	0.072	0.064
	74%	74%	73%	74%	74%	74%
Former Government Official	-0.217***	-0.220***	-0.131**	-0.133**	-0.109*	-0.160***
	-3.30	-3.34	-2.17	-2.18	-1.78	-5.74
	0.030	0.031	0.012	0.013	0.008	0.018
	74%	74%	73%	74%	74%	74%
Liquidity	-0.181**	-0.002	-0.136	0.233**	-0.032	0.015
	-2.16	-0.02	-1.47	2.40	-0.39	0.37
	0.011	0.000	0.005	0.014	0.000	0.000
	74%	74%	73%	73%	74%	74%
Profitability	-1.746***	-1.437***	-1.305***	-1.034***	-1.153***	-1.322***
	-8.46	-7.33	-6.98	-5.64	-6.17	-15.49
	0.306	0.162	0.156	0.093	0.127	0.162
	85%	80%	80%	77%	78%	80%
Leverage	0.208**	-0.106	0.306***	-0.293***	-0.014	-0.083**
	2.38	-1.07	-3.13	-2.86	-0.18	-1.98
	0.013	0.003	0.024	0.021	0.000	0.002
	74%	74%	73%	74%	74%	74%
Firm Size	-0.134***	-0.137***	-0.135***	-0.132***	-0.123***	-0.132***
	-20.12	-17.81	-17.30	-16.76	-16.64	-39.72
	0.444	0.381	0.373	0.350	0.341	0.376
	89%	87%	85%	83%	83%	85%
Firm Age	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	-2.80	-2.74	-2.91	-2.74	-2.64	-6.18
	0.020	0.019	0.021	0.020	0.018	0.020
	74%	74%	73%	74%	74%	74%

*, ** and *** stand for significance at 10%, 5% and 1%, respectively.

The results indicate that firm size consistently dominates all other variables in predicting failure. Explicitly, it records a predictive accuracy (pseudo r -squared), of 83% (34%) and 89% (44%) for years five and one prior failure, respectively. This is consistent with the prediction of resource dependency theory, suggesting that firm size can enhance a firm's legitimacy to access critical resources (e.g. capital), thereby reducing the likelihood of firm's failure. As well, the result verifies prior studies (e.g. Moulton and Thomas 1993 and Sine, Mitsuhashi, and Kirsch 2006).

Table 11 provides that board composition (i.e. independence, gender diversity and size), board structure (i.e. appointment, accountability and compensation committees), board monitoring (i.e. CEO performance evaluation and frequency of board meetings), board resource provision (i.e. NED interlock, board interlock, former government officials) variables are robust univariate predictors of corporate failure. The CEO performance evaluation, remuneration, audit and nomination committees register a predictive accuracy (pseudo r-squared) of 82% (37%) and 74% (10%) for years five and one prior failure, respectively, with a chi-square degrees of freedom at the 0.01 significance level. This is consistent with predictions from the agency and resource dependency theories. More importantly, these results provide preliminary evidence to support Hypotheses 1, 2, 3, 4, 5 and 6, which suggest that board attributes (i.e. composition and structure) and board functions (control and resources) exhibit a significant negative association with corporate failure.

I also observe that firm age, financial leverage, profitability, and liquidity are robust univariate predictors of corporate failure (see table 11). This confirms prior studies (e.g. Daily and Dalton, 1994a; Charitou, Neophytou and Charalambous, 2004).

The frequency of board meetings, however, is not statistically significant in all years, whereas financial leverage and liquidity are not statistically significant in both years two and five prior failure. Nevertheless, the frequency of board meetings, financial leverage and liquidity variables document a stable predictive accuracy of 73% to 74% over the five year period prior failure. This possibly implies that these variables may have potential explanatory power in a multivariate logit model, which is the focus of the next section.

7.4 MULTIVARIATE LOGIT ANALYSIS

The previous section results are consistent with the research hypotheses. However, the univariate analysis considers one variable at a time, and thus, neglects the multi-dimensional nature of the process leading to a firm's failure. This section extends the analysis to a multivariate logit analysis. Simply put, I examine the relative contributions of diverse predictive variables to the corporate failure event simultaneously.

Largely, the results from the logit analysis are consistent with the univariate tests but with few exceptions. Before I report these results, it is vital to make some critical explanations. First, I stratify the data into five cross-sectional sub-samples namely: *t* - 1, *t* - 2, *t* - 3, *t* - 4 and *t* - 5 prior to failure or otherwise (see chapter 6, sections 6.3 and 6.4, page 148). Following Sheppard (1994), I randomly stratify each year's data into two sub-samples for estimation and holdout test of the models. Thus, this study departs from the extant literature; however the motivation is to test the robustness of the models. From this point, I employ three phases of logit runs namely: estimation (panel A), holdout (panel B) and combined (panel C) tests. I use robust estimation and cluster by firm for estimations of the pooled and multi-period LOGIT models and, in this way, mitigate the effects of heteroskedasticity and serial correlation. In contrast, the Jackknife procedure is used for the holdout test of the cross-sectional models. The goal is to test the reliability of the predictions (see Altman, Haldeman and Narayanan, 1977).

Second, the baseline model (hereafter model 1) includes only the control variables. The board composition model (hereafter model 2) considers all the three board composition measures and the control variables. The board structure models (models 3 to 5) consider the same control variables in model 1 and nomination, audit and remuneration committees' effectiveness in turn. In this respect, nomination, audit and remuneration committees' effectiveness are considered as important corporate governance attributes within the Anglo-Saxon Literature and the empirical context, in particular. From this point, the goal for looking at each board structure variable is to assess the enhancement of goodness of fit (e.g. Wald chi-square, r-squared, ROC, and accuracy). For this reason, I replicate the analysis for models 2 to 5, taking into account the interaction between board functions and attributes. In this regard, I estimate six different models (hereafter models 6 to 11) with only one board attribute and its interaction entering each of the six models due in part to the high degree of multi-collinearity between the interaction terms12. I also estimate split models for the three composite measures (nomination, audit and remuneration committees' effectiveness) and present the results in models 12 to 14.

In brief, I present the results (i.e. marginal effects and standard errors) from 14 estimated models from the pooled, cross sectional and multi-period data analysis. Thus, I perform 336 LOGIT runs using STATA 12 to test six main and 24 auxiliary hypotheses using three different approaches namely: pooled cross-sectional (42), cross-sectional (210), and multi-period (84) data analysis. I will discuss each in turn.

7.4.1 Results of the Pooled Cross-Sectional LOGIT Model

The pooled LOGIT Model uses multiple year data of firms and, in this way, allows for sufficient number of firms in the estimation and holdout samples (see EL Hennawy and Morris 1983, D'Aveni 1989, and Sheppard 1994). Table 12 contains results of the LOGIT analysis performed for the combined sample (see Appendix 13, pages 306-309, for the estimation and holdout tests), the analysis of which I turn to.

Table 12 illustrates that corporate failure is negatively and significantly related to profitability (β=-0.641, $p<0.01$), firm size (β=-0.110, $p<0.01$), proportion of outside directors (β=-0.200, $p<0.10$), board size (β=-0.012, $p<0.01$), audit committee effectiveness (β=0.022, $p<0.10$), and remuneration committee effectiveness (β=-0.042, $p<0.01$). In model 5 of the holdout test, for example, a 1 per cent decline in remuneration committee effectiveness, profitability and firm size results in the likelihood of corporate failure by 3.9, 69.0 and 7.4 per cent, respectively (see Appendix 14, page 310). Corporate failure, however, is not significantly related to the presence of female directors (β=0.026, $p>0.10$) and nomination committee effectiveness (β=-0.003, $p>0.10$).

12 In unreported results, I examine the possible degree of multi-collinearity between the board attributes and functions as well as their interactions. The results suggest various issues of multicollinearity.

Table 12: Results of the Pooled Cross-sectional LOGIT Model

		COMBINED SAMPLE (PANEL C)										
MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.200*	-0.186	-0.134	-0.061	-0.166	-0.185*	-0.189*	-0.163	-0.115	-0.032
			(0.104)	(0.114)	(0.111)	(0.113)	(0.223)	(0.104)	(0.104)	(0.116)	(0.110)	(0.113)
H2A: FMALE	-		0.026	0.028	0.037	0.043	0.028	-0.039	0.028	0.030	0.040	0.045
			(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.074)	(0.035)	(0.035)	(0.035)	(0.034)
H3A: BODS	-		-0.012*	-0.012*	-0.010	-0.008	-0.009	-0.008	-0.016	-0.010	-0.007	-0.005
			(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.015)	(0.007)	(0.007)	(0.007)
Board structure												
H4A: NCE	-			-0.003						-0.014		
				(0.010)						(0.018)		
H5A: ACE	-				-0.022*						-0.049**	
					(0.012)						(0.023)	
H6A: RCE	-					-0.042***						-0.071***
						(0.012)						(0.013)
Board Functions												
BODM	-						0.009	0.005	-0.000	0.006	0.000	0.002
							(0.014)	(0.005)	(0.012)	(0.006)	(0.008)	(0.010)
BINT3	-						-0.101	-0.070*	0.001			
							(0.094)	(0.039)	(0.152)			
Interactions												
H1B i: BODC*BODM	-						-0.003					
							(0.027)					
H1B ii: BODC*BINT3	-						0.045					
							(0.177)					
H2B i: FMALE*BODM	-							0.008				
								(0.008)				
H2B ii: FMALE*BINT3	-							-0.029				
								(0.078)				
H3B i: BODS*BODM	-								0.001			
									(0.001)			
H3B ii: BODS*BINT3	-								-0.011			
									(0.020)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.003	
											(0.002)	
H6B: RCE*BODM	-											0.003
												(0.002)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01

Table 12: Continuation

		COMBINED SAMPLE (PANEL C)										
MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.080	-0.071	-0.072	-0.075	-0.076	-0.060	-0.060	-0.066	-0.063	-0.067	-0.064
		(0.063)	(0.063)	(0.063)	(0.062)	(0.062)	(0.061)	(0.060)	(0.061)	(0.063)	(0.062)	(0.061)
Profitability	-	-0.641***	-0.650***	-0.647***	-0.609***	-0.577***	-0.601***	-0.600***	-0.606***	-0.608***	-0.564***	-0.522***
		(0.141)	(0.142)	(0.141)	(0.140)	(0.131)	(0.140)	(0.139)	(0.140)	(0.143)	(0.139)	(0.126)
Leverage	+	0.043	0.054	0.055	0.047	0.042	0.049	0.045	0.044	0.043	0.025	0.023
		(0.069)	(0.069)	(0.069)	(0.068)	(0.067)	(0.067)	(0.067)	(0.069)	(0.068)	(0.068)	(0.066)
Firm Size	-	-0.110***	-0.094***	-0.091***	-0.844***	-0.074***	-0.095***	-0.096***	-0.096***	-0.093***	-0.088***	-0.077***
		(0.008)	(0.011)	(0.013)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.013)	(0.012)	(0.011)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	+/-	5.016***	6.168***	6.044***	5.878***	5.977***	5.454***	5.864***	6.182***	5.384***	5.883***	5.825***
		(1.128)	(1.298)	(1.334)	(1.358)	(1.382)	(1.676)	(1.309)	(1.599)	(1.386)	(1.433)	(1.474)
Parameters												
Observations		1748	1748	1748	1748	1748	1748	1748	1748	1748	1748	1748
Wald chi2(9)/12/16		107.51***	109.29***	110.01***	112.25***	130.40***	118.38***	115.02***	115.39***	112.84***	116.03***	142.52***
Pseudo R2		0.456	0.466	0.466	0.471	0.486	0.481	0.483	0.482	0.473	0.480	0.499
Log pseudo		-549.665	-538.942	-538.710	-534.104	-519.400	-524.210	-522.376	-523.393	-531.820	-524.677	-505.419
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		80.31	81.40	80.83	80.82	80.21	81.03	80.72	80.92	81.96	81.59	81.09
Non-failed		88.59	89.20	88.99	89.24	88.96	89.25	89.11	89.37	89.41	89.46	89.90
Overall		86.78	87.47	87.19	87.36	87.01	87.41	87.24	87.47	87.76	87.70	87.87
Hosmer-Lemeshow (10)												
Chi2(8)		22.05	22.71	19.57	26.19	12.04	16.57	12.59	9.94	26.31	22.67	21.44
Prob>chi2		0.005	0.004	0.012	0.001	0.150	0.035	0.127	0.270	0.001	0.004	0.006
ROC		0.913	0.917	0.917	0.919	0.925	0.922	0.923	0.923	0.919	0.922	0.928

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01

Turning to the interaction effects, three observations merit attention. First, corporate failure is negatively and significantly related to former government official (β=-0.70, $p<0.10$) but positively and insignificantly associated to frequency of board meetings (β=0.009, $p>0.10$). Second, the interactions between frequency of board meetings and presence of female directors, nomination, audit and remuneration committees' effectiveness exhibit a positive and insignificant marginal effect in models 7, 9, 10 and 11. Third, the interactions between former government official and board composition proxies (i.e. board size and board gender diversity), exhibit a positive and insignificant marginal effect in models 6 and 7. I turn next to the assessment of the goodness of fit of the pooled model.

The classification accuracy is quite high with an average 87.43, 88.16, and 87.45 per cent for estimation, holdout and combined samples, respectively. As well, the estimation, holdout and combined models record an average type I (II) errors of 18.16(11.04), 17.67 (10.13) and 18.91 (10.72) per cent respectively, yielding an overall misclassification of 12.57, 11.84 and 12.55 per cent at a cut-off of 0.5 prior probabilities. Nonetheless, classification accuracy as a measure of goodness fit is limited in part due to the absence of a measure of significance. For this reason, I turn to Hosmer-Lemeshow test.

The Hosmer and Lemeshow's goodness-of-fit test[13] proposes that the more closely the predicted and observed frequencies match, the better the model fit. Thus, it answers the crucial question, how well the model fits the data. By rule of thumb, a good fit as measured by Hosmer and Lemeshow's test yields a large p-value. Put differently, an insignificant chi-square indicates that the model has adequate fit. The presence of continuous predictors in the model, however, result in many cells defined by the predictor variables, making a very large contingency table, which in turn yields significant results. For this reason, Hosmer and Lemeshow (2000) recommend combining the patterns formed by the predictor variables into 10 groups and, in this way, form a contingency table of 2 by 10.

The Hosmer and Lemeshow test for the holdout sample records a non-significant ($p>0.1$) for all models at eight degrees of freedom, implying that there is no statistically significant

[13] Hosmer and Lemeshow goodness-of-fit is computed as the Pearson chi-square from the contingency table of observed and expected frequencies

difference between the observed and predicted classifications. Thus, this study fails to reject the null hypothesis, which suggests that there is no difference between models predicted and observed values. This study also observes that, the Hosmer and Lemeshow test for the estimation sample records a non-significant (*p >0.1)* for almost all the models at eight degrees but not in models 1 and 2. In parallel, the combined samples' Hosmer and Lemeshow tests largely suggest statistical significance at the 0.05 level. Hence, this study rejects the null hypothesis. In short, Hosmer and Lemeshow tests for panel A and B suggest the pooled model has adequate fit, whereas panel C suggests otherwise. This implies that the overall LOGIT model fit is sensitive to sample size; therefore I turn to log likelihood chi-square to assess the validity of the overall logit model.

The log likelihood chi-square is an omnibus test to assess the statistical significance of the estimated model. Log likelihood chi-square (-2LL) is calculated as 2 times the change between the log likelihood of the estimated model (LL_m) and the log likelihood of the constant-only model (LL_o). The pooled LOGIT models show a reduction of the log likelihood for iteration 0 is significant at the 0.000 level, with the minimum (maximum) chi-square of 79.29 (142.52) with 9 (16) degrees of freedom and predicts corporate failure accurately at 86.97 (87.87) per cent in model 7 (11) of the estimation (combined) test. The general rule is that lesser values of -2LL suggest better model fit. Hair, Underson, Tatham and Black, (1998), however, suggest that there is no bench mark limit for this value. Hence, I turn to ROC[14] and McFadden's r-squared[15] (hereafter pseudo r-squared) to assess the validity of the pooled model.

The pooled LOGIT model registers an average ROC of 0.92, 0.93 and 0.92 for the training, holdout and combined samples, respectively, implying the efficacy of the models is quite high. As well, pseudo r-squared captures the proportion of change in terms of likelihood, implying that higher levels of pseudo r-squared indicate better fit. The pooled model produces a pseudo r-squared of 0.460 and 0.510 for the estimation and holdout tests. This suggests that the pooled model accounts for approximately 49 per cent in the prediction of

[14] Agarwal and Taffler (2008) document that the area under the ROC curve gives an indication of the model's quality.

[15] McFadden's r-squared = $1 – (LL_m / LL_o)$.

corporate failure in the UK, yielding a chi-square at the 0.0001 significance level. This implies that there is a less than 0.0001 chance that the classification accuracy, variance explained and ROC by the pooled LOGIT model and particularly, the findings outlined above happened by chance.

The pooled LOGIT model, however, neglects changes in predictive variables. This is because this approach considers pooled data prior to failure and in this way, neglects the passage of time. The pooled model indicates the relationship between several corporate governance measures and corporate failure, but when these measures are considered important is beyond its scope. This is because the pooled model shows the entire signposts to failure and thus, assumes failure is a sudden event. Corporate failure, however, is considered as a 'protracted downward spiral' (see Argenti 1976, Hambrick and D'Aveni 1988, Amankwah-Amoah and Debrah, 2010). For this reason, I turn to the analysis of the cross-sectional LOGIT models in the next section.

7.4.2 Results of the Cross-Sectional LOGIT Model

Under this sub-section, I discuss the results of the logit analysis run for each sample year: *t* – 1, *t* - 2, *t* – 3, *t* - 4 and *t* - 5. The goal is to uncover changes in regressors over time. Thus, I seek to overcome the limitations associated with pooling data across different years (see Moyer 1977; Mensah, 1984; Charitou, Neophytou, Charalambous, 2004) and the neglect of the time dimension of failure (see Dimitras, Slowinski, Susmaga, Zopounidis,1999; Balcaen and Ooghe 2006; Du Jardin and Séverin, 2011). As discussed in chapter three, the practice of pooling data across different years in the classical failure prediction models assume stationarity and data stability. Critics (e.g. Zmijewski 1984), however, suggest otherwise: implying that classical failure models suffer from stationarity problems (Mensah, 1984). Further, Balcaen and Ooghe (2006) and Jardin and Séverin (2011) contend that the use of pooled data or one annual account is based on the assumption that consecutive annual accounts are independent, repeated measurements. This suggests classical prediction models are limited due in part to year selection bias, neglect of time-series behaviour (D'Aveni, 1989; Dimitras, Slowinski, Susmaga, Zopounidis, 1999) and signal inconsistency problem (Luoma and Laitinen, 1991). Thus, classical models based on a fixed score output do not consider the corporate failure phenomenon as a process, and, in turn, contradicts general intuition (Balcaen and Ooghe, 2006).

Table 13: Results of the Cross-Sectional LOGIT Model: One Year (t-1) Prior Failure

		COMBINED SAMPLE (PANEL C)										
MODEL *t* -1 MAIN VARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Board composition												
H1A: BODC	-		-0.046	-0.042	-0.023	0.027	-0.051	-0.059	-0.045	-0.036	-0.017	0.028
			(0.102)	(0.109)	(0.109)	(0.108)	(0.247)	(0.098)	(0.096)	(0.109)	(0.105)	(0.104)
H2A: FMALE	-		-0.029	-0.028	-0.025	-0.011	-0.027	-0.084	-0.032	-0.028	-0.023	-0.011
			(0.034)	(0.034)	(0.035)	(0.036)	(0.036)	(0.081)	(0.035)	(0.034)	(0.036)	(0.037)
H3A: BODS	-		-0.024***	-0.024***	-0.023***	-0.021**	-0.019**	-0.020**	-0.048**	-0.021***	-0.020**	-0.018**
			(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.022)	(0.008)	(0.008)	(0.008)
Board structure												
H4A: NCE	-			-0.001						-0.018		
				(0.009)						(-0.019)		
H5A: ACE	-				-0.006			-			-0.041	
					(0.012)						(0.027)	
H6A: RCE	-					-0.026**						-0.061**
						(0.012)						(0.031)
Board Functions												
BODM	-						0.007	0.005	-0.009	0.006	-0.001	-0.001
							(0.013)	(0.004)	(0.016)	(0.005)	(0.007)	(0.009)
BINT3	-						-0.006	-0.122	-0.320			
							(0.143)	(0.076)	(0.223)			
Interactions												
H1B i: BODC*BODM	-						0.001					
							(0.025)					
H1B ii: BODC*BINT3	-						-0.155					
							(0.247)					
H2B i: FMALE*BODM	-							0.004				
								(0.009)				
H2B ii: FMALE*BINT3	-							0.097				
								(0.102)				
H3B i: BODS*BODM	-								0.003			
									(0.002)			
H3B ii: BODS*BINT3	-								0.034			
									(0.026)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.003	
											(0.003)	
H6B: RCE*BODM	-											0.003
												(0.003)

Robust Standard Errors in parenthesis ,.* p<0.1, ** p<0.05 and *** p<0.01

Table 13: Continuation

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 1		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.189***	-0.190**	-0.191***	-0.194***	-0.187***	-0.161**	-0.162**	-0.156**	-0.174**	-0.186***	-0.162**
		(0.070)	(0.075)	(0.074)	(0.074)	(0.072)	(0.069)	(0.071)	(0.070)	(0.070)	(0.070)	(0.067)
Profitability	-	-0.793***	-0.789***	-0.785***	-0.771***	-0.727***	-	-0.735***	-0.736***	-0.730***	-0.708***	-
		(0.208)	(0.192)	(0.191)	(0.196)	(0.170)	0.721***	(0.176)	(0.165)	(0.182)	(0.180)	0.648***
							(0.181)					(0.157)
Leverage	+	0.013	0.002	0.002	0.001	0.007	0.002	-0.006	0.028	-0.019	-0.032	-0.012
		(0.074)	(0.073)	(0.073)	(0.073)	(0.072)	(0.073)	(0.071)	(0.077)	(0.070)	(0.071)	(0.071)
Firm Size	-	-0.094***	-0.070***	-0.069***	-0.068***	-0.058***	-	-0.066***	-0.070***	-0.068***	-0.069***	-
		(0.010)	(0.012)	(0.014)	(0.013)	(0.011)	0.069***	(0.012)	(0.012)	(0.014)	(0.013)	0.058***
							(0.012)					(0.011)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		7.420***	9.190***	9.120***	9.027***	8.919***	8.395***	8.818***	11.110***	8.451***	9.675***	9.398***
		(1.588)	(2.046)	(2.083)	(2.129)	(2.034)	(2.379)	(1.900)	(2.792)	(2.060)	(2.217)	(2.286)
Parameters												
Observations		353	353	353	353	353	353	353	353	353	353	353
Wald chi2(9)/12/16		74.63***	73.93***	75.68***	76.99***	83.10***	90.41***	94.70***	103.43***	86.92***	87.54***	89.58***
Pseudo R2		0.593	0.614	0.614	0.614	0.623	0.634	0.638	0.642	0.626	0.629	0.641
Log pseudo		-82.864	-78.605	-78.596	-78.489	-76.714	-74.442	-73.797	-72.819	-76.119	-75.460	-73.100
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		89.02	90.24	88.10	89.02	91.57	90.48	88.24	89.16	89.29	89.02	86.29
Non-failed		92.62	92.99	92.94	92.62	93.70	93.68	93.28	92.96	93.31	92.62	93.31
Overall		91.78	92.35	91.78	91.78	93.20	92.92	92.07	92.07	92.35	91.78	92.35
Hosmer-Lemeshow (10)												
Chi2(8)		12.92	14.47	14.42	14.73	12.36	8.07	10.13	5.75	6.98	9.89	8.94
Prob>chi2		0.115	0.070	0.072	0.065	0.136	0.427	0.256	0.267	0.539	0.273	0.347
ROC		0.947	0.953	0.953	0.953	0.956	0.958	0.958	0.960	0.957	0.958	0.960

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,. * p<0.1, ** p<0.05 and *** p<0.01

Table 14: Results of the Cross-Sectional LOGIT Model: Two Years (t-2) Prior Failure

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 2		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.245*	-0.227	-0.194	-0.118	0.061	-0.231*	-0.225*	-0.209	-0.179	-0.093
			(0.131)	(0.141)	(0.135)	(0.137)	(0.267)	(0.130)	(0.130)	(0.143)	(0.136)	(0.139)
H2A: FMALE	-		0.031	0.033	0.039	0.045	0.031	0.031	0.032	0.034	0.041	0.044
			(0.041)	(0.041)	(0.041)	(0.040)	(0.042)	(0.084)	(0.042)	(0.041)	(0.041)	(0.039)
H3A: BODS	-		-0.020**	-0.020**	-0.019*	-0.016*	-0.015*	-0.015*	-0.016	-0.017*	-0.017*	-0.013
			(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.017)	(0.010)	(0.009)	(0.009)
Board structure												
H4A: NCE	-			-0.005						-0.013		
				(0.011)						(0.019)		
H5A: ACE	-				-0.018						-0.029	
					(0.014)						(0.022)	
H6A: RCE	-					-0.041***						-0.060**
						(0.013)						(0.024)
Board Functions												
BODM	-						0.022	0.006	0.005	0.006	0.005	0.004
							(0.017)	(0.004)	(0.015)	(0.006)	(0.008)	(0.010)
BINT3	-						-0.116	-0.158***	-0.139			
							(0.146)	(0.061)	(0.205)			
Interactions												
H1B i: BODC*BODM	-						-0.033					
							(0.030)					
H1B ii: BODC*BINT3	-						0.011					
							(0.269)					
H2B i: FMALE*BODM	-							-0.002				
								(0.007)				
H2B ii: FMALE*BINT3	-							0.109				
								(0.093)				
H3B i: BODS*BODM	-								0.000			
									(0.002)			
H3B ii: BODS*BINT3	-								0.003			
									(0.026)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.001	
											(0.002)	
H6B: RCE*BODM	-											0.001
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,* p<0.1, ** p<0.05 and *** p<0.01

Table 14: Continuation 1 of 1

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 2		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.105	-0.086	-0.087	-0.082	-0.098	-0.060	-0.055	-0.065	-0.081	-0.078	-0.088
		(0.073)	(0.073)	(0.073)	(0.072)	(0.070)	(0.072)	(0.072)	(0.071)	(0.072)	(0.072)	(0.069)
Profitability	-	-0.623***	-0.657***	-0.642***	-0.612***	-0.552***	-0.595***	-0.613***	-0.616***	-0.608***	-0.578***	-0.506***
		(0.172)	(0.170)	(0.168)	(0.167)	(0.147)	(0.162)	(0.162)	(0.163)	(0.167)	(0.163)	(0.140)
Leverage	+	0.048	0.062	0.063	0.062	0.048	0.072	0.066	0.068	0.047	0.043	0.028
		(0.082)	(0.082)	(0.082)	(0.082)	(0.078)	(0.085)	(0.085)	(0.086)	(0.082)	(0.082)	(0.075)
Firm Size	-	-0.117***	-0.093***	-0.089***	-0.083***	-0.071***	-0.091***	-0.091***	-0.092***	-0.091***	-0.086***	-0.074***
		(0.011)	(0.013)	(0.015)	(0.014)	(0.014)	(0.014)	(0.013)	(-0.014)	(0.015)	(0.015)	(-0.014)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	+/-	5.411***	6.939***	6.726***	6.640***	6.748***	4.810***	6.466***	6.510***	6.180***	6.281***	6.455***
		(1.334)	(1.647)	(1.730)	(1.724)	(1.800)	(2.019)	(1.523)	(1.941)	(1.744)	(1.7275)	(1.816)
Parameters												
Observations		351	351	351	351	351	351	351	351	351	351	351
Wald chi2(9)/12/16		92.68***	90.56***	91.81***	97.91***	106.10***	100.65***	106.84***	104.96***	90.23***	97.37***	109.70***
Pseudo R2		0.464	0.482	0.483	0.486	0.501	0.507	0.508	0.504	0.489	0.493	0.513
Log pseudo		-108.706	-105.119	-105.001	-104.341	-101.226	-100.016	-99.922	-100.602	-103.721	-102.874	-98.847
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		78.95	82.05	83.12	81.25	77.11	82.28	81.48	81.25	80.49	81.82	80.49
Non-failed		88.00	89.38	89.42	89.67	89.18	89.71	90.00	89.67	89.96	89.05	89.96
Overall		86.04	87.75	88..03	87.75	86.32	88.03	88.03	87.75	87.75	87.46	87.75
Hosmer-Lemeshow (10)												
Chi2(8)		12.94	4.81	3.67	6.07	4.47	1.03	3.43	4.08	7.32	6.28	12.70
Prob>chi2		0.114	0.777	0.885	0.640	0.812	0.998	0.905	0.850	0.503	0.616	0.123
ROC		0.913	0.923	0.923	0.924	0.930	0.930	0.931	0.929	0.924	0.924	0.932

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level, * p<0.1, ** p<0.05 and *** p<0.01

Table 15: Results of the Cross-Sectional LOGIT Model: Three Years (t-3) Prior Failure

		COMBINED SAMPLE (PANEL C)										
MODEL t - 3		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.242**	-0.230*	-0.193	-0.074	-0.071	-0.201*	-0.220*	-0.196	-0.167	-0.039
			(0.120)	(0.132)	(0.134)	(0.132)	(0.342)	(0.121)	(0.121)	(0.135)	(0.132)	(0.129)
H2A: FMALE	-		0.069*	0.070*	0.077*	0.084**	0.066	-0.048	0.069*	0.070*	0.080*	0.083**
			(0.042)	(0.042)	(0.043)	(0.043)	(0.042)	(0.098)	(0.042)	(0.043)	(0.043)	(0.042)
H3A: BODS	-		-0.009	-0.008	-0.007	-0.004	-0.006	-0.004	-0.023	-0.006	-0.004	-0.000
			(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.020)	(0.009)	(0.009)	(0.008)
Board structure												
H4A: NCE	-			-0.003						-0.015		
				(0.011)						(0.022)		
H5A: ACE	-				-0.015						-0.052*	
					(0.015)						(0.027)	
H6A: RCE	-					-0.046***						-0.072***
						(0.015)						(0.026)
Board Functions												
BODM	-						0.017	0.003	-0.008	0.007	-0.001	0.005
							(0.021)	(0.007)	(0.018)	(0.007)	(0.010)	(0.010)
BINT3	-						-0.086	-0.018	0.002			
							(0.140)	(0.050)	(0.187)			
Interactions												
H1B i: BODC*BODM	-						-0.019					
							(0.041)					
H1B ii: BODC*BINT3	-						0.071					
							(0.260)					
H2B i: FMALE*BODM	-							0.015*				
								(0.009)				
H2B ii: FMALE*BINT3	-							-0.090				
								(0.095)				
H3B i: BODS*BODM	-								0.002			
									(0.002)			
H3B ii: BODS*BINT3	-								-0.008			
									(0.025)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.004	
											(0.003)	
H6B: RCE*BODM	-											0.002
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,. * p<0.1, ** p<0.05 and *** p<0.01

Table 15: Continuation 1 of 1

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 3		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.047	-0.045	-0.046	-0.043	-0.058	-0.018	-0.040	-0.038	-0.036	-0.038	-0.054
		(0.082)	(0.009)	(0.085)	(0.084)	(0.085)	(0.085)	(0.083)	(0.085)	(0.085)	(0.082)	(0.082)
Profitability	-	-0.660***	-0.685***	-0.682***	-0.651***	-0.585***	-0.632***	-0.626***	-0.636***	-0.634***	-0.583***	-0.527***
		(0.209)	(0.215)	(0.214)	(0.220)	(0.208)	(0.212)	(0.221)	(0.214)	(0.214)	(0.215)	(0.190)
Leverage	+	0.021	0.016	0.016	0.009	-0.016	0.022	0.007	0.005	0.006	-0.019	-0.037
		(0.087)	(0.085)	(0.085)	(0.086)	(0.085)	(0.088)	(0.086)	(0.090)	(0.088)	(0.089)	(0.085)
Firm Size	-	-0.110***	-0.098***	-0.096***	-0.091***	-0.075***	-0.100***	-0.106***	-0.104***	-0.098***	-0.096***	-0.080***
		(-0.009)	(0.012)	(0.014)	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)	(0.014)	(0.014)	(0.013)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	+/-	4.738***	6.108***	6.008***	5.915***	5.928***	4.449***	5.923***	6.686***	5.167**	6.003	5.478***
		(1.601)	(1.970)	(2.006)	(2.030)	(1.997)	(2.540)	(2.047)	(2.479)	(2.045)	(1.985)	(1.892)
Parameters												
Observations												
Wald chi2(9)/12/16		352	352	352	352	352	352	352	352	352	352	352
Pseudo R2		80.50***	81.90***	82.46***	84.18***	101.84***	90.48***	85.79***	89.19***	88.11***	86.67***	107.63***
Log pseudo		0.440	0.456	0.457	0.459	0.478	0.467	0.474	0.468	0.464	0.470	0.494
Accuracy		-114.890	-111.583	-111.550	-111.147	-107.101	-109.359	-107.920	-109.110	-110.010	-108.822	-103.945
Failed		%	%	%	%	%	%	%	%	%	%	%
Non-failed		80.52	81.01	81.01	81.25	80.25	79.75	81.25	80.77	78.31	80.72	79.76
Overall		88.00	88.64	88.64	88.97	88.93	88.28	88.97	88.32	88.85	89.59	89.55
Hosmer-Lemeshow (10)		86.36	86.93	86.93	87.22	86.93	86.36	87.22	86.65	86.36	87.50	87.22
Chi2(8)												
Prob>chi2		6.95	8.70	7.91	10.21	6.57	4.87	5.83	5.12	6.36	5.48	2.88
Prob>chi2		0.543	0.368	0.443	0.251	0.583	0.771	0.666	0.744	0.607	0.705	0.942
ROC		0.908	0.915	0.916	0.916	0.922	0.919	0.921	0.919	0.917	0.918	0.925

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,. * p<0.1, ** p<0.05 and *** p<0.01

Table 16: Results of the Cross-Sectional LOGIT Model: Four Years(t-4) Prior Failure

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 4		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.234*	-0.258*	-0.160	-0.076	-0.400	-0.205*	-0.214*	-0.221	-0.118	-0.012
			(0.120)	(0.133)	(0.132)	(0.125)	(0.311)	(0.121)	(0.124)	(0.139)	(0.132)	(0.128)
H2A: FMALE	-		0.041	0.040	0.058	0.059	0.044	-0.112	0.046	0.043	0.063	0.066
			(0.047)	(0.047)	(0.049)	(0.047)	(0.047)	(0.110)	(0.048)	(0.047)	(0.049)	(0.047)
H3A: BODS	-		-0.009	-0.010	-0.005	-0.004	-0.005	-0.003	-0.004	-0.007	0.000	0.000
			(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.023)	(0.010)	(0.011)	(0.010)
Board structure												
H4A: NCE	-			0.006						-0.004		
				(0.012)						(0.025)		
H5A: ACE	-				-0.026						-0.074**	
					(0.017)						(0.034)	
H6A: RCE	-					-0.047						-0.095***
						(0.015)						(0.035)
Board Functions												
BODM	-						0.001	0.005	0.008	0.009	0.003	0.002
							(0.020)	(0.007)	(0.020)	(0.008)	(0.011)	(0.013)
BINT3	-						-0.103	-0.042	0.171			
							(0.120)	(0.050)	(0.238)			
Interactions												
H1B i: BODC*BODM	-						0.021					
							(0.039)					
H1B ii: BODC*BINT3	-						0.068					
							(0.234)					
H2B i: FMALE*BODM	-							0.020*				
								(0.010)				
H2B ii: FMALE*BINT3	-							-0.117				
								(0.107)				
H3B i: BODS*BODM	-								0.000			
									(0.003)			
H3B ii: BODS*BINT3	-								-0.034			
									(0.032)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.005	
											(0.003)	
H6B: RCE*BODM	-											0.005
												(0.004)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01

Table 16: Continuation 1 of 1

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 4		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.026	-0.024	-0.024	-0.035	-0.021	-0.011	-0.002	-0.031	-0.005	-0.006	-0.005
		(0.080)	(0.078)	(0.078)	(0.078)	(0.079)	(0.081)	(0.085)	(0.083)	(0.079)	(0.079)	(0.004)
Profitability	-	-0.468**	-0.471**	-0.474**	-0.432**	-0.425**	-0.431**	-0.428**	-0.438**	-0.453**	-0.385**	-0.396**
		(0.214)	(0.217)	(0.215)	(0.209)	(0.191)	(0.204)	(0.209)	(0.210)	(0.208)	(0.195)	(0.166)
Leverage	+	0.026	0.043	0.043	0.027	0.030	0.022	0.025	0.016	0.036	0.007	0.021
		(0.081)	(0.086)	(0.086)	(0.087)	(0.081)	(0.085)	(0.083)	(0.088)	(0.085)	(0.084)	(0.079)
Firm Size	-	-0.118***	-0.104***	-0.108***	-0.093***	-0.080***	-0.110***	-0.112***	-0.108***	-0.111***	-0.102***	-0.087***
		(0.010)	(0.014)	(0.016)	(0.015)	(0.014)	(0.016)	(0.015)	(0.015)	(0.018)	(0.016)	(-0.016)
Firm Age	-	-0.000	-0.000	0.000	-0.000	-0.000	0.000	-0.000	0.000	0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.287***	5.276***	5.476***	4.951***	5.111***	5.393***	4.947***	4.512***	4.598***	5.190***	4.940***
		(1.277)	(1.407)	(1.444)	(1.426)	(1.378)	(1.986)	(1.564)	(2.056)	(1.576)	(1.550)	(1.500)
Parameters												
Observations		346	346	346	346	346	346	346	346	346	346	346
Wald chi2(9)/12/16		84.95***	87.92***	87.27***	89.32***	98.30***	97.19***	93.52***	93.73***	88.53***	89.13***	101.30***
Pseudo R2		0.399	0.410	0.411	0.415	0.433	0.426	0.435	0.428	0.419	0.430	0.456
Log pseudo		-119.838	-117.625	-117.520	-116.558	-112.966	-114.460	-112.720	-113.947	-115.875	-113.553	-108.516
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		76.71	80.00	80.00	79.73	79.45	77.33	78.95	77.33	78.67	78.95	77.78
Non-failed		87.18	87.32	87.32	88.24	87.91	87.82	88.52	87.82	88.19	88.52	89.43
Overall		84.97	85.84	85.84	86.42	86.13	85.55	86.42	85.55	86.13	86.42	86.71
Hosmer-Lemeshow (10)												
Chi2(8)		6.19	8.50	6.64	6.76	4.29	4.21	10.05	8.52	5.63	15.52	3.97
Prob>chi2		0.626	0.387	0.577	0.563	0.831	0.838	0.262	0.384	0.689	0.050	0.860
ROC		0.896	0.901	0.901	0.903	0.911	0.907	0.912	0.909	0.904	0.908	0.916

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01

Table 17: Results of the Cross-Sectional LOGIT Model: Five Years (t -5) Prior Failure

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 5		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.154	-0.123	-0.023	-0.007	-0.276	-0.156	-0.153	-0.109	-0.012	0.012
			(0.110)	(0.120)	(0.112)	(0.115)	(0.250)	(0.108)	(0.109)	(0.122)	(0.113)	(0.115)
H2A: FMALE	-		0.020	0.023	0.043	0.038	0.019	-0.069	0.023	0.026	0.044	0.041
			(0.048)	(0.048)	(0.047)	(0.047)	(0.049)	(0.090)	(0.049)	(0.049)	(0.048)	(0.047)
H3A: BODS	-		-0.006	-0.005	0.002	-0.000	-0.004	-0.003	-0.010	-0.005	0.003	0.001
			(0.010)	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)	(0.016)	(0.010)	(0.010)	(0.009)
Board structure												
H4A: NCE	-			-0.008						-0.014		
				(0.015)						(0.022)		
H5A: ACE	-				-0.051***						-0.076***	
					(0.015)						(0.029)	
H6A: RCE	-					-0.046***						-0.077**
						(0.014)						(0.030)
Board Functions												
BODM	-						-0.003	-0.001	-0.008	-0.002	-0.005	-0.005
							(0.015)	(0.006)	(0.015)	(0.007)	(0.010)	(0.012)
BINT3	-						-0.129	-0.061	0.156			
							(0.104)	(0.051)	(0.015)			
Interactions												
H1B i: BODC*BODM	-						0.013					
							(0.029)					
H1B ii: BODC*BINT3	-						0.090					
							(0.227)					
H2B i: FMALE*BODM	-							0.013				
								(0.009)				
H2B ii: FMALE*BINT3	-							-0.121				
								(0.122)				
H3B i: BODS*BODM	-								0.002			
									(0.002)			
H3B ii: BODS*BINT3	-								-0.036			
									(0.029)			
H4B: NCE*BODM	-									0.001		
										(0.001)		
H5B: ACE*BODM	-										0.003	
											(0.003)	
H6B: RCE*BODM	-											0.003
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01

Table 17: Continuation 1 of 1

		COMBINED SAMPLE (PANEL C)										
MODEL *t* - 5		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.003	-0.006	-0.009	-0.035	-0.015	-0.028	-0.025	-0.050	-0.003	-0.028	-0.009
		(0.082)	(0.082)	(0.084)	(0.083)	(0.082)	(0.089)	(0.090)	(0.095)	(0.087)	(0.087)	(0.085)
Profitability	-	-0.656***	-0.670***	-0.672***	-0.649***	-0.628***	-0.649***	-0.642***	-0.656***	-0.646***	-0.621***	-0.584***
		(0.147)	(0.147)	(0.147)	(0.143)	(0.139)	(0.152)	(0.157)	(0.157)	(0.156)	(0.154)	(0.151)
Leverage	+	0.078	0.083	0.084	0.053	0.068	0.068	0.061	0.056	0.076	0.0.36	0.049
		(0.071)	(0.076)	(0.017)	(0.076)	(0.074)	(0.074)	(0.076)	(0.079)	(0.078)	(0.078)	(0.076)
Firm Size	-	-0.107***	-0.096***	-0.091***	-0.077***	-0.077***	-0.098***	-0.097***	-0.099***	-0.091***	-0.078***	-0.078***
		(0.009)	(0.013)	(0.017)	(0.013)	(0.013)	(0.014)	(0.013)	(0.014)	(0.017)	(0.078)	(0.014)
Firm Age	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.306***	5.002***	4.768***	4.785***	4.909***	5.599***	5.402***	5.093***	4.509***	5.447***	5.209***
		(0.976)	(1.002)	(1.012)	(1.060)	(1.003)	(1.614)	(1.146)	(1.498)	(1.209)	(1.277)	(1.390)
Parameters												
Observations		346	346	346	346	346	346	346	346	346	346	346
Wald chi2(9)/12/16		98.31***	106.71***	107.10***	103.54***	117.23***	97.54***	103.27***	108.58***	104.99***	104.21***	115.21***
Pseudo R2		0.426	0.432	0.433	0.455	0.455	0.443	0.449	0.448	0.434	0.458	0.461
Log pseudo		-113.811	-112.702	-112.514	-108.130	-108.113	-110.417	-109.238	-109.510	-112.196	-107.515	-106.968
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		77.03	77.78	77.33	77.33	76.62	77.92	78.67	75.32	78.67	77.03	75.95
Non-failed		87.87	87.59	88.19	88.19	88.48	88.85	88.56	88.10	88.56	87.87	88.76
Overall		85.55	85.55	85.84	85.84	85.84	86.42	86.42	85.26	86.42	85.55	85.84
Hosmer-Lemeshow (10)												
Chi2(8)		7.34	4.58	5.934	4.50	6.29	5.69	4.71	5.40	6.50	3.87	10.52
Prob>chi2		0.500	0.802	0.655	0.810	0.614	0.682	0.788	0.714	0.591	0.869	0.230
ROC		0.904	0.905	0.905	0.913	0.916	0.911	0.912	0.913	0.907	0.915	0.917

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,. * p<0.1, ** p<0.05 and *** p<0.01.

Tables 13 through 17 contain results of the combined sample LOGIT analysis performed for *t* - 1, *t* - 2, *t* - 3, *t* - 4 and *t* - 5 sample years, (see Appendix 15 to 24, pages 310-328, for the estimation and holdout samples), the analysis of which I turn to.

In almost all models and years, the results suggest that firm size, profitability and remuneration committee effectiveness are significantly related to corporate failure at the 0.01 or 0.05 significance level. Profitability, however, is not statistically significant in sample year four, where proportion of outside directors (β=-0.367, $p<0.05$), remuneration committee effectiveness (β=-0.057, $p<0.01$), frequency of board meetings (β=0.061, $p<0.10$) and firm size (β=-0.106, $p<0.01$) are significant predictors of corporate failure. Particularly, model 2's estimation test suggests that a 5 (1) per cent decline in proportion of outside directors (firm size) results in the likelihood of corporate demise by 36.7 (10.6) per cent, as far as four years prior to potential failure.

In addition to Remuneration committee effectiveness, firm size, and profitability, I observe that corporate failure is negatively and significantly related to both liquidity (β=-0.189, $p<0.01$) and board size (β=-0.024, $p<0.01$) but exhibit a positive and significant association with the presence of female directors (β=0.069, $p<0.10$), in years one and three, respectively. I also observe that corporate failure exhibits a negative and significant marginal effect association with audit committee effectiveness (β=-0.073, $p<0.01$), proportion of outside directors (β=-0.324, $p<0.05$) and both board size (β=-0.020, $p<0.10$) and former government official (β=-0.158, $p<0.01$), as far as five, three and two years prior to failure. This confirms Argenti (1976), Hambrick and D'Aveni (1988) and Sheppard (1994) assertion that some variables take on superior significance as the firm approaches failure. From this point, I find that the effect of industry is more pronounced in the penultimate year of failure. There is no evidence that firm age determines the survival or failure of firms.

Concerning the interaction effects, the results show that the interaction between presence of female directors and frequency of board meetings (β=0.030, $p<0.10$) is positively and significantly related to corporate failure in year four prior to failure. I turn next to the assessment of the goodness of fit measures of the cross-sectional models.

First, the p-values (0.0001) associated with the chi-square degrees of freedom ranging from 9 to 15 indicate that the cross-sectional models are statistically significant. This suggests that there is a less than .0001 likelihood that the high level of average accuracies of 93, 88, 88, 87, and 86 per cent, improving over the five years prior to failure, might have happened by chance. Further, the cross-sectional models record an average type I (II) errors of 11 (6), 18 (10), 18 (11), 20 (11) and 23 (11) per cent, yielding an overall misclassifications of 7, 12, 12, 13, 14 per cent at a cut-off of 0.5 prior probabilities, declining over the five years prior to failure.

Second, the Hosmer and Lemeshow test statistic is above 0.05 for almost all the cross-sectional models. This implies that I fail to reject the null hypothesis, implying that the cross-sectional LOGIT models fit the data at a satisfactory level. Models 2, 4, 10 and 11 in panel B of $t - 1$ and model 10 of panel C of $t - 4$, however, are the few exceptions.

Third, the cross-sectional models show a reduction of the log likelihood for iteration 0 is significant at the 0.0001 level, recording chi-squares of 56.45 (85.17), 50.18 (98.98), 47.85 (88.98), 54.58 (91.92) and 68.22 (106.06) with 9 degrees of freedom respectively for estimation (combined) tests for year one through to five prior to failure. Finally, the cross-sectional models record an average pseudo r-squared (ROC) of 0.65(0.96), 0.52(0.93), 0.49(0.92), 0.44(0.91), and 0.47(0.92), improving over the five years prior to failure. This implies that the cross-sectional models contribute an average of 44 to 65 per cent in the prediction of corporate failure in the UK as far as five years prior to failure, yielding a dominate chi-square at the 0.0001 significance level. Thus, there is a less than 0.0001 probability that the classification accuracies of the cross-sectional models and in particular, the findings above occurred by chance.

Critics (e.g. Sheppard 1994 and Shumway 2001), however, may argue that the present findings are sample specific but not a result of passage of time. Therefore, I follow Sheppard (1994), Darrat, Gray and Wu (2010), Wu, Gaunt and Gray (2010) and in turn, estimate a multi-period model. The rationale is to investigate changes in failing firms relative to their non-failed counterparts. This sets the scene for a discussion of the multi-period model in the next sub-section.

7.4.3 Results of the Multi-period LOGIT Model

This sub-section discusses the results of the logit analysis run for multi-period sample: *t* – 1/2 and *t* – 4/5. The goal is to observe changes in independent variables in both one to two (t-1/2) and four to five (4/5) years prior to failure (see Darrat, Gray and Wu (2010), Wu, Gaunt and Gray 2010; and Sheppard (1994). Thus, I concur with Sheppard's (1994) notion that this procedure allows two years to elapse for alteration to occur in the firms' governance and financial performance. Accordingly, I first examine changes four to five (4/5) year prior failure using a sample of 181 failed and 511 non-failed firm year observations. Finally, I observe the changes one to two (1/2) years prior failure, using a sub-sample of 186 failed and 518 non-failed firm year observations. Tables 18 and 19 display results of the combined sample of the LOGIT analysis performed for 1/2 and 4/5 year periods prior to failure. (For the sake of brevity see Appendix 25 through 28, pages 332-346, for the results of panel A and B of the 1/2 and 4/5 years prior failure). I turn next to the discussion of the multi-period model.

Consistent with the findings of the cross-sectional models, firm size, profitability, proportion of outside directors as well as both, audit and remuneration committees' effectiveness are significantly related to corporate failure at the 0.01 significance level. Proportion of outside directors, however, is not statistically significant in period one to two years prior to failure, where board size (β=-0.021, $p<0.05$), remuneration committee effectiveness (β=-0.035, $p<0.01$), former government official (β=-0.040, $p<0.05$), liquidity (β=-0.147, $p<0.05$), profitability (β=-0.168, $p<0.01$) and firm size (β=-0.107, $p<0.01$) are significantly related to corporate failure. Particularly, model 4's holdout test suggests that a 1 per cent decline in board size, audit committee effectiveness, liquidity, profitability and firm size results in the likelihood of corporate demise by 2.60, 0.05, 26.10, 74.40 and 7.00 per cent, respectively.

Further, corporate failure is not related to presence of female directors (β=0.189, $p>0.10$), financial leverage (β=0.033, $p<0.10$), nomination committee effectiveness (β=-0.012, $p>0.10$), frequency of board meeting (β=-0.000, $p>0.10$) and firm age (β=-0.000, $p>0.10$). On the interaction effects, corporate failure is not related to either the interactions between board attributes and boards' monitoring or resource provision functions. I turn next to the assessment of the goodness of fit measures of the cross-sectional models.

Table 18: Results of the Four and Five Year Period LOGIT Model

		COMBINED SAMPLE (PANEL C)										
MODEL T-4/5		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.190*	-0.189	-0.088	-0.037	-0.319	-0.177	-0.176	-0.165	-0.067	-0.002
			(0.109)	(0.119)	(0.115)	(0.114)	(0.262)	(0.109)	(0.110)	(0.122)	(0.115)	(0.115)
H2A: FMALE	-		0.031	-0.031	0.051	0.049	0.032	-0.083	0.036	0.035	0.054	0.054
			(0.047)	(0.047)	(0.047)	(0.046)	(0.047)	(0.101)	(0.047)	(0.047)	(0.047)	(0.046)
H3A: BODS	-		-0.008	-0.007	-0.002	-0.002	-0.005	-0.004	-0.007	-0.006	0.000	0.000
			(0.009)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.017)	(0.009)	(0.010)	(0.009)
Board structure												
H4A: NCE	-			-0.000						-0.007		
				(0.013)						(0.002)		
H5A: ACE	-				-0.037***						-0.073**	
					(0.014)						(0.030)	
H6A: RCE	-					-0.047***						-0.085***
						(0.014)						(0.031)
Board Functions												
BODM	-						-0.000	0.002	0.001	0.006	-0.004	-0.001
							(0.016)	(0.006)	(0.015)	(0.007)	(0.010)	(0.012)
BINT3	-						-0.124	-0.048	-0.161			
							(0.104)	(0.050)	(0.212)			
Interactions												
H1B i: BODC*BODM	-						0.015					
							(0.031)					
H1B ii: BODC*BINT3	-						0.101					
							(0.211)					
H2B i: FMALE*BODM	-							0.016				
								(0.010)				
H2B ii: FMALE*BINT3	-							-0.112				
								(0.107)				
H3B i: BODS*BODM	-								0.001			
									(0.002)			
H3B ii: BODS*BINT3	-								-0.034			
									(0.029)			
H4B: NCE*BODM	-									0.000		
										(0.002)		
H5B: ACE*BODM	-										0.004	
											(0.003)	
H6B: RCE*BODM	-											0.004
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Table 18: Continuation 1 of 1

		COMBINED SAMPLE (PANEL C)										
t-4/5 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.016	-0.156	-0.156	-0.034	-0.119	-0.017	-0.110	-0.040	-0.003	-0.016	0.001
		(0.076)	(0.075)	(0.075)	(0.076)	(0.076)	(0.079)	(0.082)	(0.083)	(0.078)	(0.078)	(0.077)
Profitability	-	-0.565***	-0.572***	-0.572***	-0.532***	-0.522***	-0.531***	-0.530***	-0.541***	-0.541***	-0.489***	-0.470***
		(0.158)	(0.160)	(0.160)	(0.152)	(0.148)	(0.164)	(0.169)	(0.170)	(0.169)	(0.161)	(0.152)
Leverage	+	0.056	0.065	0.065	0.046	-0.053	0.048	0.046	0.039	0.057	0.025	0.035
		(0.070)	(0.074)	(0.074)	(0.074)	(0.072)	(0.074)	(0.075)	(0.077)	(0.076)	(0.076)	(0.074)
Firm Size	-	-0.112***	-0.100***	-0.100***	-0.085***	-0.078***	-0.103***	-0.103***	-0.103***	-0.101***	-0.090***	-0.082***
		(0.009)	(0.013)	(0.016)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.017)	(0.014)	(0.014)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.256***	5.087***	5.079***	4.745***	4.948***	5.334***	5.086***	4.963***	4.494***	5.028***	4.982***
		(1.056)	(1.129)	(1.140)	(1.168)	(1.142)	(1.698)	(1.273)	(1.573)	(1.300)	(1.366)	(1.399)
Parameters												
Observations		692	692	692	692	692	692	692	692	692	692	692
Wald chi2(9)/12/16		97.81***	101.36***	102.05***	101.80***	114.18***	102.81***	104.13***	107.83***	101.16***	101.37***	116.38***
Pseudo R2		0.409	0.417	0.417	0.429	0.441	0.430	0.561	0.433	0.422	0.437	0.453
Log pseudo		-234.857	-231.701	-231.700	-227.074	-222.483	-226.722	-178.480	-225.472	-229.894	-223.768	-217.374
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		76.92	77.24	77.24	78.77	77.85	77.63	79.73	77.33	78.77	77.03	78.21
Non-failed		87.07	87.39	87.39	87.91	88.03	88.33	88.42	88.01	87.91	87.68	88.99
Overall		84.97	85.26	85.26	85.98	85.84	85.98	86.56	85.69	85.98	85.40	86.56
Hosmer-Lemeshow (10)												
Chi2(8)		11.384	9.80	10.17	10.99	7.42	7.11	4.97	6.55	13.78	7.26	12.90
Prob>chi2		0.181	0.279	0.253	0.202	0.492	0.525	0.761	0.586	0.088	0.509	0.115
ROC		0.900	0.903	0.903	0.907	0.912	0.909	0.911	0.912	0.905	0.910	0.916

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Table 19: Results of the One and Two Year Period LOGIT Model

		COMBINED SAMPLE (PANEL C)										
t- 1/2 MODEL MAIN VARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Board composition												
H1A: BODC	-		-0.157	-0.146	-0.121	-0.054	-0.019	-0.155	-0.149	-0.132	-0.109	-0.038
			(0.117)	(0.125)	(0.119)	(0.123)	(0.232)	(0.114)	(0.115)	(0.127)	(0.119)	(0.122)
H2A: FMALE	-		0.003	0.004	0.009	0.021	0.005	-0.021	0.004	0.005	0.011	0.021
			(0.035)	(0.035)	(0.036)	(0.035)	(0.035)	(0.071)	(0.035)	(0.035)	(0.035)	(0.035)
H3A: BODS	-		-0.021**	-0.020**	-0.019**	-0.017**	-0.016**	-0.016*	-0.027	-0.018**	-0.017**	-0.014*
			(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.017)	(0.008)	(0.008)	(0.008)
Board structure												
H4A: NCE	-			-0.003						-0.016		
				(0.009)						(0.017)		
H5A: ACE	-				-0.012						-0.032	
					(0.012)						(0.021)	
H6A: RCE	-					-0.035***						-0.060***
						(0.012)						(0.023)
Board Functions												
BODM	-						0.014	0.006	-0.001	-0.005	0.002	-0.001
							(0.014)	(0.004)	(0.013)	(0.006)	(0.007)	(0.009)
BINT3	-						-0.057	-0.140**	-0.196			
							(0.129)	(0.058)	(0.186)			
Interactions												
H1B i: BODC*BODM	-						-0.014					
							(0.026)					
H1B ii: BODC*BINT3	-						-0.082					
							(0.229)					
H2B i: FMALE*BODM	-							-0.001				
								(0.007)				
H2B ii: FMALE*BINT3	-							0.100				
								(0.084)				
H3B i: BODS*BODM	-								0.001			
									(0.002)			
H3B ii: BODS*BINT3	-								0.014			
									(0.024)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.002	
											(0.002)	
H6B: RCE*BODM	-											0.002
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Table 19: Continuation 1 of 1

		COMBINED SAMPLE (PANEL C)										
t-1/2 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.147**	-0.135**	-0.136**	-0.137**	-0.138**	-0.112*	-0.110*	-0.110*	-0.127*	-0.130**	-0.123**
		(0.065)	(0.067)	(0.067)	(0.066)	(0.065)	(0.065)	(0.065)	(0.065)	(0.065)	(0.065)	(0.062)
Profitability	-	-0.681***	-0.697***	-0.687***	-0.664***	-0.611***	-0.639***	-0.654***	-0.645***	-0.642***	-0.617***	-0.551***
		(0.164)	(0.165)	(0.163)	(0.167)	(0.144)	(0.161)	(0.159)	(0.155)	(0.160)	(0.160)	(0.135)
Leverage	+	0.033	0.035	0.035	0.035	-0.030	0.038	0.034	0.046	0.016	0.009	0.010
		(0.073)	(0.074)	(0.074)	(0.074)	(0.071)	(0.074)	(0.074)	(0.077)	(0.072)	(0.072)	(0.068)
Firm Size	-	-0.107***	-0.083***	-0.081***	-0.078***	-0.066***	-0.082***	-0.082***	-0.084***	-0.082***	-0.081***	-0.068***
		(0.009)	(0.012)	(0.014)	(0.013)	(0.009)	(0.012)	(0.012)	(0.012)	(0.014)	(0.010)	(0.002)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		6.141***	7.696***	7.545***	7.455***	7.463***	11.780***	7.242***	7.994***	6.972***	7.428***	7.483***
		(1.291)	(1.650)	(1.724)	(1.724)	(1.718)	(1.974)	(1.519)	(1.553)	(1.730)	(1.732)	(1.824)
Parameters												
Observations		704	704	704	704	704	704	704	704	704	704	704
Wald chi2(9)/12/16		102.18***	98.89***	100.54***	105.74***	119.57***	115.10***	117.08***	126.19***	102.33***	111.30***	125.05***
Pseudo R2		0.521	0.537	0.537	0.539	0.552	0.559	0.561	0.559	0.546	0.549	0.566
Log pseudo		-194.729	-188.172	-188.066	-187.455	-182.249	-179.384	-178.480	-179.151	-184.56	-183.461	-176.424
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		84.18	84.57	83.54	84.05	83.95	85.28	86.90	85.19	85.80	86.08	83.83
Non-failed		90.29	90.96	90.93	90.94	90.77	91.31	92.88	91.14	91.33	90.84	91.43
Overall		88.92	89.49	89.20	89.35	89.20	89.91	91.45	89.77	90.06	89.77	89.63
Hosmer-Lemeshow (10)												
Chi2(8)		20.14	17.65	13.88	8.46	8.63	6.35	8.23	7.30	11.09	5.79	8.23
Prob>chi2		0.010	0.024	0.085	0.390	0.375	0.608	0.412	0.505	0.197	0.671	0.411
ROC		0.929	0.936	0.936	0.936	0.941	0.941	0.942	0.941	0.938	0.939	0.944

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,. .* p<0.1, ** p<0.05 and *** p<0.01

First, the p-values (0.0001) associated with the chi-square degrees of freedom of 15 indicate that the multi-period LOGIT models are significant. This implies that there is a less than .0001 likelihood that the high level of average accuracies in the estimation (88.98%), holdout (91.01%) and combined (89.76) samples of the one to two years period prior failure, might have occurred by chance. It also records an average type I (II) errors of 21.42 (11.59) per cent, yielding an overall misclassifications of 13.74 per cent at a cut-off of 0.5 prior probabilities for the period four to five years prior failure.

Second, the Hosmer and Lemeshow test statistic is above 0.05 in models 1 to 11 of the estimation, holdout and combined samples at 8 degrees of freedom, implying that I cannot reject the null hypothesis. In contrast, the Hosmer and Lemeshow test statistic is significant at the 0.05 significance level in models 1 and 2 of the combined sample for the period one to two years prior failure, suggesting that I reject the null hypothesis. Nonetheless, I have enough evidence from the estimation, holdout and combined samples of both periods (1/2 and 4/5) to conclude that the multi-period models fit the data quite well.

Third, the multi-period models show a reduction of the log likelihood for constant- only model is significant at the 0.0001 level, recording average chi-square of 99.38(89.85) with 9 degrees of freedom for the period one to two (four to five) years prior failure.. Fourth, the multi-period models record an average pseudo r-squared of 0.50, 0.54 and 0.51 for the estimation, holdout and combined samples, respectively. Thus, the multi-period model accounts for an average of 50 to 54 per cent in the prediction of corporate failure in the UK from the 4/5 year period period failure. This yields a chi-square at the 0.0001 significance level and ROC of 0.92, 0.94 and 0.93 for the estimation, holdout and combined samples, respectively. Accordingly, I conclude that there is a less than 0.0001 likelihood that the classification accuracies of the multi-period models happened by chance. The next section presents the results in line with the hypotheses developed in chapter five.

Table 20: Summary of Results of the Hypotheses tested

HYPOTHESES		RESULTS		
	Model	Pooled	Cross-Sectional	Multi-period
BOARD COMPOSITION				
Board Independence				
1a	Proportion of outside directors	Supported (-)	Supported (-)	Supported (-)
1b(i)	Proportion of outside directors* frequency of board meeting	Not supported	Not supported	Not supported
1b(ii)	Proportion of outside directors* Former Government Official	Not supported	Not supported	Not supported
Board Gender Diversity				
2a	Presence of female director	Not supported	Not supported	Not supported
2b(i)	Presence of female director* frequency of board meeting	Not supported	Not supported	Not supported
2b(ii)	Presence of female director* Former Government Official	Not supported	Not supported	Not supported
Board Size				
3a	Board size	Supported (-)	Supported (-)	Supported (-)
3b(i)	Board Size* frequency of board meetings	Not supported	Not supported	Not supported
3b(ii)	Board Size* Former Government Official	Not supported	Not supported	Not supported
BOARD STRUCTURE				
Nomination Committee				
4a	Nomination committee effectiveness	Not supported	Partially supported (-)	Not supported
4b.	Nomination committee effectiveness* frequency of board meeting	Not supported	Not supported	Not supported
4c.	Nomination committee presence	Not supported	Not supported	Not Supported
4d.	Nomination committee independence	Not supported	Not supported	Not supported
4e.	Nomination committee chairman independence	Not supported	Not supported	Not supported
4f.	Nomination committee size	Supported (-)	Supported (-)	Supported (-)
4g.	Nomination committee meeting	Not supported	Not supported	Not supported
Audit Committee				
5a	Audit committee effectiveness	Supported (-)	Supported (-)	Supported (-)
5b.	Audit committee effectiveness* frequency of board meeting	Not supported	Not supported	Not supported
5c.	Audit committee presence	Not Supported	Supported (-)	Supported (-)
5d.	Audit committee independence	Not supported	Not supported	Not supported
5e.	Audit committee expertise	Supported (-)	Supported (-)	Supported (-)
5f.	Audit committee size	Not supported	Supported (-)	Not Supported
5g.	Audit committee meeting	Not supported	Not supported	Not supported

Table 20: Continuation 1 of 1

HYPOTHESES		Pooled	RESULTS Cross-sectional	Multi-periodl
Remuneration Committee				
6a	Remuneration committee effectiveness	Supported (-)	Supported (-)	Supported (-)
6b.	Remuneration committee effectiveness* frequency of board meetings	Not supported	Not supported	Not supported
6c.	Remuneration committee presence	Not supported	Supported (-)	Not supported
6d.	Remuneration committee independence	Not supported	Not supported	Not supported
6e.	Remuneration committee chair independence	Supported (-)	Supported (-)	Supported (-)
6f.	Remuneration committee size	Not supported	Not supported	Not supported
6g.	Remuneration committee meeting	Not supported	Not supported	Not supported
Board Functions		Supported (-)	Supported (-)	Supported (-)
	Frequency of board meetings	Not supported	Not supported	Not supported
	Former Government Official	Not Supported	Supported (-)	Supported (-)
CONTROLS				
	Liquidity	Not Supported	Supported (-)	Supported (-)
	Profitability	Supported (-)	Supported (-)	Supported (-)
	Leverage	Not supported	Not supported	Not Supported
	Firm Size	Supported (-)	Supported (-)	Supported (-)
	Firm Age	Not supported	Not supported	Not supported

Note: supported means there is a significant association between the variable and corporate failure, whereas partially supported denotes a significant association in one of the samples namely: estimation, holdout and combined.

7.5 RESULTS OF THE HYPOTHESES TESTS

The conclusions are based on a variable's significance in at least two of the three samples namely: estimation, holdout and combined. Appendix 29 through 31 reports the results of the split models (see pages 338-342), whereas table 20 contains the summary results of the hypotheses based on: the pooled, cross-sectional and multi-period LOGIT models.

Model 1 contains only the control variables. It compares favourably with re-estimated Taffler's (1983) model[16] (see Appendix 32, page 344). Further, table 20 contains four

[16] In this respect, Taffler's model is "well-established and widely used UK based Z-score" (Agarwal and Taffler (2007; p.286). Taffler's (1983) model includes four ratios: (a) profit before interest and tax to current

observations worth mentioning. First, model 1 indicates that three of the control variables namely: liquidity (β =-0.189, p<0.01), profitability (β=-0.793, p<0.01) and firm size (β=-0.094, p<0.01) have a significant marginal effect relationship with the probability of corporate failure. I also observe that industry effects (i.e. technology, consumer, industrial and healthcare) determine the likelihood of firm's failure. Conversely, I fail to find evidence that both firm age (β=0.000, p>0.10) and financial leverage (β=0.013, p>0.10) reduce the probability of corporate failure. Model 1 records an average pseudo r-squared of 0.474 and predicts 87.36 in all cases. The Hosmer and Lemeshow test statistic is also insignificant in most cases, whereas the chi-squares are significant at the 0.01 level, implying that model 1 is adequate, with average ROC value of 0.915.

Second, on the main variables, the results indicate that five measures: proportion of outside directors, board size, audit committee effectiveness and remuneration committee effectiveness and. former government official play a major role in the prediction of corporate failure. Third, the presence and size of nomination committee, audit committee's presence, expertise and size as well as the independence of remuneration committee chairman also play a significant role in discriminating between failed and non-failed firms. Fourth, on the interaction effects, this result indicates that all the LOGIT models fail to record a robust result for either the interactions between frequency of board meetings and board attributes or the interactions between former government official and board attributes. I turn next to the presentation of these findings in line with the hypotheses.

H1: Board Independence and Corporate Failure Hypothesis

Hypothesis 1a proposes that *ceteris paribus*, there is a negative association between proportion of outside directors and corporate failure. As Hypothesis 1a predicts, proportion of outside directors has a negative and significant marginal effect in the pooled, and cross-sectional LOGIT models as well as period four to five LOGIT model. In model 2, a 10 per

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liabilities, a profitability indicator; (b) working capital to total assets, a proxy for working capital position; (c) current liabilities to total assets, a proxy for financial risk; (d) (quick assets – current liabilities)/daily operating expenses. Daily operating expenses = (sales – profit before interest and tax – depreciation)/365. I use logit analysis in the re-estimation of Taffler's (1983) model, instead of the linear discriminant analysis used by Taffler (1983). The aim is to overcome the demanding assumptions of the linear discriminant analysis (see chapter 3, table 1, page 49).

cent decrease in proportion of outside directors results in the likelihood of corporate failure by 20 per cent (see table 12, page 184).

Hypothesis 1b (i) states that c*eteris paribus,* the lower the level of monitoring, the stronger is the negative association between proportion of outside directors and corporate failure. I find no evidence to support hypothesis 1b. The few exceptions, however, are t – 3 and t – 4 cross-sectional LOGIT models, which support the interaction between proportion of outside directors and frequency of board/corporate failure association at the 0.05 and 0.10 significance levels, in panel A. Model 6 of panel B of *t* – 4, in contrast, reports that the interaction between proportion of outside directors and frequency of board meetings ($\beta=0.132$, $p<0.01$) exhibits a positive and significant marginal effect with corporate failure. Explanations for the findings of hypothesis 1b (i) are limitless but are reviewed in the discussion chapter.

There is also no evidence to support hypothesis 1b (ii), which proposes that *ceteris paribus*, the lower the level of resources, the stronger is the negative association between proportion of outside directors and corporate failure. The addition of hypotheses 1b (i) and (ii) (see model 6) to model 2 considerably improves the likelihood ratio chi-square. The notable enhancement in chi-square (average accuracy) of 173.66 (87.65) to 193.68 (88.28) with 16 degrees of freedom) occurs in 1/2 year period, yielding p-values at the 0.0001 significance level. The chi-square (from 106.71 to 97.54), however, shrinks in *t* – 5. The pseudo r-squared (ROC) also record a slight improvement, with the outstanding occurring at 0.07 (0.03). This suggests that proportion of outside directors, frequency of board meeting, former government official and their interactions account for 0.07 per cent of why entities fail in the UK.

Overall, model 6 registers an average pseudo r-squared (ROC) of 0.514 (0.929), and misclassifies an average of 11.72 per cent in all cases. As well, model 6 reports an insignificant Hosmer and Lemeshow test statistic in all estimations save panel C of the pooled LOGIT model, suggesting that I cannot reject the null hypothesis. In short, I have enough evidence from the goodness of fit measures to assume the validity of model 6. Hypotheses 1b (i) and (ii) therefore obtain no support.

H2: Board Gender Diversity and Corporate Failure Hypothesis

Hypothesis 2a states that *ceteris paribus*, board gender diversity is negatively associated with corporate failure. On the contrary, there is a significant positive association between the presence of female directors and corporate failure in panels B and C of the *t* - 3 LOGIT models at the 0.10 significance levels. Likely reasons for this specific presence of female directors/corporate failure are reviewed in the discussion chapter.

Hypothesis 2b: The LOGIT models fail to provide evidence to support H2b, which states that c*eteris paribus*, the lower the level of (i) monitoring and (ii) resources, the stronger is the negative association between presence of female directors and corporate failure. There is, however, a significant positive association between corporate failure and the interaction between presence of female directors and frequency of board meetings in both the *t* – 4 and t – 4/5 LOGIT models at the 0.10 and 0.05 significance levels.

In addition, I find a significant positive association between corporate failure and the interaction between presence of female directors and former government official in the *t* – 3 LOGIT models. Corporate failure, conversely, exhibits a significant negative association between the interaction between presence of female directors and former government official in panel B of *t* – 4, 4/5 period LOGIT models and panel A of *t* – 5 LOGIT models. Reasons for the findings of hypotheses H2b (i) and (ii) are several but are listed in the discussion chapter.

Model 7 shows that the addition of hypotheses 2b (i) and (ii) to model 2 significantly improves the likelihood ratio chi-square, with the dominant occurring in *t* -1 (chi-square of 73.93 to 97.7 at 16df with $p<0.0001$). In the year five prior failure, however, the chi-square declines (from 70.52 to 66.54). Model 7 also reports slight improvement in r-squared, with the outstanding occurring at 0.09 in *t* - 2. This indicates that presence of female directors, frequency of board meetings, former government official and their interactions contribute 0.09 per cent in corporate failure prediction in the UK.

On the average, model 7 records pseudo r-squared of 0.523, and predicts 88.08 per cent in all cases. Thus, model 7 contributes 52.3 per cent in explaining the corporate failure syndrome in the UK, yielding an overall misclassification of 11.20 per cent. More importantly, model 7 records an insignificant Hosmer and Lemeshow test statistic in all estimations, suggesting that I fail to reject the null hypothesis. In short, model 7 fits the data quite well, with average ROC of 0.932. Hypotheses 2b (i) and (ii) consequently receive no support.

H3: Board Size and Corporate Failure Hypothesis

Hypothesis 3a proposes that *ceteris paribus*, the size of the board is negatively related to corporate failure. This hypothesis is supported in the pooled, *t* -1, *t* – 2 and 1/2 year period modelsl. In the penultimate year to failure, model 2 reports that, 1 per cent decrease in board size results in the likelihood of corporate failure by 2.40 per cent (see table 13, page 189).

The addition of hypotheses 1 - 3 (see model 2) to model 1 significantly enhances the likelihood ratio chi-square. The prevalent improvement in goodness fit (from a chi-square (accuracy) of 170.60 (86.04) to 180.53 (87.75) with 12 degrees of freedom) occurs in 4/5 (*t* - 2) year period, yielding p-values at the 0.0001 significance level. In contrast, the goodness of fit shrinks in 1/2 (from a chi-square of 102.18 to 98.89 with 12 degrees of freedom). In addition, the r-squareds' (ROC) improvements are negligible, with the outstanding occurring at 0.03 (0.012), implying that the three board composition variables explain 0.3 per cent of corporate failure.

On the average, model 2 records a pseudo r-squared of 0.488, and predicts an average of 87.64 per cent in all cases. Finally, model 2 registers an insignificant Hosmer and Lemeshow test statistic in almost all the logit models, suggesting that I cannot reject the null hypothesis. In a sharp contrast, the Hosmer and Lemeshow test statistic is significant at the 0.05 significance level in panel C of the pooled and 4/5 year period LOGIT models as well as panel B of the *t* - 1, implying that I reject the null hypothesis. Nevertheless, I have sufficient evidence from the classification accuracy, Hosmer-Lemeshow statistics, log likelihood chi-square, and McFadden's r-squared to conclude that the model 2, with average ROC of 0.923, fits the data quite well. Hypotheses 1a and 3a thus receive full support but not hypothesis 2a.

Hypothesis 3b states that c*eteris paribus*, the lower the level of (i) monitoring and (ii) resources, the stronger is the negative association between board size and corporate failure. There is almost no evidence from the logit models to support hypothesis H3b. Corporate failure, however, exhibits a significant positive association between the interactions between board size and both frequency of board meetings (β=0.003, $p<0.10$) and former government official (β=0.069, $p<0.05$) in panel A of *t* -1 LOGIT models, respectively. Probabe reasons for these findings are outlined in the discussion chapter of this thesis.

Largely, the chi-squares for model 8 estimations are all significant at the 0.0001 level, with the highest occurring in *t* – 1 (chi-square of 73.93 to 103.43 at 16df). Model 8 also registers an average pseudo r-squared of 0.513, and misclassifies 11.67 per cent in all cases. This implies that the interaction between board size and frequency of board meetings as well as the interaction between board size and former government officials contribute 2.4 per cent in corporate failure prediction in the UK.

Further, model 8 contributes 51.3 per cent in explaining the corporate failure phenomena in the UK. It also registers an insignificant Hosmer and Lemeshow test statistic in all estimations but not panel A of the pooled LOGIT models, implying that I cannot reject the null hypothesis. Thus, Model 8 fits the data adequately, with average ROC of 0.930. Hence, hypotheses 3b (i) and (ii) receive no support.

H4: Nomination Committee Effectiveness and Corporate Failure Hypothesis

Hypothesis 4a posits that c*eteris paribus*, nomination committee effectiveness is negatively related to corporate failure. There is no support for this hypothesis using the direct effects. The only significant exception is panel B of *t* – 5, which reports a significant negative association between the firm's nomination committee effectiveness (β=-0.049, $p<0.05$) and corporate failure (see model 3, Appendix 24, page 328). Nomination committee effectiveness exhibits a negative and insignificant association with corporate failure in almost all estimations, implying that the signs of the parameter estimates are in line with agency theory.

Using the interaction effects, nomination committee effectiveness (β=-0.063, $p<0.05$) is negatively related to corporate failure as far as two years prior to the event (see model 9, Appendix 17, page 314). Possible explanations for this specific nomination committee effectiveness/ corporate failure relationship are discussed in the next chapter of this thesis.

Chi-squared for all model 3 (9) estimations are significant at 0.0001, with an increase in pseudo r-squared of 0.01 (0.02) to 0.494 (0.504) and misclassify 12.16 (11.64) per cent in all cases. As well, the Hosmer and Lemeshow test statistic is insignificant in all estimations but not panel C in the pooled LOGIT model. In sum, models 3 and 9 fit the data acceptably, with average ROC values of 0.924 and 0.928. For this reason, hypothesis 4a receives partial support.

Hypothesis 4b: There is no support for H4b, which suggests that c*eteris paribus,* the lower the level of monitoring the stronger is the negative association between nomination committee effectiveness and corporate failure. Model 9, however, reports that corporate failure is positively and insignificantly associated with the interaction between nomination committee effectiveness and frequency of board meetings.

Model 9 records a slight increase in pseudo r-squared of 0.01 (from model 3's 0.494 to 0.504) and misclassifies 11.63 per cent compared to 12.16 per cent of model 3. Chi-squares are incremental and also significant at the 0.01 level. Finally, the Hosmer and Lemeshow test statistic is not significant in all but three cases, suggesting that model 9 fits the data quiet well. From this point, hypothesis 4b obtains no support.

Hypotheses 4c, 4e and 4g: There is also no evidence to support hypotheses 4c, 4e and 4g on nomination committees' presence, chair independence and meetings, all predicted to have a negative association with corporate failure, c*eteris paribus.* The only significant exception is panel A of model 12, which reports that nomination committee meeting has a positive significant marginal effect association with corporate failure in the five years prior failure at the 0.10 significance level (see model 12, Appendix 29, page 338).

Hypothesis 4d states that *ceteris paribus*, nomination committee independence is negatively related to corporate failure. There is no evidence to support this hypothesis. In contrast, there is a significant positive association between the firm's nomination committee independence and corporate failure in the pooled and cross-sectional LOGIT models. Model 12 illustrates that, 1 per cent increase in nomination committee independence results in the likelihood of corporate failure by 11 per cent. Possible causes for this specific nomination committee independence/corporate failure association are listed in the discussion chapter.

Hypothesis 4f posits that c*eteris paribus,* there is a negative association between nomination committee size and corporate failure. As hypothesis 4f predicts, nomination committee size has a negative and significant marginal effect ($p<0.01$) in the pooled and two of the cross-sectional LOGIT models. The results also show that a 1 per cent decline in nomination committee size increases the likelihood of corporate failure by 15.2% in the penultimate year to failure.

The addition of hypotheses 4c, 4d, 4e, 4f and 4g (see model 12) to model 1 significantly improves the goodness of fit, with the prevalent occurring in the pooled model (from a chi-square of 107.68 to 129.87 with 9df). The goodness of fit, however, shrinks in *t* - 5 (from a chi-square of 61.02 to 54.97 with 9 degrees of freedom). This notwithstanding, model 12 records a pseudo r-squared increment of 2.9 per cent (from 0.474 to 0.504), yielding an average classification accuracy of 88.46 per cent. In addition, the Hosmer-Lemeshow chi-square statistic indicates non-significance for the cross-sectional LOGIT models but not panels A and C of the pooled LOGIT model. This implies that the model 12's validity may be questionable.

However, model 12 records satisfactory results for the other measures of goodness of fit (a chi-square of 87.52, pseudo r-squared of 0.456, type I (II) errors of 15 (11) per cent) at the 0.0001 significance level. Specifically, the change LOGIT model records satisfactory results for other measures of goodness fit {an average chi-square, pseudo r-squared, ROC and type I (II) errors of 37.79, 0.089, 0.695, and 33.14 (22.69) per cent, respectively} at the 0.0001 significance level. Hence, I have enough grounds to assume the adequacy of model 12. Hypothesis 4f therefore receives full support but not hypotheses 4c, 4d, 4e, and 4g.

H5: Audit Committee Effectiveness and Corporate Failure Hypothesis

Hypothesis 5a states that *ceteris paribus*, there is a negative association between audit committee effectiveness and corporate failure. This hypothesis is supported in the pooled and *t* - 5 cross-sectional LOGIT models. In model 4, for example, 1 per cent deterioration in audit committee effectiveness results in the probability of corporate failure by 7.3 per cent as far as five years prior failure (see Appendix 24, page 328). The *t* – 5 LOGIT model also records chi-square of 71.11 (103.54) and pseudo r-squared of 0.517 (0.455) at the 0.0001 significance levels for the estimation (combined) sample.

The Hosmer and Lemeshow chi-square (6.16 with 8df) is not significant, yielding an ROC of 0.926. On average, the addition of hypothesis 5a results in a slight increase in pseudo r-squared by 0.01 (from model 2's 0.489 to 0.498) and predicts 87.95 compared to 87.65 per cent of model 2, suggesting that model 5 fits the data quite well. Hypothesis 5a consequently receives full support.

Hypothesis 5b: There is no support for H5b, which suggests that c*eteris paribus,* the lower the level of monitoring the stronger is the negative association between audit committee effectiveness and corporate failure. Model 10 records an ROC and chi-square of 0.668 and 33.33 (with 15df) at the 0.0001 significance level. The pseudo r-squared and predictive accuracy are also 0.064 and and 74.89%, implying that model 10 accounts for 6% in answering the question of why firms fail in the UK. The Hosmer and Lemeshow chi-square of 5.73 is not significant ($p>0.05$) for panel A of the change LOGIT models. Further, the chi-square, case classification, ROC and pseudo r-squared suggest that model 10 is adequate. From this point, I assume the validity of model 10, and, in this way, conclude that hypothesis 5b receives no support.

Hypothesis 5c states that c*eteris paribus*, there is a negative association between audit committee presence and corporate failure. As hypothesis 5c predicts, audit committee presence exhibits significant negative marginal effect association ($p<0.10$) with corporate failure in the *t* - 5 LOGIT models.

There is no support for hypotheses 5d and 5g on audit committee independence and meeting, both predicted to have a negative association with corporate failure. Specifically, I find that both exhibit a negative and insignificant marginal effect ($p>0.10$) relationship with corporate failure.

Hypothesis 5e posits that c*eteris paribus,* there is a negative association between audit committee expertise and corporate failure. As hypothesis 5e predicts, audit committee expertise has a negative and significant marginal effect in the pooled and *t* – 5 LOGIT models. In particular, model 13 reports that, 1 per cent drop in audit committee expertise results in the likelihood of corporate failure by 16.9%, as far as five years prior failure.

Hypothesis 5f states that c*eteris paribus,* there is a negative association between audit committee size and corporate failure. This hypothesis is supported in *t* – 5 at the 0.05 significance level. Model 10 again reports that, 1 per cent drop in audit committee size results in the likelihood of corporate failure by 9.4%.

The addition of hypotheses 5c, 5d, 5e, 5f and 5g (see model 13) to model 1 significantly improves the goodness of fit, with the prevalent occurring in the *t* - 5 model (from an ROC of 0.908 to 0.949). The *t* – 5 also registers chi-square of 96.97(13df) and pseudo r-squared of 0.467 at the 0.0001 significance levels in the combined sample. The Hosmer and Lemeshow chi-square (10.61 with 8df) also is not significant, yielding an overall classification accuracy of 87.86 per cent, implying that the overall fit of model 13 is good. Hypotheses 5c, 5e and 5f therefore receive full support, whereas hypotheses 5d and 5g receive no support. The discussion chapter provides possible reasons for this specific corporate failure/audit committee effectiveness measures association in the relevant subsection.

H6: Remuneration Committee Effectiveness and Corporate Failure Hypothesis

Hypothesis 6a states that *ceteris paribus*, remuneration committee effectiveness is negatively related to corporate failure. As hypothesis 6a predicts, remuneration committee effectiveness has a negative and significant marginal effect association with corporate failure in the pooled, change, and cross-sectional LOGIT models. Specifically, this hypothesis is supported in the pooled and *t* – 3, *t* – 4, *t* - 5 cross-sectional LOGIT models at the 0.01 significance level in model 5.

The addition of hypothesis 6a (see model 5) to model 2 considerably increases the model fit, with the prevalent occurring in the pooled LOGIT model's estimation test (from a chi-square of 83.78 to 108.063 with 13df). There is also a slight improvement in pseudo r-squared (from an average of 0.489 to 0.510), resulting in a decline (increase) in the average misclassification rate (ROC) from 12.35 (92.30) to 11.96 (93.00) per cent. Accordingly, I assume the adequacy of model 5, and, thus, conclude that hypothesis 6a receives full support.

Hypothesis 6b: There is no support for H6b, which suggests that c*eteris paribus,* the lower the level of monitoring the stronger is the negative association between remuneration committee effectiveness and corporate failure. Model 11 registers chi-square of 35.82 with 15 degrees of freedom at the 0.0001 significance level, and predicts corporate failure accurately at 75.77% of the combined sample. The pseudo r-squared and ROC values are also 0.070 and 0.676. As well, the Hosmer and Lemeshow chi-square of 7.330 with 8df is not significant (p>0.10), implying that model 11 is appropriate and contributes to 7% in answering the question of why firms collapse in the UK. For this reason, I assume the validity of model 11, and, in turn, conclude that hypothesis 6b gets no support.

Hypothesis 6c states that *ceteris paribus*, remuneration committee presence is negatively related to corporate failure. This hypothesis is supported in *t* – 2 cross-sectional LOGIT model at the 0.01 significance level.

Hypotheses 6d and 6f, respectively, predict a negative relationship between corporate failure and remuneration committee's independence and size. The logit results fail to provide robust significant evidence, *ceteris paribus*, to support the association between corporate failure and remuneration committee's independence and size. The few significant exceptions are a negative association between remuneration committee size (independence) and corporate failure in panel A (B) of *t* – 1 (*t* – 5) and *t* - 2 cross-sectional LOGIT models as well as the 1/2 (4/5) year period logit model.

Hypothesis 6e proposes that c*eteris paribus*, there is a negative association between remuneration committee chairman's independence and corporate failure. As hypothesis 6e predicts, remuneration committee chairman's independence exhibits a significant negative marginal effect with corporate failure in model 14 in all estimations at the 0.01 significance level. Thus, a 1 per cent shrink in remuneration committee chairman's independence increases the likelihood of corporate failure by 16.7, 17.1, 19.0, 22.10 and 20.3 per cent respectively for *t* - 1 through to *t* - 5.

There is no support for hypothesis 6g on remuneration committee meeting, which predicts a negative association with corporate failure. The only significant exception is panel B of *t* – 2, where corporate failure exhibits a negative and significant relationship with remuneration committee effectiveness at the 0.01 significance level. There is also a significant positive marginal effect association between corporate failure and remuneration committee meeting in panel A of t – 2 cross-sectional LOGIT model. In panel A (B) of model 14, a 1 (5) per cent increase in remuneration committee meeting as far as two years prior failure results in the likelihood of corporate failure by 13.2 (12.2) per cent.

The addition of hypotheses 6c, 6d, 6e, 6f and 6g (see model 14) to model 1 significantly enhances the goodness of fit, with the prevalent occurring in the t - 2 model (from an ROC of 0.899 to 0.945). Model 14 in t - 2 registers chi-square of 1021.53 with 13 degrees of freedom at the 0.0001 significance level, and predicts corporate failure accurately in 90.34% (90.86%) in the training (combined) test. The Hosmer-Lemeshow chi-square (9.23 with 8df) is also insignificant, generating a pseudo r-squared of 0.565 (0.642). This implies that model 14 fits the data well, with an average ROC of 0.945, and contributes to 57%-64% in solving the query of why entities fail in the UK. Overall, hypotheses 6c, 6e receive full support but not 6d, 6f and 6g.

7.6 CHAPTER SUMMARY

This chapter is dedicated to answer the two sub-questions of the study. First, I test whether the composition and structure of corporate boards relate to firm's failure. Second, I examine how the interactions between attributes and functions of corporate board relate to firm's failure. Accordingly, I test a number of LOGIT models, due in part to the binary nature of the dependent variable.

Consistent with literature, I employ the univariate analysis for a preliminary assessment of the hypotheses. As expected, the profile analysis portrays that corporate governance attributes and financial indicators of failed firms are not only weaker compared to non-failed firms, they also declined significantly as a firm approached failure. The univariate logit analysis similarly suggests that all but one (i.e. frequency of board meetings) of predictive variables exhibit a significant marginal effect relationship with corporate failure at the 0.0001 significance level as far as five years preceding failure. Financial leverage likewise appears to be positive and significant ($p<0.05$) as far as five years, whereas the frequency of board meetings is positive but not significant. Another significant observation of the univariate logit worth mentioning is that firm size dominated all in the prediction of corporate failure, yielding an average pseudo r-squared of 0.39 and predicts an average of 85 per cent in all cases.

Turning to the main independent variables, the preliminary analysis suggests that proportion of outside directors, presence of female directors, board size, remuneration, audit and nomination committees' effectiveness contribute 8, 15, 15, 22, 27, and 30 per cent, respectively, in explaining the corporate failure the 0.0001 significance level, predicting an average of 76, 74, 76, 79, 79 and 81 per cent in all cases as far as five years. On board function variables, the results suggest that CEO's performance evaluation, frequency of board meetings, non-executive directors interlock, board interlock, and former government official account for 26, 0, 8, 7, and 2 per cent in explaining the corporate failure occurrences at the 0.0001 significance level.

In addition to firm size, the control variables' results suggest that liquidity ($p<0.05$), profitability ($p<0.01$), leverage ($p<0.05$) and firm age ($p<0.01$) contribute an average of 0, 19, 0, and 0 per cent, respectively, in answering the question why entities fail in the UK. Firm's age, leverage, liquidity, former government officials, frequency of board meetings, however, predict an average of 74% in all cases as far as five years preceding failure, therein lays their justification in the multivariate logit analysis.

Turning to the multivariate logit analysis, I perform numerous tests through three main data analysis namely: pooled cross-sectional, cross-sectional and change. Accordingly, the conclusions drawn with respect to the hypotheses are based on the pooled, cross-sectional and change logit analyses. I evaluate the overall fit of the models with five main measures namely: 1) classification accuracy, (2) Hosmer-Lemeshow test, (3) log likelihood chi-square, (4) McFadden's r-squared and (5) ROC. Generally, the five measures indicate that the logit models fit the data quite well.

On board composition measures, I find that corporate failure exhibits a significant negative marginal effect association with both proportion of outside directors and board size but shows a significant positive association with the presence of female directors. On board structure measures, corporate failure exhibits a significant negative marginal effect relationship with the presence and size of nomination committee, audit committee's effectiveness, presence, expertise and size, as well as remuneration committee's presence, effectiveness and its chairman's independence. Nomination committee effectiveness, however, shows a negative and significant association with corporate failure through the interaction effects but not the direct effects. I also observe that corporate failure exhibits a significant positive relationship with nomination committee independence as well as remuneration committee's meeting.

Turning to the interaction effects, corporate failure shows a significant positive relationship with the interactions between frequency of board meetings and presence of female directors. On board functions, corporate failure exhibits a significant negative marginal effect association with former government officials but not frequency of board meetings. Concerning the control variables, corporate failure exhibits a negative and significant marginal effect association with liquidity, profitability, firm size, industry effects. There is however, no evidence to support the notion that firm age and financial leverage reduced the probability of corporate failure.

In summary, hypotheses 1a, 3a, 4f, 5a, 5c, 5e, 5f, 6a and 6e receive full support, whereas, hypotheses 4a and 6c obtain partial support. Hypotheses 1b (i), 1b (ii), 2a, 2b (ii), 3b(i), 3b(ii), 4c, 4b, 4e, 4g, 5b, 5d, 5g, 6d and 6f are not supported but the signs are in line with expectations. Hypotheses 2b (i), 4d, 6b and 6g are also not supported. Possible reasons for these findings are numerous. The next chapter is dedicated to these reasons.

CHAPTER EIGHT
DISCUSSION AND CONCLUSION

8.0 INTRODUCTION

As discussed in chapter one, this study examines whether corporate governance is related to corporate failure? Chapter Four discussed the corporate failure from the perspectives of two main theoretical lenses namely: agency, and resource dependency. Chapter Five presented six main hypotheses developed from a multi-theoretical approach. Chapter Six highlighted the UK as the empirical setting for the analysis. Thus, I concur with Taffler's (1984) notion that the UK is a major global economic market, and, in this way, ideal for an effective development of corporate failure prediction model. This notwithstanding, to the best of my knowledge, no attempt has been made in the UK to develop a theoretical model to assess the financial health of UK companies. This study attempts to fill this gap among others. Chapter Seven reported the results of the study. The aim of this chapter is threefold. First, I discuss the results from the perspective of their theoretical and practical implications. Second, I highlight limitations of the study. Finally, I recommend potentially fruitful lines of further research from this study.

The present chapter proceeds as follows. Sections 8.1 and 8.2 review the findings from the direct and interaction effects. Section 8.3 contains the contribution of this research to theory, practice and policy. The limitations of the research are considered in Section 8.4. Section 8.5 concludes with recommendations for future research.

8.1 DISCUSSION OF KEY FINDINGS ON THE DIRECT EFFECTS

The basic objective is to explore, whether corporate governance can explain corporate failure. For this reason, the study explores two sub questions: (1) whether board attributes are related to corporate failure; and (2) whether the interactions between board attributes and functions are related to corporate failure. This section is dedicated to an in-depth discussion of the findings of the first sub-question in relation to the extant literature.

The results indicate three distinct patterns. The first relates to the proportion of outside directors, board size, audit committee effectiveness and remuneration committee effectiveness. The second and third patterns relate to the presence of female directors on boards and nomination committee effectiveness, respectively. The first of the three patterns exhibits a direct association with corporate failure. The second and third patterns, however, exhibit certain features which need to be discussed. I turn next to the discussion of these patterns.

8.1.1 Proportion of Outsider Directors

The results suggest that firms with higher proportions of outside directors are less likely to fail. This probably confirms agency theory's proposition that outside dominated boards are more likely to meticulously monitor and evaluate the CEO, and ultimately, fire non-performing CEOs and, thus, reduce likelihood of firm's failure (Jensen and Meckling, 1976; Eisenhardt, 1989). Put differently, outside directors, due to their presumed independence and reputation (Fama and Jensen, 1983; Field and Keys, 2003), may reduce the likelihood of a firm's failure by motivating managers to pursue shareholder value enhancing strategies (see Fich, 2005; Fich and Slezak, 2008). This implies that outside dominated boards are less likely to collude with the CEO to expropriate shareholders' fund (Fama, 1980: Mizruchi and Strearns, 1988; Carter, Simkins and Simpson 2003), thereby reducing the probability of a firm's failure[17]. This interpretation is in line with Rosenstein and Wyatt's (1990) finding, suggesting that an additional outside director on the board increases shareholder value.

I can speculate that financial distress may trigger severe inside and outside directors' conflict over how the firm should be managed. For example, inside directors, due to the risk of losing their jobs and source of perquisites, may have a greater incentive to rescue the firm (Fich and Slezak, 2008). As well, Fama and Jensen (1983) contend that experienced inside directors are more effective in performing the service tasks. Inside directors, however, are indebted to the CEO for their livelihood and, in this mode, may be reluctant to evaluate the CEO's performance (Patton and Baker, 1987) and protect shareholders' interest (Mace, 1971). For this reason, outside directors may depart to save their reputational capital and career in the board network[18]. This is in line with Hermalin and Weisbach's (1988) finding, suggesting that poor performance is followed by more director departures. It is also argued that the failing firm may lack the growth prospects and resources required to retain prestigious outside directors[19]. This may lead to insufficient representation of outside directors on board, which in turn, explains the board's inability to discharge their

17 Fich and Slezak (2008) provide reasons on why inside directors may not be effective monitors of CEO to avoid corporate failure.

18 Gilson's (1990) findings suggest that directors of failed firms, due to the stigma of bankruptcy, are less likely to be appointed within the board network. Fich and Shivdasani's (2006) study also suggests that busy outside directors are more likely to exit boards during performance decline.

19 D'Aveni (1989b) report that a failing firm lacks the financial resources required to change competitive strategies to reverse deteriorating performance trend and thus, cannot retain prestigious outside directors.

monitoring role. In turn, this allows the CEO to pursue self-serving policy, thereby increasing the probability of corporate failure.

The results report that a 1 per cent decrease in proportion of outside directors increases the likelihood of a firm's failure by 20 per cent. Thus, outside director's departure reduces the firm's dependability (D'Aveni, 1989a: b; Beasley, 1996), due in part to a firm's reputational capital loss. This may prompt negative stock price reaction and finally, firm's failure[20]. This also confirms resource dependency theory's (Burt, 1983; Pfeffer and Salancik, 1978) notion that greater proportion of outside directors reduces the likelihood of a firm's failure (Zahra and Pearce, 1989) by improving firm's access to resources (Bazerman and Schoorman, 1983; Peng, 2004) and legitimacy (Hillman and Dalziel, 2003). Surviving firms may increase the proportion of outside directors on board as a competitive strategy to control probable environment uncertainty (Pfeffer and Salancik, 1978; Hillman, Cannella, and Paetzold, 2000) and thus, avoid corporate failure. This is also consistent with the legalistic view, suggesting that boards require greater proportion of outside directors to discharge their service tasks[21] effectively (Carpenter, 1988; Zahra and Pearce 1989; Zhang, 2010).

Another possible reason that explain why higher proportion of outside directors reduce the likelihood of a firm's failure is that outside directors, due to their assumed independence, are more likely to discharge their legal duties (see Sarbanes-Oxley Act 2002; Higgs, 2003). Therefore, outside dominated boards safeguard shareholders' interest by contributing to the firm's strategy formulation and evaluation (Carpenter and Westphal, 2001) to avoid firm's failure. This verifies board reformers' view (e.g. Zahra and Pearce, 1989; Daily and Dalton, 1994a; Higgs, 2003), suggesting that firms with lower proportion of independent directors, due to the presumed board ineffectiveness, are more likely to fail.

Finally, the result supports Gales and Kesner (1994) and Fich and Slezak (2008) findings in the US, confirming that failing firms' outside directors reduce prior to failure. The result, however, disputes Daily and Dalton (1994a: 1995), and Platt and Platt's (2012) findings, who find that board independence is not significantly related to corporate failure. The present study, however, differs

20 For example, Rosenstein and Wyatt (1990) find that the appointment of outside director is linked to positive stock price reaction.

[21] Carpenter (1988) and Zahra and Pearce (1989) document that the boards service tasks include legal duties (e.g. providing counsel to CEO, enhancing firm's legitimacy and reducing firms interdependency with its environment).

slightly from Daily and Dalton (1994a: 1995) and Platt and Platt (2012). This is probably because Daily and Dalton (1994a) use the independent/interdependent director distinction, matched on the basis of size, industry and year, but the present study considers number of outside directors divided by the board size (see Chancharat, Krishnamurti and Tian, 2012).

The above analysis probably lends support to the suitability of agency and resource dependency theories as analytical lenses through which to study the efficacy of outside directors, as a board monitoring, resource and strategy device, in the corporate failure context.

8.1.2 Presence of Female Directors

The results indicate that there is a significant positive association between the presence of female directors and corporate failure. The possible explanations are as follows. First, female directors are largely not part of the "old boys" network and hence, may provide tougher monitoring of the CEO's actions (van der Walt and Ingley 2003; Kang, Cheng and Grey, 2007). This may thwart CEO's creativity and ultimately, reduce firm's flexibility, value and survival chances. This interpretation is in line with Almazan and Suarez (2003) and Adams and Ferreira's (2007) notion that female directors may reduce shareholder value.

Second, heterogeneity may produce additional conflict in the decision making process (Carter, Simkins and Simpson, 2003). Female directors, for example, offer variety of perspectives to enrich the board decision process. This variety of perspectives, in turn, may cause the board to evaluate more alternatives and explore the consequences. This evaluation requires mutual collaboration between the executives and non-executives. Top management, however, may consider female directors, due to their tougher monitoring, as "unfriendly" and, in this manner, may be circumspect to share information to facilitate effective collaboration (Adams and Ferreira, 2007). This means that there is potential limitations in the decision making process. Specifically, female directors are limited in their advisory role, implying that corporate board strategy may not benefit from their wide base of acumen (Carver, 2002) ranging from creativity to innovation associated with board gender diversity (Cox and Blake, 1991; Robinson and Dechant, 1997 and Carter, Simkins and Simpson, 2003). In sum, board gender diversity may not impact on board strategy role resulting in ineffective board process and firm's failure, itself.

Third, homogeneity in the board is associated with a narrow perspective, implying that diversity (including gender) improves the effectiveness of the board and its committees (Cox and Blake, 1991; Robinson and Dechant, 1997 and Carter, Simkins and Simpson, 2003). For this reason, entrenched CEOs may use board gender diversity as a window dressing mechanism to appease critical stakeholders to obtain legitimacy (Brammer, Millington and Pavelin, 2007) and continual support from the investment community (Fondas, 2000). Thus, board gender diverisity, despite their perceived competitive advantage (Bernardi, Bean, and Weippert, 2002), may not be motivated by shareholder value enhancing objective but compliance[22].

Finally, the result lends support to Rose's (2007) notion suggesting that directors belonging to the "old boy's club" may supress any unique feature from female directors. Thus, female directors' contribution may not be considered in board decisions (Westphal and Milton, 2000). Further, female directors, despite their independence, may own insignificant equity stake (Eisenberg, Sundgren and Wells, 1998) and thus, lack the incentive to be effective board monitors (see Jensen, 1993). The important implication is that female directors may adapt to the passive board behaviour of the traditional "old boy's" network to retain their seats. For this reason, female directors may avoid excessive CEO monitoring but rather serve as a "rubber stamp" for CEO's agenda (see Pearce and Zahra, 1991; Adams and Ferreira, 2009), which in turn, may be detrimental to the firm's performance and long term success. In short, I invoke Rose's (2007) notion that the potential benefits of female directors are never realised by firms and its owners, so far as the CEO continues to have informal influence on board appointments.

Nonetheless, this result contradicts expectations of the agency theory, suggesting that 'more diverse boards' (Carter, D'Souza, Simkins and Simpson, 2010), due to their presumed independence, have a greater incentive to evaluate the CEO's performance, thereby reducing the likelihood of firm's failure. This result probably disputes resource dependency's proposition, suggesting that board gender diversity reduces the likelihood of a firm's failure by yielding different perspectives of looking at board strategy. The result contradicts board reformers' view (Davies, 2011), suggesting that board gender diversity leads to better board process and thus reduces the probability of a firm's failure. In sum, the result supports Jensen's (1993) notion that the composition and characteristics

[22] Daily and Dalton (2003), for example, suggest that board gender diversity is considered as an investment criterion by investors.

of corporate board should be designed to maximize shareholder value but not to appease stakeholders.

In comparison with related studies, the finding confirms Ahern and Dittmar's (2012) findings from Norwegian firms[23]. It however, contradicts Erhardt, Werbel and Shrader (2003) and Campbell and Minquez-Vera's (2008) findings[24]. The study's design and empirical settings, however, differ sharply from Erhardt, Werbel and Shrader (2003) and Campbell and Minquez-Vera (2008). Campbell and Minquez-Vera (2008), for example, use a dataset from Spain, a civil law country, dominated by concentrated and largely family ownership.

The above arguments may raise questions about the suitability of agency and resource dependency theories as analytical lenses through which to study the efficacy of board gender diversity, as a board monitoring, resource and strategic device, in the performance context.

8.1.3 Board Size

The results suggest that a firm with a smaller board size is more likely to fail. This probably confirms Dowell, Shackell and Stuart (2011) and Cole, Daniel and Naveen's (2008) finding that firms benefit immeasurably from greater monitoring effort by having larger boards. This also confirms agency theory's notion, suggesting that larger boards yield an effective board control role, and thus, enhance firm's performance (Dalton, Daily, Johnson and Ellstrand, 1999) to diminish the likelihood of failure. It is argued that smaller boards are more susceptible to CEO domination, implying that an entrenched CEO may overturn board decisions in furtherance of his interest and thereby, increasing the likelihood of a firm's failure (Miller, 1990).

This result also confirms resource dependency theory's proposition, implying that large boards, due in part to their effective linkage (Pfeffer, 1972) and diversity (Goodstein, Gautam and Boeker, 1994), reduce the likelihood of firm's failure by improving firm's ability to co-opt the turbulent environment (Hambrick and D'Aveni, 1988). Put simply, smaller boards, due to insufficient linkage, may lack the legitimacy required to secure critical resources for firm's survival.

[23] Ahern and Dittmar (2012) find that the female quota caused a negative share price reaction.
[24] Erhardt, Werbel and Shrader (2003) and Campbell and Minquez-Vera (2008) document a positive and significant association between board gender diversity and various measures of firm performance.

Another possible explanation of the efficacy of large boards to enhance firm's survival is rooted in its ability to discharge the strategic function effectively, compared to smaller boards. The strategic function is crucial during prolonged firm value decline or critical periods of financial distress (Mintzberg, 1983). In distress, smaller boards, due in part to limited diversity, may cause firm's failure by increasing the uncertainty surrounding strategic development (Pearce and Zahra, 1991). Thus, smaller boards are less diverse, and in this light, may be ineffective in taking crucial strategic decisions to adjust to environmental changes (Mintzberg, 1983; Goodstein, Gautam, Boeker, 1994). This in turn, may increase uncertainty and ultimately, reduce the probability of a firm's failure.

The deteriorating board size also suggests that directors of failed firms may depart to save their reputational capital. Alternatively, failed firms may lack the resources necessary to retain highly competent board members. Put differently, failed firms may prefer smaller boards[25], due to reduced coordination and free-rider problems associated with larger boards (Yermack, 1996). Larger boards, however, may be better for firms, due in part to inability of smaller boards to discharge their monitoring, resources and strategy functions effectively.

Finally, the result confirms Gales and Kesner (1994) and Platt and Platt's (2012) findings in the US context but not Fich and Slezak (2008). The dependent variable is, however, different from Fich and Slezak (2008). Fich and Slezak's (2008) hazard analysis, the dependent variable is the time between a firm's distress and Chapter 11 bankruptcy filing.

The present finding probably lends support for the continual use of the agency and resource dependency theories as analytical lenses through which to study the efficacy of board size, as a monitoring and strategic device, in the corporate performance and failure context.

8.1.4 Nomination Committee Effectiveness

From the interaction effects, nomination committee effectiveness is negatively related to corporate failure as far as two years prior failure. In contrast, the direct effects' result suggests that nomination committee effectiveness is not significantly related to corporate failure. Therefore, I find partial support in advancing the argument that nomination committee effectiveness is negatively related to corporate failure. The likely reasons are as follows.

[25] Jensen (1993) suggests that boards exceeding eight directors are easily dominated by CEO and thus may be ineffective.

First, decisions by the nomination committee are subject to ratification by the entire board. Thus, entrenched CEOs may lobby and in most cases overturn nomination committees' decisions in furtherance of their interests, which may be detrimental to shareholders. This interpretation is in line with evidence (see Golden and Zajac, 2001, Ees and Postma, 2004) suggesting that powerful CEOs, rather than shareholders, often select directors.

Second, the CEO may influence the succession planning process by dismissing viable successor candidates (Daily, Dalton and Cannella, 2003). The implication is that CEO influence in the board recruitment process is a more important factor in assessing the efficacy of the nomination committee in the corporate failure context. This in part may account for the partial support findings.

Third, directors who may serve on the nomination committee may own allegiance to the CEO, due to the timing of their appointment. Affiliated directors, for example, may be less likely to challenge the CEO's proposals (Wade, O'Reilly, and Chandratat, 1990). Thus, it is argued that the power relationship between nomination committee members and the CEO depends in part to the timing of directors' appointment.

Turning to the split NCE model results, I observe three distinct patterns. The first visible pattern relates to nomination committee's presence and size; the second relates to nomination committee's independence; the final pattern relates to nomination committee's chairman independence and meeting. The first of the three patterns exhibits a direct association with corporate failure. The second and third patterns, however, display some intriguing features which need to be discussed, the analysis of which I turn to.

(a) ***Nomination Committee Presence***

The results suggest that the presence of nomination committee has an insignificant negative association with corporate failure. This is at variance with propositions of Cadbury (1992), suggesting that the nomination committee enhances effective monitoring and advising of the board, a situation that could avoid corporate failure. This finding also contradicts the agency theory notion that NCs enhance directors' independence, board effectiveness and corporate survival by reducing the CEO's power (Westphal and Zajac, 1995; Westphal, 1998).

Finally, the finding disputes resource dependence theory's (Pfeffer, 1972; Pfeffer and Salancik, 1978) assertion that NCs reduce the likelihood of failure by adjusting board composition to the demands posed by a firm's external environment (Ruigrok, Peck, Tacheva, Greve and Hu, 2006). The present results suggest that the mere presence of nomination committee is not related to the likelihood of firm's failure.

(b) Nomination Committee Size

The results suggest that the size of the nomination committee has a negative significant marginal effect on corporate failure.This means that nomination committees with a minimum three independent NEDs are more likely to evaluate the board diversity prior to new appointments. This in turn, may reduce the agency conflicts (Jensen and Meckling, 1976; Fama and Jensen, 1983; Jensen, 1993), thereby diminishing the probability of firm's failure. This interpretation is consistent with the argument that nomination committees enhance firm's survival chances by strengthening the board selection process.

This result, however, disputes Platt and Platt's (2012) findings. Platt and Platt define nomination committee size as the absolute number of nomination committee members. In this study, nomination committee size takes a value of "1" if it has at least three independent NEDs, "0" otherwise.

(c) Nomination Committee Independence

The result indicates that the independence of the nomination committee has a significant positive association with corporate failure, which is at variance with agency theory. This leads to the question: how is it possible that the firm with independent nomination committee would fail? The possible explanations are several.

First, I can speculate that a nomination committee consisting exclusively non-executive directors may have lower incentive, due in part to their negligible equity holding, to design the board composition to maximise shareholder value. Second, the nomination committee consisting exclusively of non-executive directors may have to rely on CEO's input to discharge their duties. Thus, such a committee is limited by their inferior information compared to the CEO (Jensen, 1993), implying that the CEO may dominate the board selection process. This in turn, may reduce board effectiveness thereby increasing the probability of a firm's failure.

Third, the board appointment may be influenced by other factors such as substantial equity stake but not independence of the nomination committee. Thus, I could speculate that nomination committee independence may be a cosmetic device to enhance firm's legitimacy but not a firm value enhancing strategy. As failure approaches, firms conform to the accepted norms of their population (Judge and Zeithami, 1992; Sheppard, 1994), which include enhancing the independence of nomination committee. Failing firms, in turn, obtain some degree of legitimacy, due to presumed board effectiveness, to access critical resources from their environment (D'Aveni, 1989b) and to safeguard their going concern. In contrast, the evidence suggests that such attempts may not be successful as the agency and resource dependency theories may suggest.

This finding differs from contemporary studies in the US (e.g. Platt and Platt, 2012). Platt and Platt, however, use the percentage of independent directors on the nomination committee as a proxy of independence. This study's nomination committee independence takes a value of "1", if members are exclusively independent NEDs, otherwise "0".

(d) Nomination Committee chair's independence

Contrary to the expectations, the independence of the nomination committee chairperson is not significantly related to corporate failure. This suggests that the independence of the chairperson of the nomination committee is irrelevant to the corporate failure. This finding contradicts proposals of board reformers and agency theory, suggesting that an independent director serving as chairman of the nomination committee reduces the possibility of a firm's failure by promoting quality monitoring.

The likely reasons are twofold. First, other variables in the nomination committee model may be more important than the independence of the committee's chair. Large nomination committee size, for instance, may influence the chair's influence, implying that the chair may serve as a mere ceremonial head during annual general meetings and/or steer committee's meeting. Second, the measure of nomination committee chair's independence may not be appropriate in the corporate failure context. Nomination committee chair independence takes a value of "1" if its chair is independent NED (board chair inclusive), "0" otherwise.

(e) Nomination Committee Meeting

The results indicate that the number of nomination committee meetings has a significant positive association with corporate failure, which is at variance with agency theory. This suggests that frequent meetings of nomination committee increase its fees paid to directors for meeting attendance, travelling and lodging expenses as well as the opportunity cost of time executive directors' use in organizing, preparing and attending meetings (Vafeas, 1999a). Further, the nomination is approved by the entire board. This implies an increase of the operating costs of both the entire board and the nomination committee. These operating costs may diminish shareholders' value and ultimately, increase the likelihood of a firm's failure.

An alternative reason is that failing firms begin to comply with expected norms, and in the light of these meetings, look like their non-failed counterparts. Nomination committee meeting takes a value of "1", if the committee meets at least twice in the year, otherwise "0". The assumption is that by meeting twice or more the nomination committee of a firm is likely to effectively prepare a description of the role and capabilities required for a particular appointment. This, in turn, enables the firm to recruit and select prestigious board members who are more connected to the board interlock, and, thus, enhances the firms' access to vital resource (D'Aveni, 1989b) to safeguard its survival. The evidence, however, suggests that such attempts may be unfruitful, contrary to propositions of the agency and resource dependency theories.

The above arguments may raise questions about the suitability of the agency theory as analytical lenses through which to study the efficacy of nomination committees, as a board monitoring device, in the corporate failure context.

8.1.5 Audit Committee Effectiveness

Consistent with agency theory, audit committee effectiveness has a negative marginal effect on corporate failure. This suggests that an effective audit committee exercises professional care to ensure higher integrity of the firm's internal controls, higher level of audit quality (Carcello and Neal, 2003) and good financial reporting. These, in turn, improve market transparency, reduce agency costs and restore investors' confidence and ultimately, reduce the probability of the firm's failure. This interpretation is in line with the argument that audit committees enhance firm's survival chances by strengthening the financial reporting and audit process.

Turning to the split ACE models' result, I observe two key distinct patterns. The first discernible pattern relates to audit committee's presence, expertise and size; the second relates to audit committee's independence and meeting. The first of the two patterns exhibits a direct relationship with corporate failure. The second pattern, however, shows specific features which need to be discussed in the subsequent paragraphs.

(a) Audit Committee Presence

The results suggest that the presence of audit committee has a significant negative association with corporate failure. This confirms propositions of agency theory, suggesting that the mere presence of audit committee contributes towards reducing the predominant agency costs (Mendez and Garcia, 2007) and thus, enhances firm's survival chances. In this respect, audit committee presence is linked to better governance quality and reduced information asymmetries.

The result, however, contradicts related studies' findings, that suggest that the presence of the audit committee is not related to the likelihood of financial statement fraud (Beasley, 1996), earnings management (Peasnell, Pope and Young, 2005), and, thus, does not enhance the quality of financial reporting (Menon and Deahl Williams, 1994).

(b) Audit Committee Expertise

Audit committee expertise has a significant negative association with corporate failure. This means that compliance with section 3.16 of Smith (2003) reduces the likelihood of firm's failure by enhancing its risk management and external auditor's independence. Section 3.16 provides that a member of the audit committee should have relevant financial expertise.

Consistent with Anglo-Saxon related research, the present result suggests that audit committee expertise enhances corporate survival by reducing financial statement fraud (Beasley, Carcello, Hermanson, Lapides, 2000). I can speculate that financial expertise members, due in part to their reputational capital, have greater incentive to be effective monitors of external auditors' independence (Fama, 1980; Fama and Jensen, 1983; Peasnell, Pope and Young, 2005).

(c) Audit Committee Size

I find that a firm with a large audit committee is less likely to fail. This implies that at least three independent NEDs audit committee members (Smith 2003; Zaman, Hudaib and Hanifa, 2011) are required to enhance audit committee's status and resources to fulfil its monitoring role (Pincus, Rusbarsky and Wong, 1989; Kalbers and Fogarty, 1993).

I can also speculate that large audit committees may demand higher external auditors' independence by encouraging suspicious auditor switches (Archambeault and DeZoort, 2001). This result confirms agency theory propositions as well as findings from contemporary studies (e.g. Platt and Platt, 2012).

(d) Audit Committee Independence

Audit committee independence may not enhance a firm's survival. This submits that audit committee independence is not relevant to corporate failure prediction[26]. This contradicts Platt and Platt's (2012) findings. Platt and Platt, however, use percentage of independent directors compared to a more stringent definition in this study that uses a binary measure of "1" if all members of audit committee are independent NEDs and "0" otherwise. This finding is also at variance with related studies, suggesting that audit committee independence enhances the financial reporting process by reducing financial statement fraud (Beasley, Carcello, Hermanson, Lapides, 2000) and/or receiving going-concern opinion (Carcello and Neal, 2000). Possible reasons for this finding are as follows.

First, I can argue that the measure of size subsumes the audit committee independence measure. Second, it is also possible that the measure of audit committee independence adopted from Smith (2003) and Zaman, Hudaib and Hanifa (2011) may not be suitable in the corporate failure context. Third, critics may argue that the binary measure of "1" if all members of audit committee are independent NEDs does not correctly measure audit committee independence. Fourth, I can also argue that shareholders may use other mechanisms (example: reputable external audit firm) to monitor the financial reporting and audit processes. Finally, the audit committee performs a specialised function and, hence its impact may be dependent on audit committee expertise and/or size and not independence, as agency theory may suggest.

(e) Audit Committee Meeting

Frequency of audit committee meetings is not related to corporate failure. This implies that compliance with the minimum three meetings suggested by Smith (2003) is not an assurance to

[26] In this regard, in an unreported model, I test the audit committee independence measure together with the control variables only but with no difference in results.

rescue a failing company. The finding contradicts expectations from research that draws on agency theory, suggesting that regular audit committee meetings may signal due diligence (Menon and Williams, 2001), reduce fraud (Beasley, Carcello, Hermanson, Lapides, 2000) and, in this manner, improve the financial reporting process. Likely reasons for this finding are as follows.

First, I may argue that our measure of size subsumes the audit committee frequency measure. Second, it is likely that our measure of audit committee meeting adopted from Smith (2003) and Zaman, Hudaib and Hanifa (2011) may not be appropriate in the corporate failure context. Third, it is also possible that the binary measure of "1" if the audit committee meets at least three times does not accurately measure audit committee meeting. Lastly, as discussed earlier, the audit committee executes an expert function and, hence its impact may be dependent on background of members and not frequency of its meetings.

The present findings probably lend support for the suitability of the agency theory as an analytical lens through which to study the efficacy of audit committee, as a board monitoring device, in the corporate failure context.

8.1.6 Remuneration Committee Effectiveness

Consistent with agency theory, firms with weak remuneration committee effectiveness are more likely to fail. This may imply that an effective remuneration committee safeguards the firm's going concern by stretching on the performance-related elements of top executives' remuneration. Thus, transparent procedure for fixing firm's executive remuneration policy is designed exclusively to minimise the executives and shareholder conflict (Main, Jackson, Pymm, and Wright, 2008), and thus, promotes the long term success of the entity. From this point, it is argued that a weak remuneration committee might be associated with overly generous pay awards to the executives (Ezzamel and Watson, 2005), implying that the going concern of the firm is threatened. An effective remuneration committee, however, may be related to competitive remuneration packages to encourage prestigious directors to run the company successfully. This interpretation is consistent with the argument that remuneration committees enhance firm's survival chances by aligning the agent and principal interests.

Concerning the split RCE model results, I spot three distinctive patterns. The first distinct pattern relates to remuneration committee chair's independence; the second relates to remuneration committee presence; finally, the third pattern relates to remuneration committee's independence, size and meeting. The first of the three patterns shows a direct relationship with corporate failure. The second and third patterns, however, display unique features. The subsequent paragraphs discuss these patterns in detail.

(a) Remuneration Committee Presence

The evidence to the hypothesis on RC presence is mixed. First, consistent with agency theory, the annual logit models' result provides partial support that the presence of remuneration committee enhances corporate survival. This may suggest that the mere presence of remuneration committees affects the level of executives' remuneration (Conyon and Peck, 1998), implying that the prevalent agency problem is minimal.

Second, and in contrast, the pooled logit model's result also contains partial support that remuneration committee presence is positively related to corporate failure. If this tells a story, I concur with O'Reilly, Main and Crystal's (1988) notion that CEOs have a significant and informal influence in selecting board members, and, in this way, the selection process itself can raise CEO compensation to the detriment of the firm's long term survival.

I, however, discuss the results of the cross sectional models due in part to the numerous limitations of the pooled logit (see, chapter 7). The possible explanations are twofold. First, remuneration committee may increase firms' survival through long term incentive plan and stock options for firm's top management. Second, consistent with agency theory, remuneration committee is designed to monitor and evaluate the top executives and thus, restores the investment community's confidence for continual support.

(b) ***Remuneration Committee Chair's Independence***

Consistent with agency theory, firms with an independent remuneration committee chair are less likely to fail. This may indicate that greater independence of remuneration committee chair safeguards firm's survival by preventing excessive CEO pay packages (Daily, Johnson, Ellstrand and Dalton, 1998; Main, Jackson, Pymm, and Wright, 2008).

This finding complements Main, Jackson, Pymm, and Wright's (2008) findings, that the nomination committee chair requires greater independence to discharge his onerous role of shaping the remuneration committee proposals, in the light of severe shareholder management conflict. Thus, independent remuneration committee chair may preserve the firms' assets by negotiating fairly and objectively with various stakeholders of the firm.

(c) ***Remuneration Committee Independence***

Contrary to agency theory, the results show that lower remuneration committee independence is not related to corporate failure. This sharply contradicts expectation of Anglo-Saxon reformers, who provide guidance for greater independence in the compensation committee (Daily, Johnson, Ellstrand and Dalton, 1998). As well, this finding is at variance with Platt and Platt (2012) and related studies' (Mangel and Singh, 1993) findings. Possible reasons for no evidence for the hypothesis on RC independence are several.

First, I can speculate that the measure of firm size subsumes the remuneration committee independence measure. Second, it is plausible that the measure of remuneration committee independence adopted from the Greenbury (1995) may not be appropriate in the corporate failure context. Third, it is also probable that the binary measure of "1" if all members of remuneration committee are independent NEDs does not correctly measure remuneration committee independence. Fourth, I also contend other governance measures such as higher proportion of outside directors are more relevant to evaluate the CEO's performance in the corporate failure context. Lastly, the remuneration committee's impact may be dependent on remuneration committee chair's independence and not the independence of its entire members.

(d.) Remuneration Committee Size

Contrary to expectations, remuneration committee size is not related to corporate failure. This suggests that the remuneration committee size is irrelevant to the corporate failure prediction. Our finding contradicts Platt and Platt's (2012) findings and propositions of agency theory. The likely reasons are as follows.

First, it is possible that the binary measure of "1" when RC includes at least three independent NED (board chair exclusive), "0" otherwise, does not correctly measure remuneration committee size. In this respect, Platt and Platt (2012) use the absolute number of remuneration committee size. Second, other variables (example: remuneration committee chair's independence, firm size) in the remuneration committee model may be more important than the size variable. Third, it is also possible that shareholders may employ other governance mechanisms to monitor executive compensation.

(e**) *Remuneration Committee Meeting***

The frequency of remuneration committee meetings is not related to corporate failure, contrary to expectations. This suggests that compliance to the minimum two meetings suggested by ICSA (2010) is not an assurance to salvage a failing company. This contradicts propositions from agency theory and related research findings, which suggest that frequent remuneration committee meetings enhance firm's survival and CEO monitoring by reducing the executive pay fiasco (Daily, Johnson, Ellstrand and Dalton, 1998). Possible reasons are as follows.

First, I argue that the measure of firm size subsumes the frequency of remuneration committee measure. Second, it is possible that the measure of remuneration committee meeting adopted from ICSA (2010) may not be suitable in the corporate failure context. Third, it is also likely that the binary measure of "1" if the remuneration committee meets at least twice does not accurately measure remuneration committee meeting. Finally, the remuneration committee's impact may be dependent on the independence of its chair and not meetings.

The current finding probably provides support for the appropriateness of the agency theory as analytical lens through which to study the efficacy of remuneration committee, as a board monitoring device, in the corporate failure context. This paves the way for the discussion of the interaction effects in the next section.

8.2 DISCUSSION OF KEY FINDINGS ON INTERACTION EFFECTS

This section discusses the findings on the interaction effects of corporate governance on corporate failure. Former government official, frequency of board meetings and the interactions between board attributes and functions are discussed accordingly in the relevant sub-sections.

8.2.1 Former Government Official

Consistent with resource dependency theory, a firm with a former government official is less likely to fail. It is argued that governments are considered as critical sources of dependency (Schuler, Rehbein and Cramer, 2002; Hillman, 2005). In this respect, former government officials on the board provide information required to secure government contracts (Hillman, Cannella and

Paetzold, 2000). Further, former government officials are “resources rich directors” (Boyd, 1990) and thus serve as channels to form strategic alliance with existing government officials to access privileged resources concerning proposed firm’s policy environment changes (Schuler, Rehbein and Cramer, 2002). Put simply, former government officials on board provide access to privilege information and legitimacy. This, in turn, reduces uncertainty (Pfeffer, 1972), thereby enhancing firm’s performance (Hillman, 2005), value (Hillman, Zardkoohi and Bierman, 1999) and survival (Schuler, Rehbein and Cramer, 2002).

This interpretation is consistent with resource dependency’s notion, suggesting that boards create linkages between the firm and critical coalition’s partners who create uncertainties (Pfeffer, 1972; Hillman, 2005). The present finding probably provides support for the appropriateness of the resource dependency theory as an analytical lens through which to study former government official, as board resource device, in the corporate failure context.

8.2.2 Frequency of Board Meetings

Contrary to expectations, the number of board meetings has a positive and significant association with corporate failure. This refutes proposition from agency theory, which suggests that higher frequency of board meetings reduces the likelihood of corporate failure by enhancing board monitoring (Vafeas, 1999a). As well, the finding refutes Vafeas’s (1999a) findings that firm performance (i.e. excess stock return) enhances following years of higher frequency of board meeting. The likely reasons are as follows.

First, more board meetings increase cost (e.g. directors’ meeting fees, managerial time), thereby reducing shareholder value, and in this way, increase the probability of a firm’s failure. Jensen (1993) concurs, emphasising that healthy firms’ boards are reasonably inactive. This interpretation is in line with Vafeas’s (1999a) study, suggesting that high frequency of board meetings are followed by negative stock price reaction and poor performance.

Second, frequency of board meetings does not correctly measure board monitoring. Put differently, board meetings are used mainly for “legal compliance activities” and “information dissemination” rather than control of CEO (Machold and Farquhar, 2013). This means that fruitful deliberations are not possible at board meetings (Jensen, 1993), due in part to boards’ passivity (Machold and

Farquhar, 2013) and unproductive routine task which absorbs most of the limited meeting time (Vafeas, 1999a).

Third, other board function measures (example: former government official) in our interaction terms models may be more significant than the board monitoring measure variable. Fourth, other governance mechanisms (e.g. board committees) may be more important as board monitoring mechanisms but not frequency of board meeting. Lastly, the measure of board monitoring may be inappropriate in the corporate failure context.

The present finding probably lends support to the argument that firms employ board meetings as a fire-fighting device (Jensen, 1993). The finding, however, raises questions about the appropriateness of the agency theory as analytical lens through which to study the efficacy of board meetings, as a board monitoring device, in the corporate failure context.

8.2.3 Interactions between Board Attributes and Functions

On the interactions, I observe three distinct patterns. The first relates to the frequency of board meetings interactions with proportion of outside directors and board size as well as the interaction between former government officials and presence of female directors. The second relates to frequency of board meetings interactions with presence of female directors, audit and remuneration committees' effectiveness. Finally, the third pattern relates to the interaction between outside directors and former government officials as well as the interaction between outside directors and the frequency of board meetings. The first of three patterns shows contradicting relationship with corporate failure. The second and third patterns, however, display positive and no relationship with corporate failure, respectively. I turn next to the discussion of these patterns.

First, the interaction between proportion of outside directors and the frequency of board meetings shows no significance in almost all estimations. The interaction between proportion of outside directors and the frequency of board meetings, however, is significantly negative in panel A of t - 3 and t – 4, but significantly positive in panel B of t - 4 logit model. The interaction between presence of female directors and former government officials exhibit significantly negative in panel B (A) of t – 4 (t – 5), but significantly positive in panel B of t - 3 logit model. There is no evidence for the interaction between board size and the frequency of board meetings. There is also no evidence for the interaction between board size and former government officials except a significant and positive association in panel A of the $t-1$ logit model. These could suggest that the results are sensitive to model specifications.

Second, the interaction between presence of female directors and the frequency of board meetings is significantly positive in model 7. This may suggest that the relationship between presence of female directors and corporate failure is stronger in firms with higher frequency of board meetings. Thus, I could argue that the female's director service task may require more board meetings to establish an intimate relationship with the CEO. The important implication is that the female director may be more sympathetic with the CEO and thus, protect his interest rather that the principal. This in part may account for why the interaction between presence of female directors and the frequency of board meetings is positively associated with corporate failure. This interpretation is in line with class managerial hegemony's notion suggesting that directors protect the interest of the ruling party (see Pettigrew, 1992; Hung, 1998; Mills, 2000).

The interaction between audit committee effectiveness and the frequency of board meetings is significantly positive in model 10. The interaction between remuneration committee effectiveness and the frequency of board meetings is significantly positive in model 11. These contradict the expectations of agency and resource dependency theories as well as reformers in the Anglo-Saxon environment. It could suggest that failing firms adopt these acceptable governance mechanisms as strategies to restore investment community's confidence but to no avail. Pfeffer and Davis-Blake (1986) suggest that effective turnarounds are associated with installation of a new board, is germane here.

Third, the interaction between proportion of outside directors and former government officials is not significant in all specifications. The possible reason is that not all outside directors are independent of management. Further, the former government official measure includes both executive and non-executive. The important implication is that this interaction ignores independence, which is essential factor for board monitoring. The interaction between nomination committee effectiveness and the frequency of board meetings exhibits no significance in all specifications. The likely reason is that nomination committee's decision is subject to board ratification. Further, frequency of board meeting may not be a suitable proxy for board monitoring. The implication is that nomination committee and board meetings may be a window dressing device to appease critical exchange partners. In short, critics (e.g. Kang and Shivdasini,

1995) may argue that the model lacks power, due in part to inappropriateness of the board monitoring measures.

The present findings add to the interaction effects literature of corporate governance and performance in two fold. First, it extends the extant literature on corporate governance and corporate failure by looking at the interplay of board attributes and functions. Second, the findings, however, raise questions about the appropriateness of the integration of the agency and resource dependency theories as analytical lenses through which to study the efficacy of the interaction of board attributes and functions, in the corporate failure context. In short, the present findings contradict propositions from agency and resource dependency theories, implying that proportion of outside directors, presence of female directors and nomination committee effectiveness interactions with board monitoring and resources provision does not influence corporate survival. This paves the way for a summary of the key findings in the next section

8.3 CONTRIBUTION OF THE RESEARCH

This section presents the study's contribution to knowledge, practice and policy. Subsection 8.3.1 describes the contribution to theoretical development. Subsection 8.3.2 deals with the contribution to advocates of board reforms. Subsection 8.3.3 considers the contribution to firm's governance policy.

8.3.1 Contribution to Theoretical Development

Hillman and Dalziel (2003) document that boards perform two main functions: control and resource provision, which in turn, are vital to prevent corporate failure. Empirical evidence, however, is distinctively lacking. The primary contribution of this research is to fill this gap. Thus, the study seeks to answer the question of whether board attributes and functions are related to a firm's likelihood of failure? In this respect, the study contributes to corporate governance and corporate failure literature in several ways.

First, this study is one of the first to test empirically an integrative model of the two corporate governance theories: agency and resource dependency theories, in the corporate failure context. Thus, I answer the call that the corporate failure context is one of the opportunities for linking the aforementioned theories (Zahra and Pearce, 1989). Accordingly, I discuss important insights connected to corporate failure prediction from the two main theoretical approaches. Thus, the theoretical basis of the study contains the fusion of the two theories to explain the corporate failure syndrome.

Second, this study extends prior corporate governance and corporate failure research by proposing and testing an integrative framework that embraces both the direct and interaction associations between corporate governance and corporate failure. Although contemporary researchers (Zahra and Pearce, 1989; Mellahi and Wilkinson, 2004; Amankwah-Amoah and Debrah, 2010) acknowledge the significance of the interaction effects of corporate governance on corporate performance and failure, in particular, empirical evidence is distinctively lacking. This study attempts to fill this gap. Our integrative framework considers board attributes and functions as well as their interactions. Thus, I seek to gain insights on how firms fail and in this way, contribute to the literature on what corporate governance mechanisms are required for a firm to survive. In sum, the proposed integrative framework departs from prior studies, and in this light, may improve our understanding of corporate failure.

Third, this study is one of the first to mirror the recommendations of Cadbury (1992), Greenbury (1995), Higgs (2003), and Smith (2003) relating to the board and its committees effectiveness in the UK. Fourth, this study is the first attempt to develop and test a theoretical model to assess the financial health of UK companies. Thus, prior prediction models in the UK are mainly based on ad hoc selection of variables approach.

Fifth, this study is the first to explore the association between corporate failure and board gender diversity, frequency of board meetings, former government official as well as nomination, audit and remuneration committees' effectiveness. The board former government official measure captures the chairman, senior NED and CEO's government experience. The inclusion of the CEO's government experience overcomes a major gap in the interlocking research. Thus, this study considers both inside and outside directors' government experience unlike prior studies that consider only the latter (sees Rivas, 2012). To date, nomination, audit and remuneration committees' effectiveness variables have been used in isolation. This study applies agency analytical lens to examine the effect of nomination, audit and remuneration committees' effectiveness variables based on a composite measure of five constructs. In this regard, I recognise the multi-dimensional nature of corporate failure by controlling for board composition, financial indicators and firm specific characteristics.

Sixth, in contrast to propositions from the agency and resource dependency theories, our results provide support to the argument that board gender diversity can possibly be a drawback in terms of performance (Adams and Ferreira, 2009) because it's not a value enhancing strategy. As Terjesen, Sealy and Singh (2009) note, women are invited to serve on boards to reflect the present generation of stakeholders. Our evidence refutes resource dependency's assertion that women reduce the likelihood of failure by bringing different values and perspectives to enrich the boardroom dynamics (Ruigrok, Peck, Tacheva, Greve and Hu, 2006). As well, this study does not lend support to Pearce and Zahra's (1991) assertion that boards with at least a woman director would be less likely to rubber-stamp, due in part to their broader experiences and different "voices" (Fondas and Sassalos, 2000).

Seventh, the use of agency and resource dependency theories in this study has shown that the proportion of outside directors and board size are significant signposts to the failure event. For this reason, the findings lend support to the notion that outside dominated boards exhibit a positive association with effective board control (Johnson, Daily and Ellstrand, 1996) and resource provision function (Pfeffer, 1972; Pearce and Zahra, 1991; Fich, 2005) and, thus, enhance a firm's survival chances. This contradicts Gales and Kesner's (1994) findings, implying board composition (i.e. absolute number of outside directors) is not related to corporate failure, using the resource dependency analytical lens. The findings also provide support that board size is a device to access resource, implying that large board is valuable for the breath of its 'services' (Chaganti, Mahajan, and Sharma, 1985; Dalton, Daily, Johnson, and Ellstrand, 1999) as well as an indicator of board control over the CEO (Pearce and Zahra, 1991). This supports Gales and Kesner's (1994) findings, suggesting that prior to bankruptcy declaration, declining firms experienced loss of outside directors and thus, shrink in overall board size.

Eighth, the use of agency theory in this study has shown that nomination committee size, remuneration committee effectiveness and its chair's independence as well as audit committee's effectiveness, size, presence and expertise are important governance mechanisms that contribute towards understanding of the failure syndrome. The findings lend support to the notion that well run board nomination, audit and remuneration committees prevent corporate failure by allowing the board to monitor managerial performance (Pincus, Rusbarsky and Wong 1989; Zahra and Pearce, 1989).

Ninth, the use of resource dependency theory in this study has shown that board government experience is a significant governance mechanism that contributes towards our understanding of the failure syndrome. Our findings lend support to the assertion that government experience enhances firm's survival by increasing the firm's ability to co-opt resources to decrease environmental uncertainty (Rivas, 2012; Hillman, 2005). The findings suggest that the impact of former government official becomes profound in two years prior to failure, suggesting that failing firms lack the managerial talent to pursue a turnaround strategy.

8.3.2 Contribution to Government Policy

The study also provides suggestions that could strengthen the unitary board system in four thematic areas namely: composition, effectiveness, accountability and remuneration. I will discuss each in turn.

On board composition, the Higgs Report (2003) recommends that at least half of the board should be independent NEDs, excluding the chairman. The findings suggest that this must be preserved to enhance boards' ability in discharging its monitoring and resource roles. The findings lend support to the notion that greater proportion of NEDs on the unitary board promotes board effectiveness by allowing NEDs to constructively challenge the CEO's proposals. Here prior empirical evidence on corporate governance and outside directors, in particular, are based solely on Cadbury. In contrast, this study reflects on both Cadbury (1992) and Higgs (2003) regarding outside directors in the UK.

Turning to board effectiveness, the Cadbury (1992) and Higgs (2003) recommend that nomination committee should consist of a majority NEDs and chaired by independent NED. The findings suggest a minimum of three independent NEDs nomination committee membership is required to enhance its status and power in discharging its duties. This is a wake-up call to the Financial Reporting Council and advocates of boards worldwide to be more prescriptive on the membership of the nomination committee. The findings also endorse the Code's (2003) supporting principle on board size, suggesting that sufficient board size is required to facilitate board and its committees' effectiveness. The declining board size of failing firms may hasten the failure process by disrupting management turnaround strategies through weakening the board's composition and structure. In this vein, the Financial Reporting Council should introduce measures aimed at encouraging boards of failing firms to demonstrate commitment to the board turnaround strategies to help rescue the firm.

On board accountability, the findings suggest that Smith's (2003) requirement on presence, size, and expertise of audit committees must be maintained to ensure long term success of firms in the UK. There is also the need for reforms worldwide to embrace the prescriptive nature of Smith's (2003) requirements to ensure rigorous board accountability through the audit committees.

Finally, on board remuneration, the findings suggest a more prescriptive requirement to complement Greenbury (1995) and Higgs' (2003) guidance. Specifically, the findings endorse Greenbury and Higgs recommendation for the establishment of board compensation committee with membership exclusively NEDs. In addition, the findings suggest that remuneration committee should include at least three NEDs, chaired by independent NED, and should meet at least twice a year. In this vein, the Financial Reporting Council should introduce measures aimed at encouraging boards to adopt a more prescriptive model to ensure an effective remuneration committee to minimise the conflict between executive pay and shareholder wealth maximisation. This finding also serves as a wake-up call for reforms worldwide to embrace a more prescriptive framework to ensure competitive remuneration is pay to maintain and motivate prestigious board members to run their entities successfully.

8.3.2 Contribution to Firm's Corporate Governance Strategies.

The study's findings also provide several implications for firm's corporate governance strategies. First by pursuing board gender diversity schemes, the resource dependency scholars may argue that new female directors will impact on the board advisory role (Burak, Malmender and Tate, 2008). From the agency perspective, female directors enhance board monitoring role by reducing the CEO's influence over the board (Ahern and Dittmar, 2012). The findings, however, suggest that board gender diversity strategy may be a window-dressing exercise to appease the investment community for continual support. This window dressing strategy may result in substantial costs to shareholders (Ahern and Dittmar, 2012). Thus, female directors, due to their presumed long-term orientation (Masta and Miller, 2011), may lack the experience required to reverse the downward trend of a failing firm. I concur with Jensen's (1993) notion that the board should not be moulded after the democratic political model that represents other constituencies. Investors should be aware that board gender diversity may not be motivated by safeguarding firm's survival but rather a scheme to mislead firm's stakeholder for continual support.

Second, the expectation in the Anglo-Saxon literature is that outside directors enhance their board monitoring role by demanding more board meetings. This view is strengthened by the agency theory, emphasising that more board meetings enhance a firm's likelihood of survival by allowing outside directors to pursue shareholders' interests (Vafeas, 1999a). The academic and financial press also attribute ineffective monitoring to busy directors who are not able to attend meetings frequently (NACD, 1996). The findings, however, suggest that frequent board meetings may be a fire-fighting device to pacify investors in the presence of problems (Jensen, 1993). Drawing from the class managerial hegemony perspective, these meetings may be too artificial, due to the presumed limited time of meetings and lack of genuine independence among outside directors (Vafeas, 1999a), to safeguard failing firms from the downward spiral. Further, effective board monitoring through frequent board meetings may not be possible so far as the CEOs set the agenda (Jensen, 1993) and most of the limited time for board meetings is consumed by routine task (Machold and Farquhar, 2013). Accordingly, investors should be aware that board meetings are not a proactive measure to improve performance (Vafeas, 1999a) and/or reduce the likelihood of firms' failure.

Third, by following strategies to enhance nomination committee's independence, agency scholars may argue that the CEO's influence in the board selection process is reduced and, in this way, NCs increase the board's effectiveness (Vafeas, 1999b) by raising directors' qualifications. The findings, however, propose that nomination committee independence is purely cosmetic in the presence of crisis to conform to best industry practice. Although the CEO is not a member of the nomination committee but attends every committee meeting at the invitation of the committee's chair. Therefore, investors should be aware that the selection process may potentially hasten the failure process due in part to the CEO informal influence on new board appointments.

Finally, the findings suggest that failing firms should pursue strategies aimed at recruiting, retaining and motivating competent outside directors to be committed to turnaround strategies. These outside directors, due to their managerial talent and prestige, would be more effective in board monitoring and the resource provision role. Further, they may impact on board monitoring by serving on the remuneration and audit committees. This in turn, may enhance the effectiveness of the board remuneration and audit committees and, thus, enhance the firm's legitimacy to access critical resources to reduce the likelihood of failure.

8.4 LIMITATIONS OF THE STUDY

The study's approach has six main limitations. These are: (1) arbitrary definition of corporate failure, (2) neglect of small and medium private unquoted firms, (3) arbitrary sample period, (4) neglect of a more regulated corporate governance environment, (5) neglect of the phenomenological approach, and (6) neglect of the macroeconomic indicators. I will discuss each in turn.

8.4.1 Arbitrary Definition of Corporate Failure

I define corporate failure as firms that have filed for insolvency under the UK Insolvency Act of 1986. Thus, the failed firms' sample may be contaminated with firms that may have filed for insolvency for other reasons but not financial. In contrast, this study seeks to develop an economic model but not an insolvency model. This is consistent with the vast literature (Shumway, 2001; Hillegeist, Keating, Cram and Lundstedt, 2004).

The findings, however, cannot be generalised beyond the UK due to fundamental national differences in insolvency laws. Consequently, future research should consider extending the scope of failure's definition to encapsulate the Morris's (1997) spectrum of potential indicators of corporate financial distress.

8.4.2 Neglect of Small and Medium Private Unquoted Firms

The non-failed firms are relatively large and within the top 500 publicly quoted firms on the London Stock Exchange Market. The failed firms also include formerly public quoted and unquoted firms. The major limitation is that I neglect small and medium-sized firms that are not listed where, arguably, failure is intense.

The conclusions, therefore, cannot be generalised to private and/or entities listed under the Alternative Investment Market (AIM), due in part to the major differences between publicly and privately owned firms in terms of corporate governance mechanisms. To deal with this limitation, future research should seek to replicate this study in the AIM.

8.4.3 Arbitrary Sample Period

The sample period is 1st January, 1999 to 31st December, 2011. The aim for this arbitrary sample period is to collect data 5 years after the introduction of the Cadbury's (1992) Report. In addition to Cadbury (1992), the study mirrors Greenbury (1995), Higgs (2003), Smith (2003), and the Code's

(2010) guidance on boards and its committees. The main limitation is that the failed firms have different failing years within the sample period. Hence, critics (e.g. Ooghe, Joos, and DE Bourdeaudhuij, 1995) may argue that the findings are valid for sample specific data within the chosen time period. To overcome this limitation I collect data from the non-failed firms in line with the failing firms' year datasets. As well to mitigate data stationarity and stability related issues, I randomly split the data into two sub-samples: estimation and holdout. This notwithstanding, I cannot assume causality, due to the statistical approached used[27].

8.4.4 Neglect of a more Regulated Corporate Governance EnvironmentS

I limit the empirical settings to the UK, a 'comply or explain' corporate governance environment. Further, I omit foreign firms in the UK due in part to the effects of exchange rate fluctuations.

Consequently, the results may not be applicable in: (1) a more regulated corporate governance environment (e.g. US), (2) foreign firms in the UK and finally, (3) jurisdictions with dual boards (e.g. Germany). Therefore, future research should consider replicating the study in a mandatory corporate governance environment, foreign firms in the UK and/or countries with dual boards.

8.4.5 Neglect of the Phenomenological Approach

The study adopts the positivism approach due in part to the difficulties of obtaining data through interviews from boards of failed firms. Accordingly, a significant feature of this study is that, the annual reports are meticulously analysed to extract corporate governance attributes for incorporation in the models. The aim of this is to make the model not only relevant to the population studied, but to firms that will appear in the future.

Critics, however, may argue that choosing between interpretive and positivism approaches is not straightforward. Thus, the models' validity may be enhanced if data is gathered through triangulation. As a result, future research should replicate this study by collecting data from annual reports, through questionnaires from insolvency practitioners and interviews of board members of selected failed firms.

[27] The statistical approach used in the study, however, is well established in the literature (see Chapter 6, section 6.6 and 6.7).

8.4.6 Neglect of the Macroeconomic Indicators

Finally, I limit the antecedents of corporate failure to selected corporate governance attributes, financial and firm specific indicators. The implication is that other factors (e.g. macroeconomic and natural disasters) that may precipitate failure in the real world are not captured in the models. Further, the corporate governance attributes employed in the study are not exhaustive. This paves the way for recommendations of future research in the next section.

8.5 RECOMMENDATIONS FOR FUTURE RESEARCH

This study answers two key questions. First, to what extent are the composition and structure of corporate board related to corporate failure? Second, to what extent is corporate failure related to the interactions between board attributes and functions. Other governance measures and variables operationalization, however, are recommended for future research.

On board composition, a proxy for board independence, I use a measure of proportion of outside directors. This measure may not mirror independence, since all outside directors may not necessarily be independent of management. In this regard, Dalton, Daily, Johnson, and Ellstrand, 1999) define independence as the boards' ability to provide guidance that does not reflect the CEO's will. For this reason, future research should consider dependent and independent directors as well as CEO dominance, as proxies for board independence.

Turning to board gender diversity, I use a dummy of "1" if there is a female director on the board, "0" otherwise. Critics may argue that this measure is basic and, thus, does not mirror board gender diversity. Future research, therefore, should consider background, skills, experience, age, qualifications and affiliations of female directors as well as gender diversity on board committees. The implication is that these wider set of variables may deepen the understanding on the impact of board gender diversity on corporate failure.

On board effectiveness, I use two measures: board size and nomination committee effectiveness. Further research, however, may extend this to include board diversity. Pearce and Zahra's (1991) finding suggests that large and more diverse boards enhance firm's performance by reducing uncertainties associated with strategy development. Goodstein, Gautam and Boeker (1994), however, suggest that board diversity may be a significant constraint on strategic change. These contradicting findings suggest that board diversity remains an empirical question to date. For this reason, I argue that the board diversity may provide insightful findings in the context of corporate failure.

On board accountability, I use audit committee effectiveness, a composite measure of five main constructs: audit committee's presence, independence, size, expertise and meeting. From the agency perspective (DeAngelo, 1981), due to the presumed conflicts of interest, audit function is seen as an effective monitoring device. The audit function's credibility, however, is challenged in the wake of the unprecedented financial scandals and its associated corporate failures. Arnett and Danos's (1979) findings suggest that audit firm size is not related to audit quality. In contrast, DeAngelo (1981) finds otherwise. In this vein, I argue that the corporate failure context may provide insightful findings on surrogates for the audit functions quality. For this reason, further research, may consider external auditor tenure, size and reputation in the corporate failure context.

On board remuneration, I use remuneration committee effectiveness, a composite measure of five main constructs: remuneration committee's presence, independence, size, chair's independence and meeting. Jensen and Meckling (1976) propose that execution stock option contracts reduce the prime moral hazard problem by aligning agents and shareholders' interest, and, in this manner, enhance firm performance. Contemporary researchers (e.g. Rajgopal and Shevlin, 2002) confirm this notion, implying that stock options enhance shareholder value.

Critics (e.g. Hanlon, Rajgopal and Shevlin 2003), however, have labelled executive stock options as 'rent extraction'. Carpenter and Remmers (2001), for example, find that top executives exploit stock option to the detriment of shareholder value. In sum, empirical evidence on stock options is mixed. There is also no evidence in relation to the link between executive stock option and corporate failure. Thus, I argue that an examination of stock options in the corporate failure context may provide insight to clear the present ambiguity in the top executive contract literature. More importantly, corporate failure literature would benefit greatly if future research is directed to capture executive stock options.

On the board monitoring role, I opt for frequency of board meetings instead of CEO's performance evaluation due to multicollinearity issues. This measure may not mirror board monitoring. I find that frequency of board meetings is positively related to corporate failure. This finding suggests future investigations are required on surrogates for quality of board meetings. Thus, to answer the question: which factors of board meetings contribute to corporate failure. In this vein, future research should consider meeting's agenda, duration and minutes. Vafeas (1999a), for example, recognizes proxies for board meeting quality as follows: (1) outside directors' ability to direct meeting's agenda, (2) freedom to challenge and exchange ideas at board meeting, and (3) meeting duration less time allocated for unproductive routine task.

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APPENDICES

Appendix 1: Summary of Corrporate Governance Framework in ther UK

INDICATOR	PRINCIPLE OR GUIDANCE
INTRODUCTION	
Corporate governance view	Agency paradigm
Trademark	‘comply or explain’
LEADERSHIP	
Board structure	Unitary board-(executive and independent non-executive)
CEO duality	Allowed but not permitted
Non-executive directors	Independent
EFFECTIVENESS	
Board & Committees	-Balance of skills -experience -independence -knowledge of the company
Appointment to board	-formal, rigorous and transparent -re-election at regular intervals
Directors Commitment	-Sufficient time
Directors Learning &Growth	-induction -Continuous Professional Development
Board Information needs	-reliable and relevant
ACCOUNTABILITY	
Company’s position and prospects	-balanced and understandable assessment
Risk Management	-maintain sound risk management and internal control system -established formal and transparent arrangements in relation to: corporate reporting and risk management and company’s auditor
REMUNERATION	
Levels of Remuneration	-sufficient to attract, retain and motivate directors of the quality required to run the company successfully -performance related pay - formal and transparent policy on remuneration -no director should be involved in deciding his own pay.
RELATIONS WITH SHAREHOLDERS	
Dialogue	-An active Dialogue with mutual understanding -AGM
Voting rights	One share one vote
OTHERS	
Disclosure	-mandatory- (FSA DTR chapters 7.1 and 7.2) - comply or explain- (FSA Listing Rules 9.8.6 R, 9.8.7 R, and 9.8.7)& The UK Corporate Governance Code (2010)
Additional Guidance	-Internal Controls-(The Turnbull Guidance) -Audit Committees-(FRC Guidance).
Source of documents	FRC website at: http://www.frc.org.uk/corporate/ukcgcode.cfm

Appendix 2: Comparison of Insolvency Procedures in the UK

Procedure	liquidation		Reorganization			
Options	Compulsory liquidation*	Voluntary liquidation**	Administration	Administration receivership	Company Voluntary Arrangement	Corporate voluntary moratorium
Control rights Owner of the right to run the firm during the procedure	Creditors Official Receiver becomes liquidator unless the court thinks otherwise.	Creditors Insolvency practitioner	Creditors Administrator	Creditors Administrative Receiver	Creditors Administrator	Debtor Directors
Solvency Requirement	Default of a debt covenant	Solvent or insolvent company as per directors' or creditors' orientation, respectively.	Default of a debt covenant	Default of a debt covenant	Default of a debt covenant	Default of a debt covenant
Automatic Stay against creditor claims	Yes	Yes	Yes	No	No	Yes
Main objectives	Allow the company to compromise its liabilities to creditors	Allow the company to wound-up	Act in the interest of all creditors and in turn rescue a company as a going concern	Repayment of the floating charge holder and secured creditors' claims	Rescue a company as a going concern	Allow an eligible company 28days moratorium
Owner of the right to initiate the procedure	Creditors, Company itself, company's directors, the Secretary of State Business innovation and skills, The Financial Services Authority, The official Receiver	Creditors or Directors.	The Court, Floating charge holder and the company and its directors	Floating charge holder	Administrator, or liquidator or directors	Company itself, company's directors,
Liquidation versus reorganization	The court	Special resolution at general meeting	The court	Administrative Receiver	The court	The court
Provision to ease new financing	No, new financing is junior to existing claims	No, new financing is junior to existing claims	No, new financing is junior to existing claims	No, new financing is junior to existing claims	No, new financing is junior to existing claims	No, new financing is junior to existing claims
Preservation of residual Claims of Equity Holders	Equity unlikely to have claim in compulsory liquidation	Equity likely to have claim in members voluntary liquidation but not creditors voluntary liquidation	Equity likely to have claim in administration due in part to the role of administrator, to act in the interest of all creditors	Equity unlikely to have claim in receivership, since the receiver acts in the interest of his floating charge holder	Equity unlikely to have claim in company voluntary arrangement	Equity likely to have claim in company voluntary arrangement

Adopted from Franks et al (1996) and Pochet (2002)

*Compulsory liquidation of a company is when the company is ordered by the court to be wound up.

** There are two types of Voluntary liquidation namely: members' voluntary liquidation (MVL) and creditors' voluntary liquidation (CVL)

Appendix 3: A Comparison of the Four Perspectives of Corporate Boards

	PERSPECTIVES			
Dimension	Legalistic	Managerial Hegemony	Agency Theory	Resource Dependency
Theoretical Origin	-Corporate law	-Marxist sociology	-Economics -Finance	-Organisational theory - Sociology
Board Roles	-Control -Service	-Control -Service	-Control -Service -Strategy	-Control -Service -Strategy -Resources
Board Attributes	-Composition -Characteristics -Process -Structure	-Composition -Characteristics -Process	-Composition -Characteristics -Process -Structure	-Composition -Characteristics
Contingencies	-Ownership concentration -Company Size	-Ownership concentration -CEO Style -Ruling Capitalist Values	-Ownership concentration -Company Size - board's equity compensation	-External environment -Company life cycle -Types of business -board capital breath
Company performance criteria	-Survival -Growth -Profitability	-Oligopolistic market power -Profitability	-Survival -Low operating cost -Profitability	-Growth in resources -Goal achievements -Relative Market Position
Model Representative studies	Compliance Williamson (1964) Berle and Means (1968) Mace (1971) Bainbrige (1993) Miller (1992) Cieri, Sullivan, Lennox (1994)	'Rubber Stamp' Mills (1956)	Compliance Jensen and Meckling (1976) Fama and Jensen (1983)	Co-optation Pfeffer (1972) Hayes and Hillman (2010) Drees and Heugens (2013)

Adopted from Zahra and Pearce (1989), Johnson, Daily and Ellstrand (1996), Daily, Dalton and Cannella (2003), Cornforth, 2004; Ricart, Rodriguez and Sanchez, 2005)

Appendix 4: Profile of Failed and Non-Failed Firms used in the Study

No	ENITITY Name	INSOLVENCY HISTROY Petition	Windup	Status	SIC03	SIZE Assets(£ m)	DATA Used	LEAD TIME DAYS
1	1st Dental Laboratories PLC	24/09/10	pending	R	8072	8.07	2005 - 09	298
2	Actif Group plc	21/12/06	22/02/07	D	2339	8.62	2001 - 05	509
3	Actionleisure plc	11/10/01	21/04/10	R	919	49.75	1996 - 00	284
4	Adam& Harvey Group PLC	12/07/02	12/07/02	D	5051	15.14	1997 - 01	193
5	Adval Group plc	31/08/06	11/06/07	D	7372	1.68	2001 - 05	518
6	Advanced Technology PLC	14/09/10	14/09/10	D	3669	6.45	2000 - 03	2,449
7	Airflow Streamlines PLC	19/01/04	11/01/05	L	2931	37.94	1999 - 03	19
8	Alizyme plc	06/08/09	15/06/10	L	2834	5.30	2004 - 08	218
9	Alldays plc	28/10/02	28/04/06	D	5411	175.80	1997 - 01	365
10	Aquilo plc	01/10/07	27/01/10	D	6411	5.12	2004 - 06	274
11	Arcolectric Holdings PLC	26/11/03	10/03/04	D	7415	16.25	1997 - 01	695
12	Argonaut Games PLC	23/02/05	12/05/06	D	3537	12.69	1999 - 03	573
13	Arthur Wood & Son PLC	03/10/03	05/10/04	D	7372	2.36	1998 - 02	276
14	ASW Holdings plc	10/07/02	12/08/04	D	3312	164.30	1997 - 01	191
15	AT Communications Group plc	03/08/09	31/01/11	L	4899	76.85	2004 - 08	215
16	Availeon PLC	13/12/01	26/11/02	D	5812	1.94	1996 - 00	622
17	AX Realisation Plc	12/07/10	22/12/10	L	5142	95.14	2005 - 09	527
18	Bakabo plc	10/09/10	10/09/10	L	7371	3.86	2005 - 09	528
19	Baldwin Industries Services plc	28/10/02	26/02/03	L	7353	142.18	1998 - 02	211
20	Bearing Power International PLC	08/08/06	08/08/06	D	5085	7.51	1996 - 00	2,046
21	Beauford PLC	07/09/07	07/09/07	L	3299	2.37	2001 - 04	980
22	Beaufort International Group PLC	10/12/04	20/07/06	D	8742	2.28	1999 - 03	345
23	BEDE PLC	31/03/08	23/07/10	D	3844	13.09	2002 - 06	456
24	Bertam Holding PLC	07/05/08	07/05/08	D	2076	46.70	2000 - 04	1,223
25	Bioglan Pharma PLC	21/02/02	31/01/03	L	2834	257.05	1997 - 01	386
26	Blagden PLC	21/08/00	21/08/00	D	7415	151.30	1994 - 98	599
27	Blockeys PLC	03/08/10	03/08/10	D	7499	24.26	1995 - 99	3,868
28	BNB Recruitment Solutions PLC	29/06/09	25/01/10	L	8742	52.27	2003 - 07	546
29	BV Group PLC	10/09/03	06/10/04	D	7440	3.03	1997 - 01	618
30	Cakebread Robey PLC	09/10/09	13/07/10	D	5211	10.28	1996 - 00	3,204
31	Calluna PLC	17/04/03	23/09/05	D	3572	13.97	1997 - 99	1,203
32	Canterbury Foods Group PLC	03/01/06	04/01/07	D	7361	38.94	2000 - 04	368
33	Carbo PLC	29/03/05	28/03/06	D	3291	35.80	2000 - 04	423
34	Celebrated Group PLC (THE)	27/08/99	26/06/00	D	7011	11.99	1994 - 98	516
35	Chesterton International Limited	07/03/05	09/07/08	L	7031	18.09	2000 - 04	66
36	ChoicesUK PLC	22/08/07	14/08/08	L	5212	45.51	2002 - 06	445
37	Compact Power Holding PLC	31/01/11	31/01/11	L	4953	3.36	2002 - 06	1,767
38	Connaught PLC	08/09/10	pending	R	4525	470.90	2005 - 09	373
39	Courts PLC	30/11/04	02/12/07	D	5712	619.70	2000 - 04	244
40	Customvis PLC	12/08/10	15/07/11	L	3845	4.07	2005 - 09	408
41	Designrealm Holding PLC	06/11/03	07/08/08	D	3661	20.23	1998 - 02	494
42	Dream Direct Group PLC	31/05/07	28/01/10	L	5961	2.07	2003 - 06	426
43	Ennstone PLC	09/03/09	10/03/10	L	7415	448.48	2003 - 07	434
44	Erinaceous Group plc	14/04/08	14/04/08	R	7349	439.80	2002 - 06	470
45	European Home Retail plc	13/10/06	21/02/07	L	5961	58.11	2001 - 05	531
46	Faupel Limited	12/05/09	16/11/10	L	5023	8.62	2003 - 07	498

Appendix 4: Continuation 2 of 8

No	ENITITY Name	INSOLVENCY HISTROY Petition	Windup	Status	SIC03	SIZE Assets(£ m)	DATA Used	LEAD TIME DAYS
47	Ferguson International Holdings PLC	21/01/00	13/04/06	D	2754	32.23	1995 - 99	327
48	FII Group plc	24/06/04	21/06/05	D	3149	7.05	1998 - 02	755
49	Fortress Holdings PLC	30/11/04	30/11/04	L	3646	16.76	1999 - 03	335
50	French PLC	08/04/02	08/04/02	L	2591	9.37	1997 - 01	190
51	Gaskell plc	18/03/05	09/03/06	D	2591	17.27	1999 - 03	443
52	Glow Communications PLC	15/11/04	05/04/06	D	4899	3.69	1999 - 03	351
53	Hawtal Whiting Holdings PLC	20/10/00	29/03/01	L	8711	24.77	1995 - 99	294
54	Highbury House Communications PLC	20/01/06	05/09/08	D	2721	98.85	2000 - 04	385
55	Intimas Group PLC	15/07/09	27/05/10	L	2341	17.29	2003 - 07	562
56	Inveresk PLC	08/10/10	pending	R	2621	19.83	2003 - 07	1,012
57	Jarvis PLC	26/03/10	23/09/11	R	4789	101.30	2005 - 09	360
58	Jessops PLC	21/01/10	25/04/11	D	5946	93.10	2004 - 08	478
59	John Tams Group PLC	16/02/00	08/11/00	D	3263	16.52	1995 - 99	322
60	Lambert Howarth Group plc	03/10/07	28/03/09	D	5139	49.89	2001 - 05	641
61	Lamont Holding PLC	06/02/03	06/02/03	R	2221	29.98	1997 - 01	402
62	Litho Supplies PLC	22/12/09	14/07/10	D	5085	23.42	2004 - 08	356
63	Maypole Group PLC	27/10/10	pending	R	7011	11.20	2005 - 09	300
64	Meldex International PLC	23/08/10	26/08/11	L	2834	24.34	2004 - 08	600
65	Minorplanet Systems PLC	09/11/10	pending	R	5135	10.90	2005 - 09	435
66	Newport Networks Group PLC	17/08/09	17/08/09	L	2725	7.75	2005 - 07	595
67	Oakdene Homes PLC	23/01/09	21/01/11	L	1522	144.49	2003 - 07	389
68	Old Monk Company PLC	09/10/02	08/05/08	D	5812	30.23	1997 - 01	529
69	Pan Pacific Aggregate PLC	07/06/11	07/06/11	R	1411	7.08	2006 - 10	158
70	Partridge Fine Art Ltd	20/07/09	17/06/11	L	5250	16.39	2003 - 07	628
71	Plasmon plc	06/10/08	23/09/09	D	3572	46.72	2004 - 08	189
72	Po Na Na Group PLC	01/05/03	26/07/06	D	5813	31.64	1998 - 02	396
73	Provalis PLC	15/09/06	15/09/06	L	2834	16.00	2001 - 05	467
74	Radamec Group PLC	28/07/05	15/09/06	D	3625	8.60	2000 - 04	209
75	Raymarine PLC	14/05/10	13/08/10	L	7415	121.79	2005 - 09	134
76	Regent Inns PLC	20/10/09	20/10/09	R	5813	152.15	2004 - 08	479
77	Rok PLC	08/11/10	08/11/10	R	7415	375.20	2005 - 09	312
78	Scipher PLC	27/09/04	24/07/08	D	6794	28.02	1999 - 03	546
79	Scotia Holding PLC	29/01/01	29/01/01	R	2834	45.29	1995 - 99	395
80	Shalibane PLC	30/03/01	17/12/04	D	3714	14.09	1995 - 99	455
81	Superscape Group Limited	22/12/10	22/12/10	L	3269	10.52	2004 - 08	721
82	The Mayflower Corporation PLC	31/03/04	28/12/06	L	3713	523.20	1998 - 02	456
83	Thomas Walker plc	24/04/09	22/10/09	L	3542	8.66	2004 - 08	298
84	Total Office Group PLC	08/10/99	17/07/00	D	2521	24.64	1994 - 98	312
85	UNO PLC	15/03/00	08/02/10	R	270759	6.43	1996 - 00	326
86	Vanco plc	25/05/08	13/05/11	D	7373	203.43	2003 - 07	480
87	Victory Corporation Limited	28/09/09	16/09/10	L	5122	24.10	2002 - 06	1,277
88	Vivomedica PLC	14/09/10	14/09/10	L	3841	6.23	2004 - 08	622
89	Wagon plc	08/12/08	pending	R	3465	648.60	2004 - 08	252
90	Waterdorm plc	28/02/00	06/09/11	D	3640	64.32	1995 - 99	334
91	Wembley plc	18/08/05	31/08/05	L	7997	201.75	2000 - 04	230
92	Whitehead Mann Group plc	18/05/10	18/05/10	D	7361	27.71	2003 - 07	1,144

Appendix 4: Continuation 3 of 8

No	ENITITY Name	INSOLVENCY HISTROY Petition	Windup	Status	SIC03	SIZE Assets(£ m)	DATA Used	LEAD TIME DAYS
93	Widney plc	12/03/09	14/10/09	L	2591	11.95	2003 - 07	529
94	Woolworths Group plc	27/01/09	11/02/10	L	5311	1,320.60	2004 - 08	360
95	World Telecom PLC	23/12/99	03/11/10	D	3661	18.11	1996 - 98	357
96	4imprint Group PLC	n.a	n.a	A	5248	43.91	2001 - 05	n.a
97	A.G. Barr P.L.C.	n.a	n.a	A	1598	102.39	2001 - 05	n.a
98	Acal PLC	n.a	n.a	A	5190	169.50	2002 - 06	n.a
99	Aegis Group PLC	n.a	n.a	A	7440	4,409.00	2006 - 10	n.a
100	AGA Rangemaster Group PLC	n.a	n.a	A	2972	557.30	2002 - 06	n.a
101	Aggreko PLC	n.a	n.a	A	7132	1,393.00	2006 - 10	n.a
102	Air Partner PLC	n.a	n.a	A	6220	37.55	2002 - 06	n.a
103	API Group PLC	n.a	n.a	A	2872	120.73	1999 - 03	n.a
104	Arm Holdings PLC	n.a	n.a	A	3210	623.71	2003 - 07	n.a
105	Assetco PLC	n.a	n.a	A	7415	190.27	2006 - 10	n.a
106	Associated British Foods PLC	n.a	n.a	A	1589	9,108.00	2006 - 10	n.a
107	Autologic Holdings PLC	n.a	n.a	A	6024	263.70	2000 - 04	n.a
108	Aveva Group PLC	n.a	n.a	A	7260	72.62	2001 - 05	n.a
109	Avon Rubber P.L.C.	n.a	n.a	A	2513	175.62	2000 - 04	n.a
110	Babcock International Group PLC	n.a	n.a	A	6323	3,179.00	2007 - 11	n.a
111	BAE Systems PLC	n.a	n.a	A	3530	22,870.00	2007 - 11	n.a
112	Balfour Beatty PLC	n.a	n.a	A	4521	5,216.00	2006 - 10	n.a
113	Barratt Developments P L C	n.a	n.a	A	4521	2,203.30	2006 - 10	n.a
114	BBA Aviation PLC	n.a	n.a	A	6323	1,367.70	2006 - 10	n.a
115	Bellway P L C	n.a	n.a	A	4521	1,628.80	2003 - 07	n.a
116	Berendsen PLC	n.a	n.a	A	9301	1,408.00	2006 - 10	n.a
117	Blacks Leisure Group PLC	n.a	n.a	A	5242	140.60	2001 - 05	n.a
118	Bloomsbury Publishing PLC	n.a	n.a	A	2211	84.95	1999 - 03	n.a
119	Bodycote PLC	n.a	n.a	A	2851	970.20	2003 - 07	n.a
120	Booker Group PLC	n.a	n.a	A	5139	851.50	2007 - 11	n.a
121	Bovis Homes Group PLC	n.a	n.a	A	4521	941.02	2002 - 06	n.a
122	Brammer PLC	n.a	n.a	A	5186	233.72	2003 - 07	n.a
123	British American Tobacco P.L.C.	n.a	n.a	A	1600	18,466.00	2006 - 07	n.a
124	British Polythene Industries PLC	n.a	n.a	A	2522	212.50	2003 - 07	n.a
125	British SKY Broadcasting Group PLC	n.a	n.a	A	9220	4,804.00	2006 - 10	n.a
126	Britvic PLC	n.a	n.a	A	3530	1,039.90	2006 - 10	n.a
127	BT Group PLC	n.a	n.a	A	6420	23,079.00	2006 - 10	n.a
128	BTG PLC	n.a	n.a	A	7310	98.40	1999 - 03	n.a
129	Bunzl PLC	n.a	n.a	A	5190	2,652.50	2006 - 10	n.a
130	Burberry Group PLC	n.a	n.a	A	1822	1,294.00	2007 - 11	n.a
131	Caffyns PLC	n.a	n.a	A	5010	65.75	2001 - 05	n.a
132	Carclo PLC	n.a	n.a	A	2524	129.81	1999 - 03	n.a
133	Carillion PLC	n.a	n.a	A	4521	3,049.60	2006 - 10	n.a
134	Carpetright PLC	n.a	n.a	A	5248	267.20	2003 - 07	n.a
135	Castings PLC	n.a	n.a	A	2751	75.44	1999 - 03	n.a

Appendix 4: Continuation 4 of 8

No	ENITITY Name	INSOLVENCY HISTROY Petition	Windup	Status	SIC03	SIZE Assets(£ m)	DATA Used	LEAD TIME DAYS
136	Chemring Group PLC	n.a	n.a	A	2461	355.40	2003 - 07	n.a
137	Chime Communications PLC	n.a	n.a	A	7440	117.40	2002 - 06	n.a
138	Clarkson PLC	n.a	n.a	A	6340	123.80	2001 - 05	n.a
139	Clinton Cards PLC	n.a	n.a	A	5248	245.07	2003 - 07	n.a
140	Cobham PLC	n.a	n.a	A	3530	2,559.50	2006 - 10	n.a
141	Communisis PLC	n.a	n.a	A	2222	285.97	2001 - 05	n.a
142	Compass Group PLC	n.a	n.a	A	5552	7,958.00	2006 - 10	n.a
143	Computacenter PLC	n.a	n.a	A	7222	964.18	2006 - 10	n.a
144	Cookson Group PLC	n.a	n.a	A	3663	2,603.80	2006 - 10	n.a
145	Cosalt PLC	n.a	n.a	A	2922	82.34	1999 - 03	n.a
146	Costain Group PLC	n.a	n.a	A	4521	375.40	2006 - 10	n.a
147	Cranswick PLC	n.a	n.a	A	1513	291.43	2003 - 07	n.a
148	Croda International PLC	n.a	n.a	A	2466	913.10	2006 - 10	n.a
149	Daily Mail And General Trust P LC	n.a	n.a	A	2212	2,049.70	2006 - 210	n.a
150	Dairy Crest Group PLC	n.a	n.a	A	1551	1,182.50	2007 - 11	n.a
151	Daisy Group PLC	n.a	n.a	A	6420	148.69	2001 - 04	n.a
152	Dart Group PLC	n.a	n.a	A	6024	241.50	2003 - 07	n.a
153	Dawson Holdings PLC	n.a	n.a	A	5147	85.70	1999 - 03	n.a
154	De LA Rue PLC	n.a	n.a	A	2222	519.70	2003 - 07	n.a
155	Debenhams PLC	n.a	n.a	A	5212	1,995.30	2006 - 10	n.a
156	Dechra Pharmaceuticals PLC	n.a	n.a	A	2441	90.16	2002 - 06	n.a
157	Devro PLC	n.a	n.a	A	1589	160.15	2002 - 06	n.a
158	Diageo PLC	n.a	n.a	A	1591	18,925.00	2006 - 10	n.a
159	Dialight PLC	n.a	n.a	A	3210	74.46	1999 - 03	n.a
160	Dixons Retail PLC	n.a	n.a	A	5245	3,414.00	2007 - 11	n.a
161	Domino Printing Sciences PLC	n.a	n.a	A	2956	175.88	2002 - 06	n.a
162	DS Smith PLC	n.a	n.a	A	2121	1,452.80	2006 - 10	n.a
163	Easyjet PLC	n.a	n.a	A	6210	4,002.50	2006 - 10	n.a
164	Electrocomponents PLC	n.a	n.a	A	5186	712.10	2006 - 10	n.a
165	Elementis PLC	n.a	n.a	A	2466	355.10	2003 - 07	n.a
166	Empresaria Group PLC	n.a	n.a	A	745	25.96	2002 - 06	n.a
167	Enterprise Inns PLC	n.a	n.a	A	5540	6,356.00	2003 - 07	n.a
168	Euromoney Institutional Investor PLC	n.a	n.a	A	2213	216.17	2002 - 06	n.a
169	Fenner PLC	n.a	n.a	A	2513	340.30	2003 - 07	n.a
170	Fidessa Group PLC	n.a	n.a	A	7222	81.92	2002 - 06	n.a
171	Findel P.L.C.	n.a	n.a	A	5261	577.48	2003 - 07	n.a
172	Firstgroup PLC	n.a	n.a	A	6021	5,236.10	2007 - 11	n.a
173	French Connection Group PLC	n.a	n.a	A	1548	179.80	2001 - 05	n.a
174	Fuller Smith & Turner PLC	n.a	n.a	A	1596	371.29	2002 - 06	n.a
175	G4S PLC	n.a	n.a	A	7460	5,212.00	2006 - 10	n.a
176	Galliford Try PLC	n.a	n.a	A	1542	1,110.40	2006 - 10	n.a
177	Games Workshop Group PLC	n.a	n.a	A	3650	61.35	2000 - 04	n.a
178	Genus PLC	n.a	n.a	A	142	104.83	2001 - 05	n.a
179	GKN PLC	n.a	n.a	A	3430	4,250.00	2006 - 10	n.a
180	Goodwin PLC	n.a	n.a	A	2852	20.24	1999 - 03	n.a

Appendix 4: Continuation 5 of 8								
	ENITITY	INSOLVENCY HISTROY				SIZE	DATA	LEAD TIME
No	Name	Petition	Windup	Status	SIC03	Assets(£ m)	Used	DAYS
181	Greene King PLC	n.a	n.a	A	5540	2,867.20	2006 - 10	n.a
182	Greggs PLC	n.a	n.a	A	1581	238.21	2003 - 07	n.a
183	H.R.Owen PLC	n.a	n.a	A	5010	169.95	2000 - 04	n.a
184	Halfords Group PLC	n.a	n.a	A	5030	641.90	2007 - 11	n.a
185	Halma PLC	n.a	n.a	A	3320	337.27	2003 - 07	n.a
186	Hampson Industries P.L.C.	n.a	n.a	A	3530	92.13	2001 - 05	n.a
187	Harvey Nash Group PLC	n.a	n.a	A	7450	80.71	2003 - 07	n.a
188	Havelock Europa PLC	n.a	n.a	A	3612	42.06	1999 - 03	n.a
189	Hays PLC	n.a	n.a	A	7450	753.40	2006 - 10	n.a
190	Headlam Group PLC	n.a	n.a	A	5147	324.43	2003 - 07	n.a
191	Henry Boot PLC	n.a	n.a	A	4521	199.80	2000 - 04	n.a
192	Hill & Smith Holdings PLC	n.a	n.a	A	2811	238.37	2002 - 06	n.a
193	Hilton Food Group PLC	n.a	n.a	A	5222	191.47	2008 - 10	n.a
194	HMV Group PLC	n.a	n.a	A	5248	675.30	2006 - 10	n.a
195	Holidaybreak Plc	n.a	n.a	A	5522	440.80	2007 - 07	n.a
196	Holidaybreak Plc.	n.a	n.a	A	5522	204.50	2003 - 06	n.a
197	Home Retail Group PLC	n.a	n.a	A	5244	4,098.40	2007 - 11	n.a
198	Homeserve PLC	n.a	n.a	A	6720	454.37	2003 - 07	n.a
199	Howden Joinery Group PLC	n.a	n.a	A	3614	366.20	2003 - 07	n.a
200	Huntsworth PLC	n.a	n.a	A	7440	257.91	2001 - 05	n.a
201	Hyder Consulting PLC	n.a	n.a	A	7420	101.87	2002 - 06	n.a
202	Imagination Technologies Group PLC	n.a	n.a	A	3230	20.31	1999 - 03	n.a
203	IMI PLC	n.a	n.a	A	2924	1,566.70	2006 - 10	n.a
204	Imperial Tobacco Group PLC	n.a	n.a	A	1600	8,956.00	2006 - 07	n.a
205	Inchcape PLC	n.a	n.a	A	5010	3,070.50	2006 - 10	n.a
206	Intercontinental Hotels Group PLC	n.a	n.a	A	5510	1,726.08	2006 - 10	n.a
207	Interior Services Group PLC	n.a	n.a	A	4521	377.87	2006 - 10	n.a
208	International Greetings PLC	n.a	n.a	A	2125	83.11	2001 - 05	n.a
209	Interserve PLC	n.a	n.a	A	4521	972.40	2006 - 10	n.a
210	Intertek Group PLC	n.a	n.a	A	7430	1,130.80	2006 - 10	n.a
211	Invensys PLC	n.a	n.a	A	3162	1,994.00	2007 - 11	n.a
212	ITE Group PLC	n.a	n.a	A	7487	93.69	2000 - 04	n.a
213	ITV PLC	n.a	n.a	A	9220	3,038.00	2006 - 10	n.a
214	J D Wetherspoon PLC	n.a	n.a	A	5813	893.13	2006 - 10	n.a
215	J Sainsbury PLC	n.a	n.a	A	5211	11,399.00	2007 - 11	n.a
216	Jacques Vert PLC	n.a	n.a	A	5242	77.35	2000 - 04	n.a
217	James Fisher And Sons PLC	n.a	n.a	A	6110	218.81	2002 - 06	n.a
218	James Halstead PLC	n.a	n.a	A	4543	94.79	2001 - 05	n.a
219	James Latham PLC	n.a	n.a	A	5153	50.85	2000 - 04	n.a
220	JD Sports Fashion PLC	n.a	n.a	A	5242	367.67	2007 - 11	n.a
221	John Menzies PLC	n.a	n.a	A	5147	477.80	2006 - 10	n.a
222	Johnson Matthey PLC	n.a	n.a	A	2466	2,832.80	2006 - 10	n.a
223	Johnson Service Group PLC	n.a	n.a	A	7140	393.70	2002 - 06	n.a
224	Johnston Press PLC	n.a	n.a	A	2212	1,874.17	2002 - 06	n.a
225	Kcom Group PLC	n.a	n.a	A	6420	452.65	2002 - 06	n.a

	ENITITY	INSOLVENCY HISTROY				SIZE	DATA	LEAD TIME
No	Name	Petition	Windup	Status	SIC03	Assets(£ m)	Used	DAYS
226	Keller Group PLC	n.a	n.a	A	4521	813.00	2006 - 10	n.a
227	Kesa Electricals PLC	n.a	n.a	A	5245	1,721.30	2006 - 10	n.a
228	Kier Group PLC	n.a	n.a	A	4521	1,093.70	2006 - 10	n.a
229	Kingfisher PLC	n.a	n.a	A	5246	9,576.00	2007 - 11	n.a
230	Kofax PLC	n.a	n.a	A	7222	152.38	2006 - 06	n.a
231	Ladbrokes PLC	n.a	n.a	A	9271	977.60	2006 - 10	n.a
232	Laird PLC	n.a	n.a	A	3210	790.20	2003 - 07	n.a
233	Laura Ashley Holdings PLC	n.a	n.a	A	1822	112.30	2002 - 06	n.a
234	Lavendon Group PLC	n.a	n.a	A	7132	267.75	2002 - 06	n.a
235	Logica PLC	n.a	n.a	A	3002	3,620.70	2006 - 10	n.a
236	London Security Plc.	n.a	n.a	A	2924	81.74	1999 - 03	n.a
237	Lookers PLC	n.a	n.a	A	5010	683.70	2006 - 10	n.a
238	LOW & Bonar PLC	n.a	n.a	A	1717	265.20	2002 - 06	n.a
239	Lupus Capital PLC	n.a	n.a	A	2523	118.30	2002 - 06	n.a
240	Macfarlane Group PLC	n.a	n.a	A	2522	80.44	2000 - 04	n.a
241	Majestic Wine PLC	n.a	n.a	A	5134	81.94	2002 - 06	n.a
242	Management Consulting Group PLC	n.a	n.a	A	7414	221.92	2002 - 06	n.a
243	Marks And Spencer Group P.L.C.	n.a	n.a	A	5212	7,344.10	2007 - 11	n.a
244	Marshalls PLC	n.a	n.a	A	2661	358.18	2005 - 06	n.a
245	Marston's PLC	n.a	n.a	A	5540	2,324.70	2003 - 07	n.a
246	Mcbride PLC	n.a	n.a	A	2452	404.20	2003 - 07	n.a
247	Mears Group PLC	n.a	n.a	A	4521	143.75	2003 - 07	n.a
248	Meggitt PLC	n.a	n.a	A	1598	3,079.70	2005 - 09	n.a
249	Melrose PLC	n.a	n.a	A	2852	2,110.80	2006 - 10	n.a
250	Michael Page International PLC	n.a	n.a	A	7450	308.89	2006 - 10	n.a
251	Millennium & Copthorne Hotels PLC	n.a	n.a	A	5510	2,414.20	2003 - 07	n.a
252	Misys PLC	n.a	n.a	A	7221	542.70	2003 - 07	n.a
253	Mitchells & Butlers PLC	n.a	n.a	A	5540	4,464.00	2006 - 10	n.a
254	Mitie Group PLC	n.a	n.a	A	7487	1,074.80	2007 - 11	n.a
255	Molins PLC	n.a	n.a	A	2953	151.60	1999 - 03	n.a
256	Morgan Crucible Company Plc(The)	n.a	n.a	A	2466	1,004.00	2005 - 09	n.a
257	Morgan Sindall Group PLC	n.a	n.a	A	4521	1,018.60	2006 - 10	n.a
258	Moss Bros Group PLC	n.a	n.a	A	5242	66.13	2000 - 04	n.a
259	Mothercare Plc.	n.a	n.a	A	5248	226.80	2003 - 07	n.a
260	N Brown Group PLC	n.a	n.a	A	5261	553.90	2003 - 07	n.a
261	National Express Group PLC	n.a	n.a	A	6021	2,420.80	2006 - 10	n.a
262	Next PLC	n.a	n.a	A	5242	1,792.30	2007 - 11	n.a
263	Nichols PLC	n.a	n.a	A	1598	59.21	1999 - 03	n.a
264	North Midland Construction PLC	n.a	n.a	A	4521	40.57	2000 - 04	n.a
265	Northamber PLC	n.a	n.a	A	5184	60.78	2000 - 04	n.a
266	Northgate PLC	n.a	n.a	A	7110	1,272.59	2003 - 07	n.a
267	NWF Group PLC	n.a	n.a	A	5131	81.84	2002 - 06	n.a
268	Oxford Instruments PLC	n.a	n.a	A	3320	136.80	2001 - 05	n.a
269	Pace PLC	n.a	n.a	A	3230	967.30	2006 - 10	n.a

Appendix 4: Continuation 7 of 8

No	ENITITY Name	INSOLVENCY HISTROY Petition	Windup	Status	SIC03	SIZE Assets(£ m)	DATA Used	LEAD TIME DAYS
270	Parity Group PLC	n.a	n.a	A	7222	56.55	1999 - 03	n.a
271	Pearson PLC	n.a	n.a	A	2211	10,392.00	2006 - 10	n.a
272	Pendragon PLC	n.a	n.a	A	5010	1,402.00	2006 - 10	n.a
273	Penna Consulting PLC	n.a	n.a	A	7414	42.07	1999 - 03	n.a
274	Persimmon PLC	n.a	n.a	A	4521	2,686.00	2006 - 10	n.a
275	Phoenix IT Group PLC	n.a	n.a	A	7222	107.87	2002 - 06	n.a
276	Premier Farnell PLC	n.a	n.a	A	5186	511.70	2007 - 11	n.a
277	Premier Foods PLC	n.a	n.a	A	1589	3,499.50	2006 - 10	n.a
278	Psion PLC	n.a	n.a	A	3002	237.11	2001 - 05	n.a
279	Punch Taverns PLC	n.a	n.a	A	5540	5,850.10	2006 - 10	n.a
280	PZ Cussons PLC	n.a	n.a	A	2451	540.80	2003 - 07	n.a
281	Qinetiq Group PLC	n.a	n.a	A	7430	1,449.50	2007 - 11	n.a
282	Quadnetics Group PLC	n.a	n.a	A	3162	11.25	1999 - 03	n.a
283	Reckitt Benckiser Group PLC	n.a	n.a	A	2451	13,201.00	2008 - 10	n.a
284	Redhall Group PLC	n.a	n.a	A	2875	15.07	2000 - 04	n.a
285	Redrow PLC	n.a	n.a	A	4521	927.40	2002 - 06	n.a
286	Reed Elsevier PLC	n.a	n.a	A	2211	11,103.00	2006 - 10	n.a
287	Renew Holdings Plc.	n.a	n.a	A	4521	131.46	2002 - 06	n.a
288	Renishaw P L C	n.a	n.a	A	3320	161.59	2001 - 05	n.a
289	Renold PLC	n.a	n.a	A	2914	179.80	2001 - 05	n.a
290	Rentokil Initial PLC	n.a	n.a	A	7470	1,791.20	2006 - 10	n.a
291	Rexam PLC	n.a	n.a	A	2872	5,815.00	2006 - 10	n.a
292	Ricardo PLC	n.a	n.a	A	7420	121.03	2000 - 04	n.a
293	RM PLC	n.a	n.a	A	7222	141.64	2002 - 06	n.a
294	Robert Walters PLC	n.a	n.a	A	7450	107.69	2003 - 07	n.a
295	Robert Wiseman Dairies PLC	n.a	n.a	A	1551	337.02	2007 - 11	n.a
296	Rotork P.L.C.	n.a	n.a	A	5186	139.77	2002 - 06	n.a
297	RPC Group PLC	n.a	n.a	A	2522	848.30	2007 - 11	n.a
298	Savills PLC	n.a	n.a	A	7031	524.70	2003 - 07	n.a
299	Scapa Group PLC	n.a	n.a	A	2462	154.10	2001 - 05	n.a
300	SDL PLC	n.a	n.a	A	7222	92.65	2001 - 05	n.a
301	Senior PLC	n.a	n.a	A	3530	393.00	2003 - 07	n.a
302	Serco Group PLC	n.a	n.a	A	7414	2,478.90	2006 - 10	n.a
303	Severfield-Rowen PLC	n.a	n.a	A	2811	140.41	2002 - 06	n.a
304	Shanks Group PLC	n.a	n.a	A	9001	720.60	2003 - 07	n.a
305	SIG PLC	n.a	n.a	A	5154	1,535.60	2006 - 10	n.a
306	Smiths Group PLC	n.a	n.a	A	3310	3,264.10	2006 - 10	n.a
307	Smiths News PLC	n.a	n.a	A	5147	179.60	2006 - 10	n.a
308	Southern Cross Healthcare Group PLC	n.a	n.a	A	8514	411.20	2006 - 10	n.a
309	Spectris PLC	n.a	n.a	A	3320	954.80	2006 - 10	n.a
310	Speedy Hire PLC	n.a	n.a	A	7134	350.00	2002 - 06	n.a
311	Spirax-Sarco Engineering PLC	n.a	n.a	A	2912	353.75	2003 - 07	n.a
312	Spirent Communications PLC	n.a	n.a	A	6420	287.80	2002 - 06	n.a
313	Sportingbet PLC	n.a	n.a	A	9271	163.20	2006 - 10	n.a
314	Sports Direct International PLC	n.a	n.a	A	5242	902.75	2007 - 11	n.a
315	Stagecoach Group PLC	n.a	n.a	A	6021	1,620.60	2006 - 10	n.a
316	Sthree PLC	n.a	n.a	A	7450	175.04	2003 - 07	n.a

Appendix 4: Continuation 8 of 8

No	ENITITY Name	INSOLVENCY HISTROY Petition	Windup	Status	SIC03	SIZE Assets(£ m)	DATA Used	LEAD TIME DAYS
317	STV Group PLC	n.a	n.a	A	9220	440.30	2001 - 03	n.a
318	T Clarke PLC	n.a	n.a	A	4531	67.27	2001 - 05	n.a
319	Tate & Lyle PLC	n.a	n.a	A	1583	2,977.00	2007 - 11	n.a
320	Taylor Wimpey PLC	n.a	n.a	A	4521	3,952.80	2006 - 10	n.a
321	Ted Baker PLC	n.a	n.a	A	5242	58.94	2001 - 05	n.a
322	Telecom Plus PLC	n.a	n.a	A	6420	64.84	2003 - 07	n.a
323	Tesco PLC	n.a	n.a	A	5211	24,775.00	2007 - 07	n.a
324	The Alumasc Group PLC	n.a	n.a	A	2875	69.62	1999 - 03	n.a
325	The Berkeley Group Holdings PLC	n.a	n.a	A	4521	1,249.71	2005 - 07	n.a
326	The Capita Group PLC	n.a	n.a	A	7414	2,760.30	2006 - 10	n.a
327	The Character Group PLC	n.a	n.a	A	5147	33.37	1999 - 03	n.a
328	The Game Group PLC	n.a	n.a	A	5248	668.69	2007 - 11	n.a
329	The Go-Ahead Group PLC	n.a	n.a	A	6021	983.70	2006 - 10	n.a
330	The Innovation Group PLC	n.a	n.a	A	7260	61.79	2000 - 04	n.a
331	The Rank Group PLC	n.a	n.a	A	9271	596.50	2003 - 07	n.a
332	The Restaurant Group PLC	n.a	n.a	A	5530	280.59	2003 - 07	n.a
333	The Sage Group Plc.	n.a	n.a	A	7222	2,711.00	2006 - 10	n.a
334	The Vitec Group Plc.	n.a	n.a	A	3230	161.30	2002 - 06	n.a
335	Thorntons PLC	n.a	n.a	A	1584	111.97	2001 - 05	n.a
336	Tottenham Hotspur PLC	n.a	n.a	A	9261	93.30	2000 - 04	n.a
337	Travis Perkins PLC	n.a	n.a	A	5153	4,061.80	2006 - 10	n.a
338	Tribal Group PLC	n.a	n.a	A	7414	305.52	2001 - 05	n.a
339	Trifast PLC	n.a	n.a	A	2874	73.53	1999 - 03	n.a
340	Trinity Mirror PLC	n.a	n.a	A	2212	1,966.20	2003 - 07	n.a
341	TT Electronics PLC	n.a	n.a	A	3210	375.30	2003 - 07	n.a
342	Ultra Electronics Holdings PLC	n.a	n.a	A	3162	357.55	2003 - 07	n.a
343	Umeco PLC	n.a	n.a	A	3530	211.40	2001 - 05	n.a
344	Uniq PLC	n.a	n.a	A	1513	433.70	2002 - 06	n.a
345	Victrex PLC	n.a	n.a	A	2416	121.80	2001 - 05	n.a
346	Volex Group P.L.C.	n.a	n.a	A	3162	109.43	2002 - 06	n.a
347	VP PLC	n.a	n.a	A	7134	81.85	2000 - 04	n.a
348	Weir Group Plc(The)	n.a	n.a	A	2912	2,005.60	2006 - 10	n.a
349	WH Smith PLC	n.a	n.a	A	5247	503.00	2006 - 10	n.a
350	Whitbread PLC	n.a	n.a	A	5510	2,787.70	2007 - 11	n.a
351	William Hill PLC	n.a	n.a	A	9271	1,811.10	2006 - 10	n.a
352	Wincanton PLC	n.a	n.a	A	6024	848.80	2007 - 11	n.a
353	WM Morrison Supermarkets P LC	n.a	n.a	A	5211	9,149.00	2007 - 11	n.a
354	WS Atkins PLC	n.a	n.a	A	7420	904.70	2007 - 11	n.a
355	WSP Group PLC	n.a	n.a	A	7420	457.20	2003 - 07	n.a
356	Yell Group PLC	n.a	n.a	A	7440	5,628.00	2007 - 11	n.a
357	Young & Co's Brewery PLC	n.a	n.a	A	1596	222.46	2000 - 04	n.a
358	Yule Catto & CO PLC	n.a	n.a	A	2413	574.92	2003 - 07	n.a

KEY:
Status: R –Receivership, D-Dissolved, L-In Liquidation, A-Active.
Lead Time: is the difference between firm's Insolvency petition data and the date of the last annual account used in the present study.

Appendix 5: Variables of The Study: Label, Measurement, Expected Sign

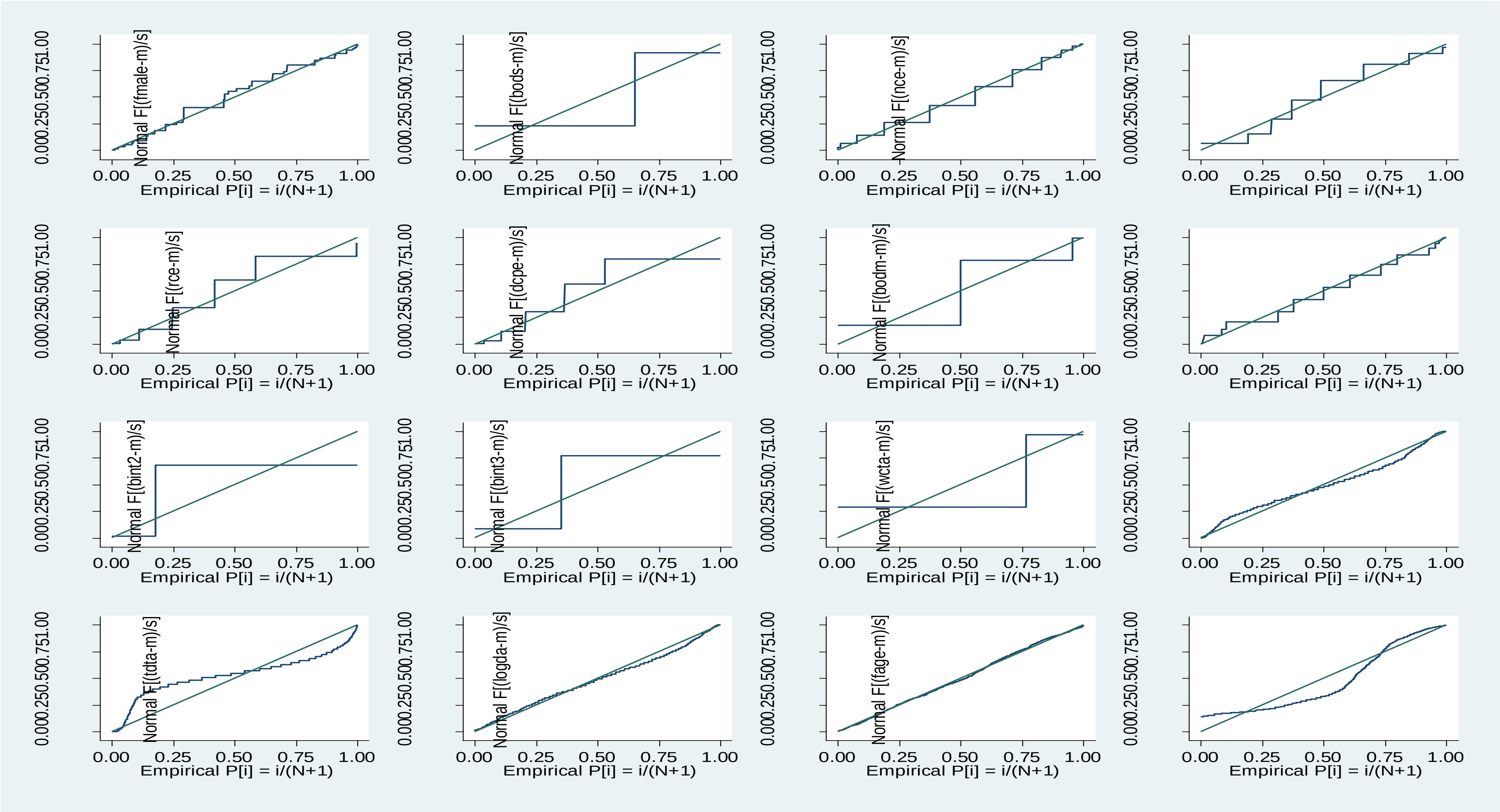
Variable	Label	Measurement	Expected sign
Dependent			
Failure	STAT1	Dummy value (1=failed firm, 0 otherwise)	n/a
Independent-H1			
Board Independence	BODC	Number of outsider directors/board Size	-
Independent-H2			
Board gender diversity	FMALE	Dummy value (1 if at least a woman is on firm's board, 0 otherwise)	-
Independent-H3			
Board Size	BODS	Number of board members during the year	-
Independent-H4			
Presence of NC	NCP	Dummy value (1 =NCP; 0 = otherwise)	-
Independence of NC	NCI	Dummy value (1 if the NC is exclusively independent [28]NED, 0 otherwise)	-
NC Chair independence	NCCI	Dummy value (1 if the NC is chaired by independent NED ,board chair inclusive save recruiting chairs successor, 0 otherwise)	-
Size of NC	NCS	Dummy value (1 if the NC has at least three independent NED, 0 otherwise)	-
Frequency of meeting of NC	NCM1	Dummy value (1 if the NC holds at least two meetings, 0 otherwise)	-
Nomination committee effectiveness	NCE	Composite measure (aggregate of NCP, NCI, NCCI,NCS, and NCM1)	-
Independent-H5			
Presence of AC	ACP	Dummy value (1 =ACP; 0 = otherwise)	-
Independence of AC	ACI	Dummy value (1 if the AC is exclusively independent NED, 0 otherwise)	-
Expertise of AC	ACX	Dummy value (1 if the AC has at least one member with relevant financial expertise, 0 otherwise)	-
Size of AC	ACS	Dummy value (1 if the AC has at least three independent NED, 0 otherwise)	-
Frequency of meeting of AC	ACM1	Dummy value (1 if the AC holds at least three meetings, 0 otherwise)	-
Audit committee effectiveness	ACE	Composite measure (aggregate of ACP, ACI, ACX, ACS, and ACM1)	-
Independent-H6			
Presence of RC	RCP	Dummy value (1 =RCP; 0 = otherwise)	-
Independence of RC	RCI	Dummy value (1 if the RC is exclusively independent NED, 0 otherwise)	-
Independence of RCC	RCCI	Dummy value (1 if the RC is chaired by independent NED, 0 otherwise)	-
Size of RC	RCS	Dummy value (1 if the RC has at least three independent NED, 0 otherwise)	-
Frequency of meeting of RC	RCM1	Dummy value (1 if the RC holds at least two meetings, 0 otherwise)	-
Remuneration committee effectiveness	RCE	Composite measure (aggregate of RCP, RCI, RCCI,RCS, and RCM1)	-

[28] Independent NED is based on the definition in the Higgs Report (2003), Refer to chapter two of the thesis.

Appendix 5: Continuation 1 of 1

Variable	Label	Measurement	Expected Sign
Interaction Effects			
Control Function	BCON		
A: CEO Performance Evaluation Or	DCPE	Coded as "0", "1", "2", if the annual report indicates that the CEO's performance was evaluated informally, formally, and externally, respectively.	-
B: Frequency of Board Meeting	BODM	Number of board meetings.	-
Resource Function	BRES		
A: Board Interlock Or	BINT	Dummy value of 1, if both the entity's chairman, senior NED serve on at least one board, zero otherwise.	-
B: Board Interlock Or	BINT2	Dummy value of 1, if all the entity's lead directors (measured by the trinity-i.e. Chairman, CEO, and senior NED) serve on at least one board, zero otherwise	-
C: Board Interlock	BINT3	Dummy value of 1, if at least an entity's lead director (measured by the trinity-i.e. Chairman, CEO, and senior NED) has Government experience, zero otherwise	-
Controls			
Liquidity	WCTA	Working Capital/Total Assets	-
Profitability	PROF	Earnings before Interest, Taxes, Depreciation and Amortisation/Total Assets	-
Leverage	TLTA	Total Liabilities/Total Assets	+
Firm Size	LOGDA	logarithm of book value of year-end total assets divided by Consumer Price Index-deflator	-
Firm Age	FAGE	Balance sheet date minus date of incorporation	+/-
Industry Indicators	INDY		
Technology	TECHN	Dummy variable equals 1 if company is in the Technology and 0 if in any other SIC classification.	+/-
Consumer	CONSU	Dummy variable equals 1 if company is in the Consumer and 0 if in any other SIC classification.	+/-
Healthcare	HEALT	Dummy variable equals 1 if company is in the Healthcare and 0 if in any other SIC classification.	+/-
Telecommunication	TELEC	Dummy variable equals 1 if company is in the Telecommunication and 0 if in any other SIC classification.	+/-
Basic Materials	BMATS	Dummy variable equals 1 if company is in the Basic Materials and 0 if in any other SIC classification.	+/-
Industrial	INDUS	Dummy variable equals 1 if company is in the Industrial and 0 if in any other SIC classification.	+/-

Appendix 6: P-P Plots of Normally and Non-Normally Distributed of Predictive Variables



Appendix 7: Correlation Matrix for One Year (t - 1) Prior Failure

t - 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Status		-0.38	-0.22	-0.45	-0.54	-0.58	-0.61	-0.58	0.03	-0.31	-0.30	-0.18	-0.11	-0.49	0.13	-0.64	-0.15
2. Independence	-0.38*		0.27	0.29	0.57	0.57	0.57	0.45	0.08	0.40	0.48	0.10	0.06	0.16	0.02	0.55	0.02
3. Gender Div.	-0.22*	0.28*		0.36	0.34	0.34	0.31	0.37	-0.01	0.22	0.25	0.06	-0.06	0.11	0.05	0.37	-0.08
4. Board Size	-0.46*	0.30*	0.36*		0.50	0.53	0.47	0.52	0.01	0.26	0.31	0.15	-0.08	0.25	0.03	0.64	0.05
5. Nomination	-0.52*	0.55*	0.34*	0.53*		0.77	0.78	0.76	0.18	0.46	0.44	0.18	-0.04	0.29	0.04	0.72	0.02
6. Audit Com	-0.57*	0.54*	0.35*	0.59*	0.75*		0.85	0.66	0.15	0.44	0.44	0.16	0.02	0.37	-0.02	0.72	0.06
7. Remuneration	-0.60*	0.51*	0.31*	0.53*	0.78*	0.82*		0.64	0.19	0.50	0.49	0.19	0.07	0.34	-0.05	0.68	0.05
8. Evaluation	-0.61*	0.45*	0.37*	0.55*	0.76*	0.71*	0.69*		0.10	0.35	0.39	0.13	-0.02	0.29	0.03	0.72	0.07
9. Meeting	0.01	0.09	-0.03	0.06	0.16*	0.14*	0.17*	0.14*		0.11	0.11	0.03	-0.07	-0.02	0.14	0.11	-0.03
10. NED Interlock	-0.31*	0.37*	0.22*	0.28*	0.43*	0.41*	0.44*	0.37*	0.10**		0.62	0.23	-0.01	0.10	0.03	0.39	0.00
11. BOD Interlock	-0.30*	0.48*	0.25*	0.32*	0.42*	0.43*	0.47*	0.40*	0.13**	0.62*		0.21	0.00	0.09	0.06	0.42	0.02
12. Gov't Official	-0.18*	0.09*	0.06	0.18*	0.18*	0.17*	0.19*	0.15*	0.05	0.23*	0.21*		0.05	-0.03	-0.06	0.10	0.04
13. Liquidity	-0.07	-0.02	-0.14**	-0.20*	-0.10*	-0.10*	-0.03	-0.09*	-0.08	-0.04	-0.05	0.06		0.04	-0.59	-0.05	0.12
14. Profitability	-0.55*	0.14*	0.07	0.28*	0.33*	0.38*	0.35*	0.38*	-0.08	0.12*	0.12*	0.07	0.03		-0.16	0.43	0.15
15. Leverage	0.10**	0.08	0.10**	0.08	0.10**	0.07**	0.02	0.08	0.12*	0.06	0.09*	-0.05	-0.54*	-0.11*		0.03	-0.11
16. Firm Size	-0.61*	0.56*	0.37*	0.66*	0.72*	0.76*	0.69*	0.76*	0.13*	0.39*	0.42*	0.10*	-0.17*	0.33*	0.13*		0.16
17. Firm Age	-0.16*	0.04	-0.09**	0.04	-0.01	0.06	0.03	0.09	-0.04	0.00	-0.01	0.03	0.19*	0.05	-0.11*	0.14*	

Notes: Pearson correlation is shown above and to the right of the diagonal; below and left is Spearman correlation.
Observations: Total=353; Failed Firms…93, Non-Failed Firms 260

Appendix 8: Correlation Matrix for Two Years (t - 2) Prior Failure

t - 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Status		-0.36	-0.16	-0.39	-0.51	-0.56	-0.61	-0.51	-0.01	-0.28	-0.26	-0.18	0.00	-0.32	-0.06	-0.60	-0.14
2. Independence	-0.36*		0.24	0.25	0.54	0.55	0.54	0.45	0.07	0.39	0.49	0.08	-0.02	0.05	0.16	0.53	0.00
3. Gender Div.	-0.16*	0.23		0.38	0.32	0.34	0.30	0.31	0.03	0.19	0.24	0.04	-0.13	0.12	0.12	0.33	-0.08
4. Board Size	-0.41*	0.26	0.39		0.48	0.51	0.47	0.43	0.04	0.22	0.25	0.17	-0.17	0.14	0.19	0.62	0.08
5. Nomination	-0.50*	0.52	0.32	0.51		0.75	0.77	0.75	0.17	0.42	0.42	0.20	-0.09	0.21	0.19	0.71	0.01
6. Audit Com	-0.55*	0.52	0.33	0.57	0.73		0.84	0.64	0.16	0.41	0.37	0.14	-0.06	0.23	0.14	0.72	0.05
7. Remuneration	-0.60*	0.49	0.30	0.52	0.77	0.80		0.62	0.21	0.47	0.44	0.16	-0.04	0.24	0.11	0.69	0.05
8. Evaluation	-0.53*	0.46	0.32	0.49	0.76	0.71	0.68		0.15	0.27	0.35	0.11	-0.10	0.15	0.22	0.69	0.06
9. Meeting	-0.03	0.09	0.02	0.09	0.20	0.17	0.22	0.19		0.12	0.08	0.00	-0.15	-0.04	0.16	0.16	-0.10
10. NED Interlock	-0.28*	0.35	0.19	0.25	0.40	0.38	0.43	0.29	0.11		0.59	0.22	-0.10	0.03	0.13	0.38	0.01
11. BOD Interlock	-0.26*	0.47	0.24	0.26	0.40	0.36	0.44	0.37	0.09	0.59		0.22	-0.08	-0.01	0.22	0.38	0.03
12. Gov't Official	-0.18*	0.07	0.04	0.19	0.20	0.14	0.17	0.11	0.07	0.22	0.22		0.03	-0.09	-0.01	0.09	0.01
13. Liquidity	-0.03	-0.04	-0.19	-0.22	-0.08	-0.09	-0.05	-0.11	-0.13	-0.06	-0.09	0.02		-0.05	-0.52	-0.15	0.08
14. Profitability	-0.41*	0.05	0.09	0.16	0.26	0.31	0.31	0.29	-0.07	0.08	0.00	-0.01	0.03		0.00	0.26	0.10
15. Leverage	-0.05	0.19	0.15	0.19	0.20	0.21	0.15	0.25	0.17	0.13	0.24	0.00	-0.47	-0.01		0.22	-0.04
16. Firm Size	-0.58*	0.53	0.33	0.65	0.71	0.75	0.70	0.74	0.18	0.38	0.38	0.09	-0.19	0.20	0.27		0.17
17. Firm Age	-0.16*	0.03	-0.07	0.08	0.00	0.06	0.00	0.07	-0.08	0.00	-0.01	-0.01	0.15	0.07	-0.04	0.15	

Notes: Pearson correlation is shown above and to the right of the diagonal; below and left is Spearman correlation.

Observations: Total=351; Failed Firms…93, Non-Failed Firms 258

Appendix 9: Correlation Matrix for Three Years (t - 3) Prior Failure

t- 3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Status		-0.36	-0.10	-0.33	-0.48	-0.54	-0.59	-0.48	-0.04	-0.30	-0.26	-0.12	0.08	-0.41	-0.16	-0.59	-0.15
2. Independence	-0.36		0.19	0.24	0.56	0.58	0.54	0.44	0.12	0.38	0.51	0.09	0.00	0.12	0.14	0.53	0.04
3. Gender Div.	-0.10	0.19		0.31	0.29	0.33	0.29	0.26	0.04	0.10	0.17	-0.03	-0.15	0.12	0.16	0.30	-0.10
4. Board Size	-0.34	0.24	0.33		0.46	0.48	0.45	0.44	0.03	0.22	0.27	0.10	-0.20	0.17	0.25	0.60	0.10
5. Nomination	-0.47	0.52	0.29	0.50		0.75	0.76	0.74	0.26	0.44	0.50	0.12	-0.10	0.26	0.25	0.70	0.01
6. Audit Com	-0.52	0.54	0.35	0.54	0.73		0.84	0.65	0.19	0.45	0.46	0.08	-0.07	0.34	0.19	0.73	0.08
7. Remuneration	-0.57	0.48	0.30	0.50	0.76	0.81		0.61	0.23	0.49	0.49	0.11	-0.05	0.32	0.15	0.69	0.07
8. Evaluation	-0.50	0.44	0.28	0.50	0.75	0.71	0.69		0.20	0.29	0.36	0.07	-0.10	0.21	0.26	0.71	0.02
9. Meeting	-0.05	0.10	0.01	0.07	0.25	0.17	0.21	0.20		0.13	0.11	0.01	-0.05	-0.01	0.12	0.19	-0.09
10. NED Interlock	-0.30	0.35	0.10	0.25	0.42	0.42	0.44	0.29	0.12		0.61	0.18	-0.08	0.07	0.13	0.40	0.00
11. BOD Interlock	-0.26	0.51	0.17	0.28	0.49	0.47	0.48	0.37	0.11	0.61		0.22	-0.07	0.07	0.23	0.44	0.04
12. Gov't Official	-0.12	0.09	-0.03	0.13	0.12	0.09	0.12	0.07	0.04	0.18	0.22		0.03	-0.02	-0.02	0.07	0.06
13. Liquidity	0.04	-0.02	-0.19	-0.19	-0.11	-0.11	-0.08	-0.15	-0.08	-0.06	-0.08	-0.02		-0.16	-0.52	-0.14	0.08
14. Profitability	-0.35	0.03	0.07	0.08	0.18	0.22	0.21	0.18	-0.06	0.05	0.00	0.04	0.00		0.24	0.32	0.12
15. Leverage	-0.15	0.16	0.19	0.23	0.28	0.26	0.21	0.31	0.15	0.15	0.25	-0.02	-0.48	0.07		0.26	-0.07
16. Firm Size	-0.58	0.51	0.31	0.63	0.70	0.76	0.71	0.75	0.19	0.39	0.44	0.08	-0.22	0.13	0.33		0.18
17. Firm Age	-0.17	0.08	-0.07	0.10	0.00	0.08	0.03	0.04	-0.10	-0.01	-0.01	0.03	0.15	0.06	-0.09	0.17	

Notes: Pearson correlation is shown above and to the right of the diagonal; below and left is Spearman correlation.
Observations: Total=352; Failed Firms 95, Non-failed firms 257

Appendix 10: Correlation Matrix for Four Years (t - 4) Prior Failure

t - 4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Status		-0.38	-0.12	-0.33	-0.45	-0.52	-0.57	-0.40	-0.06	-0.34	-0.28	-0.12	0.13	-0.33	-0.15	-0.57	-0.15
2. Independence	-0.36		0.20	0.23	0.57	0.57	0.55	0.44	0.10	0.40	0.51	0.05	-0.13	0.10	0.17	0.53	0.03
3. Gender Div.	-0.12	0.22		0.33	0.29	0.37	0.30	0.27	0.04	0.17	0.23	0.02	-0.14	0.08	0.16	0.33	-0.08
4. Board Size	-0.34	0.23	0.33		0.47	0.53	0.44	0.47	0.02	0.23	0.32	0.16	-0.16	0.17	0.22	0.61	0.11
5. Nomination	-0.44	0.54	0.30	0.52		0.72	0.74	0.72	0.26	0.45	0.55	0.13	-0.16	0.21	0.22	0.71	0.03
6. Audit Com	-0.50	0.52	0.38	0.59	0.72		0.83	0.60	0.19	0.45	0.50	0.10	-0.22	0.28	0.20	0.72	0.08
7. Remuneration	-0.55	0.49	0.31	0.50	0.73	0.80		0.56	0.27	0.46	0.51	0.13	-0.14	0.24	0.18	0.68	0.07
8. Evaluation	-0.42	0.47	0.29	0.51	0.74	0.67	0.61		0.21	0.30	0.44	0.04	-0.16	0.13	0.23	0.70	0.04
9. Meeting	-0.07	0.11	0.02	0.05	0.24	0.17	0.25	0.20		0.05	0.12	0.02	-0.15	0.06	0.10	0.22	-0.06
10. NED Interlock	-0.34	0.38	0.17	0.26	0.44	0.44	0.42	0.31	0.03		0.64	0.15	-0.11	0.10	0.14	0.38	0.01
11. BOD Interlock	-0.28	0.51	0.23	0.34	0.54	0.51	0.49	0.45	0.10	0.64		0.16	-0.09	0.09	0.25	0.47	0.03
12. Gov't official	-0.12	0.06	0.02	0.19	0.11	0.09	0.13	0.05	0.03	0.15	0.16		0.00	0.04	-0.03	0.08	0.04
13. Liquidity	0.09	-0.11	-0.18	-0.20	-0.17	-0.22	-0.14	-0.19	-0.12	-0.08	-0.08	-0.04		-0.22	-0.49	-0.20	0.09
14. Profitability	-0.30	0.02	0.03	0.14	0.15	0.22	0.17	0.12	-0.01	0.06	0.03	0.07	-0.07		0.33	0.24	0.08
15. Leverage	-0.13	0.20	0.15	0.19	0.24	0.21	0.20	0.26	0.12	0.13	0.25	-0.02	-0.44	0.17		0.21	-0.09
16. Firm Size	-0.57	0.53	0.33	0.63	0.72	0.75	0.70	0.74	0.20	0.39	0.47	0.08	-0.26	0.12	0.26		0.18
17. Firm Age	-0.16	0.04	-0.05	0.11	0.01	0.07	0.04	0.05	-0.09	0.02	0.00	0.02	0.13	0.06	-0.06	0.18	

Notes: Pearson correlation is shown above and to the right of the diagonal; below and left is Spearman correlation.
Observations: Total=346; Failed Firms…91, Non-Failed Firms 255

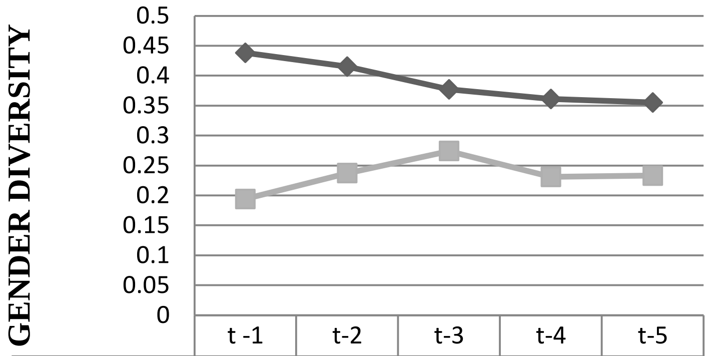
Appendix 11: Correlation Matrix for Five Years (t - 5) Prior Failure

t - 5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Status		-0.32	-0.11	-0.30	-0.43	-0.54	-0.55	-0.37	0.05	-0.36	-0.29	-0.10	-0.02	-0.35	-0.01	-0.57	-0.14
2. Independence	-0.31		0.20	0.22	0.57	0.55	0.54	0.44	0.03	0.40	0.49	0.04	-0.03	0.02	0.07	0.51	0.01
3. Gender Div.	-0.11	0.22		0.33	0.32	0.31	0.27	0.34	0.01	0.17	0.19	0.00	-0.14	0.05	0.10	0.34	-0.11
4. Board Size	-0.31	0.23	0.33		0.45	0.51	0.41	0.44	0.04	0.20	0.28	0.12	-0.12	0.12	0.20	0.59	0.12
5. Nomination	-0.43	0.55	0.32	0.49		0.71	0.72	0.69	0.18	0.47	0.53	0.09	-0.12	0.10	0.19	0.70	0.01
6. Audit Com	-0.52	0.52	0.31	0.57	0.71		0.83	0.57	0.10	0.46	0.49	0.07	-0.11	0.20	0.14	0.71	0.10
7. Remuneration	-0.53	0.50	0.28	0.48	0.71	0.82		0.50	0.14	0.49	0.50	0.10	-0.05	0.21	0.10	0.66	0.07
8. Evaluation	-0.38	0.47	0.34	0.47	0.70	0.63	0.56		0.10	0.30	0.37	0.01	-0.11	0.11	0.21	0.68	0.01
9. Meeting	-0.03	0.06	-0.01	0.03	0.18	0.10	0.17	0.12		0.01	0.02	0.05	-0.31	-0.13	0.37	0.05	-0.08
10. NED Interlock	-0.36	0.38	0.17	0.23	0.46	0.44	0.46	0.31	-0.03		0.63	0.09	0.00	0.11	0.09	0.41	0.01
11. BOD Interlock	-0.29	0.49	0.19	0.30	0.52	0.50	0.49	0.38	0.03	0.63		0.11	-0.03	0.13	0.15	0.47	0.00
12. Gov't Official	-0.10	0.04	0.00	0.13	0.08	0.07	0.10	0.01	0.04	0.09	0.11		-0.06	-0.02	0.04	0.07	0.01
13. Liquidity	0.06	-0.09	-0.19	-0.16	-0.17	-0.17	-0.13	-0.18	-0.12	-0.04	-0.08	-0.06		0.13	-0.63	-0.07	0.13
14. Profitability	-0.31	-0.03	-0.02	0.12	0.08	0.16	0.17	0.07	-0.07	0.03	0.09	0.04	0.01		-0.03	0.29	0.10
15. Leverage	-0.06	0.12	0.14	0.17	0.23	0.20	0.16	0.29	0.17	0.11	0.19	0.03	-0.48	0.12		0.11	-0.14
16. Firm Size	-0.56	0.52	0.34	0.59	0.71	0.74	0.69	0.71	0.10	0.42	0.48	0.07	-0.20	0.13	0.23		0.19
17. Firm Age	-0.15	0.01	-0.09	0.12	-0.01	0.08	0.04	0.00	-0.11	0.01	-0.01	-0.01	0.16	0.03	-0.13	0.18	

Notes: Pearson correlation is shown above and to the right of the diagonal; below and left is Spearman correlation.
Observations: Total=346; Failed Firms…90, Non-Failed Firms 256

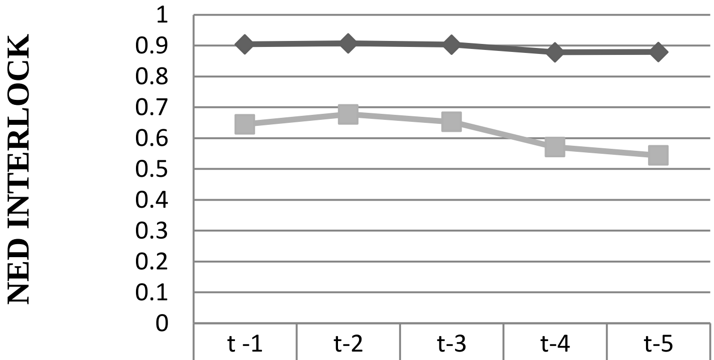
Appendix 12: The Trend of Variables used in the Study

Figure 12: Board Gender Diversity of Failed and Non-failed Firms



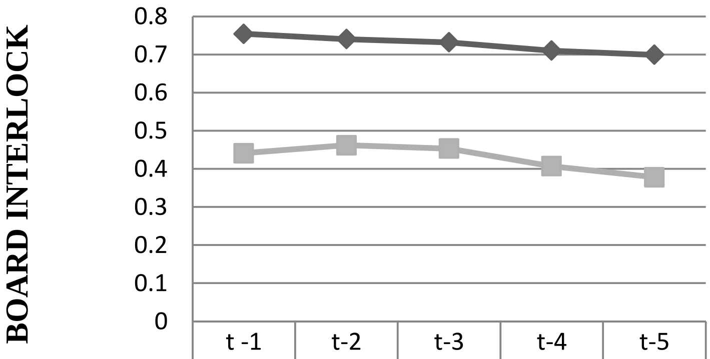
	t -1	t-2	t-3	t-4	t-5
non-failed	0.438	0.415	0.377	0.361	0.355
failed	0.194	0.237	0.274	0.231	0.233

Figure 13: Ned Interlock of Failed and Non-failed Firms



	t -1	t-2	t-3	t-4	t-5
non-failed	0.904	0.907	0.903	0.878	0.879
failed	0.645	0.677	0.653	0.571	0.544

Figure 14: Board Interlock of Failed and Non-failed Firms



	t -1	t-2	t-3	t-4	t-5
non-failed	0.754	0.74	0.732	0.71	0.699
failed	0.441	0.462	0.453	0.407	0.378

Figure 15: Former Government Official of Failed and Non-failed Firms

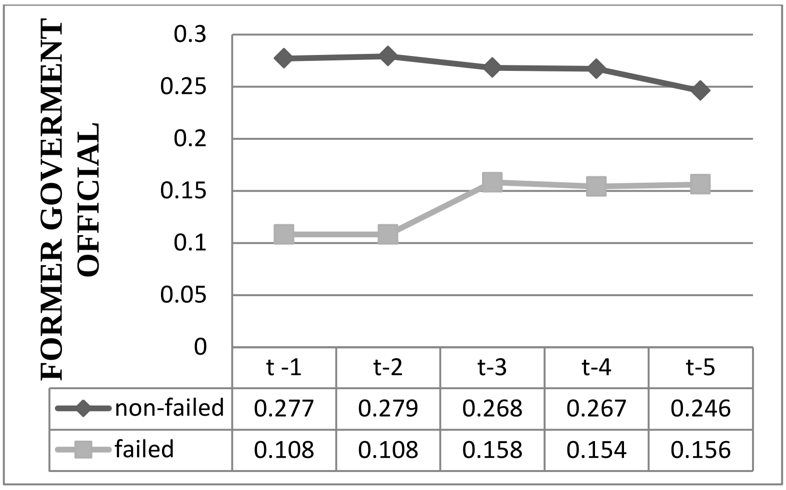


Figure 16: Firm Size of Failed and Non-failed Firms

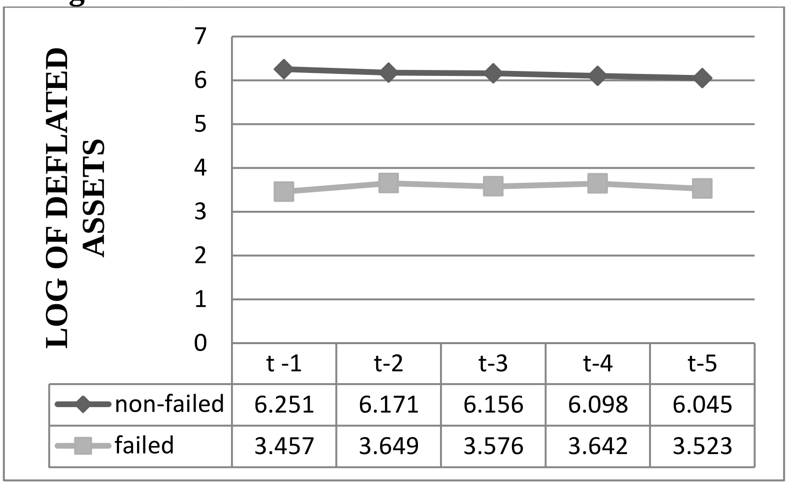


Figure 17: Audit Committee Effectiveness of Failed and Non-failed Firms

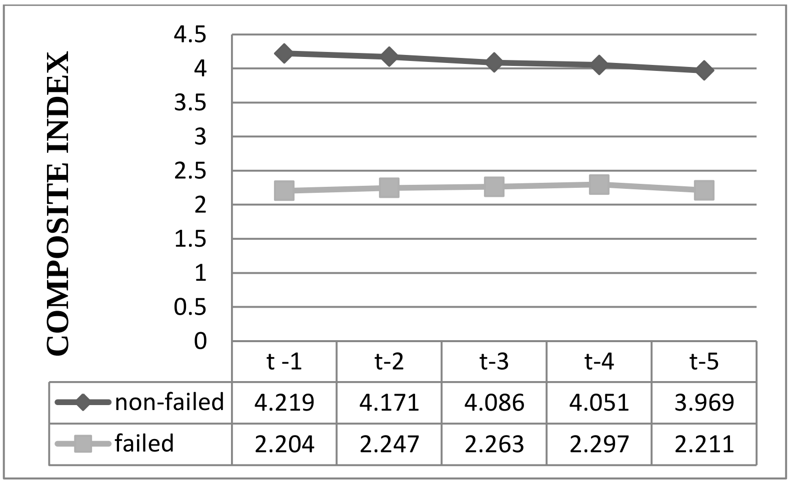
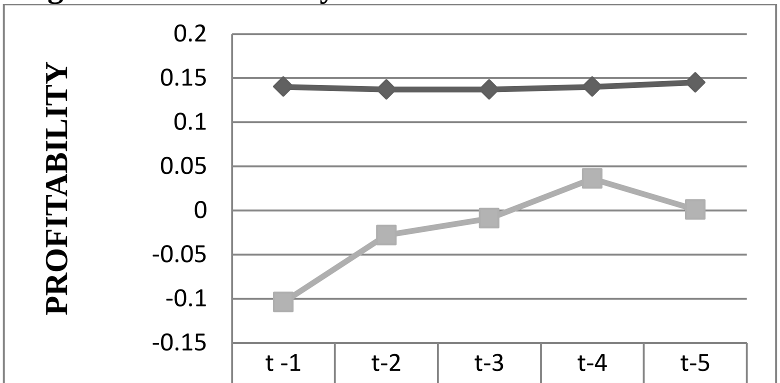
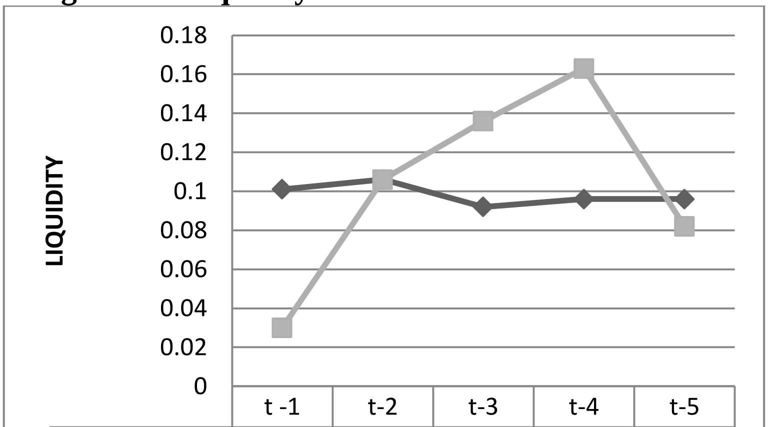


Figure 18: Profitability of Failed and Non-failed Firms



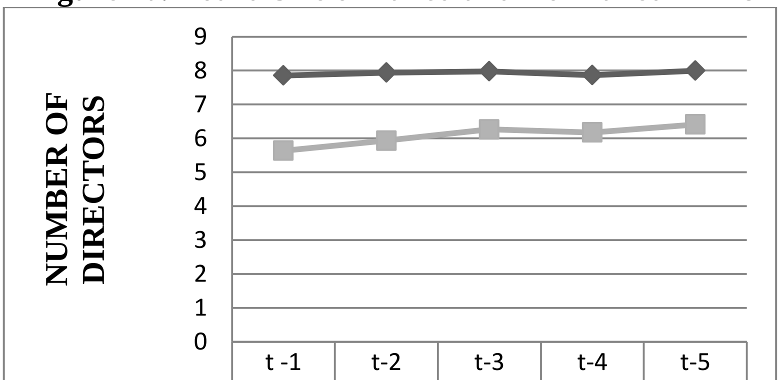
	t -1	t-2	t-3	t-4	t-5
non-failed	0.14	0.137	0.137	0.14	0.145
failed	-0.104	-0.028	-0.009	0.036	0.001

Figure 19: Liquidity of Failed and Non-failed Firms



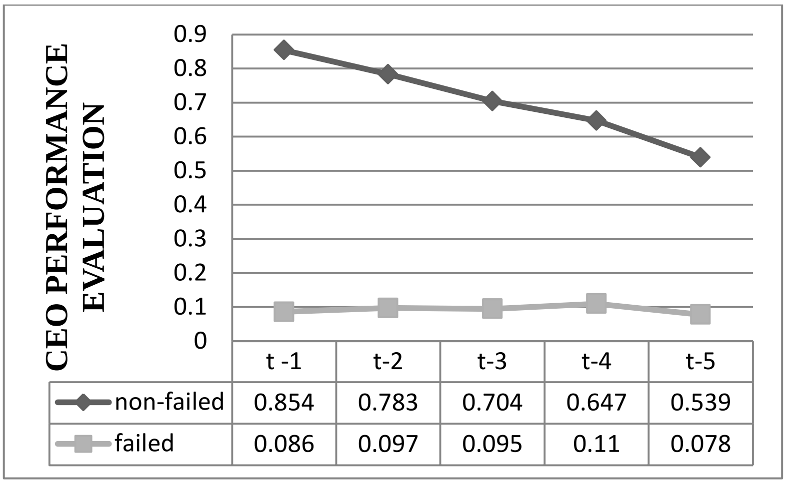
	t -1	t-2	t-3	t-4	t-5
non-failed	0.101	0.106	0.092	0.096	0.096
failed	0.03	0.106	0.136	0.163	0.082

Figure 20: Board Size of Failed and Non-failed Firms



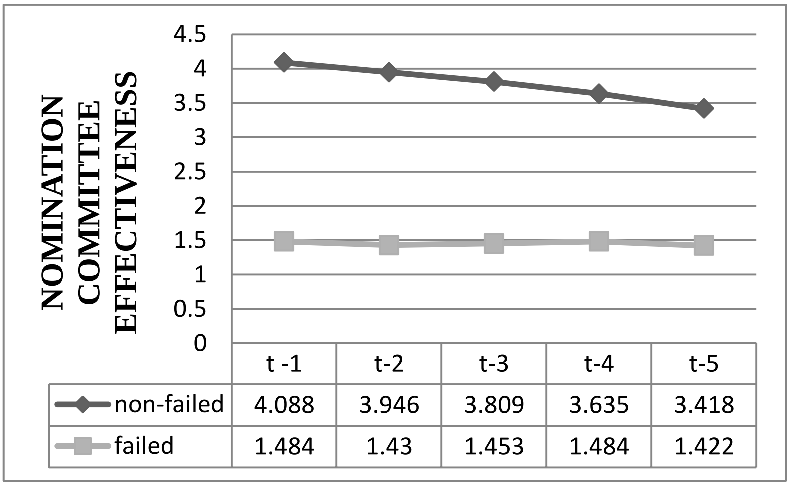
	t -1	t-2	t-3	t-4	t-5
non-failed	7.854	7.942	7.977	7.863	7.996
failed	5.634	5.935	6.263	6.176	6.411

Figure 21: CEO Performance Evaluation of Failed and Non-failed Firms



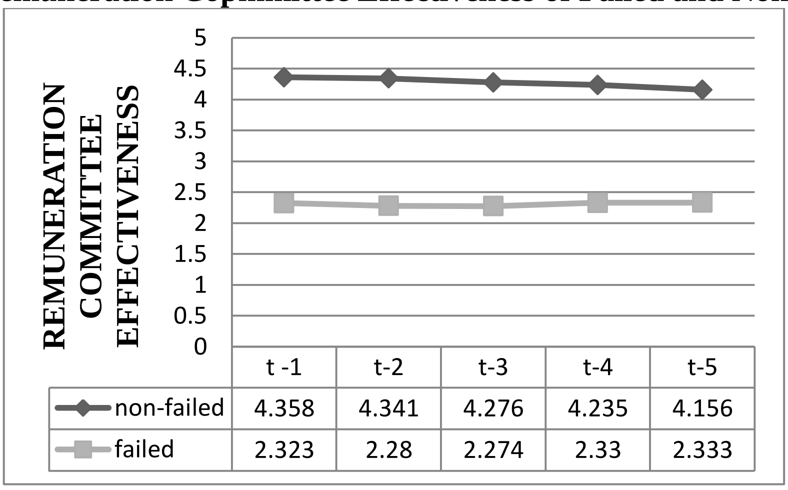
	t -1	t-2	t-3	t-4	t-5
non-failed	0.854	0.783	0.704	0.647	0.539
failed	0.086	0.097	0.095	0.11	0.078

Figure 22: Nomination Committee Effectiveness of Failed and Non-failed Firms



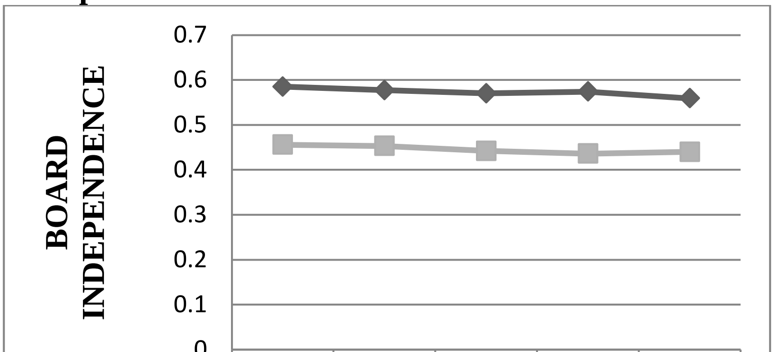
	t -1	t-2	t-3	t-4	t-5
non-failed	4.088	3.946	3.809	3.635	3.418
failed	1.484	1.43	1.453	1.484	1.422

Figure 23: Remuneration Copmmittee Effectiveness of Failed and Non-failed Firms



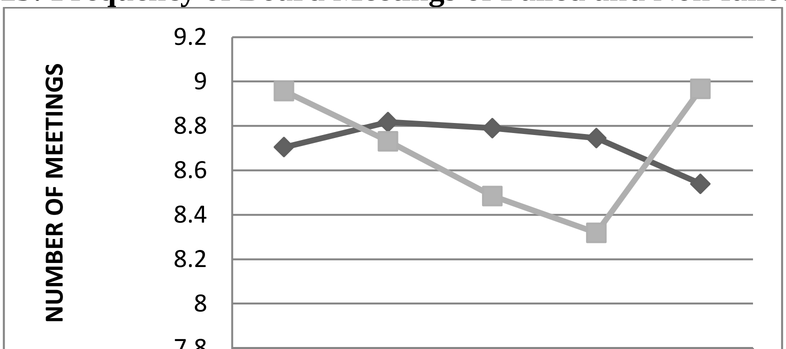
	t -1	t-2	t-3	t-4	t-5
non-failed	4.358	4.341	4.276	4.235	4.156
failed	2.323	2.28	2.274	2.33	2.333

Figure 24: Proportion of Outside Directors of Failed and Non-failed Firms



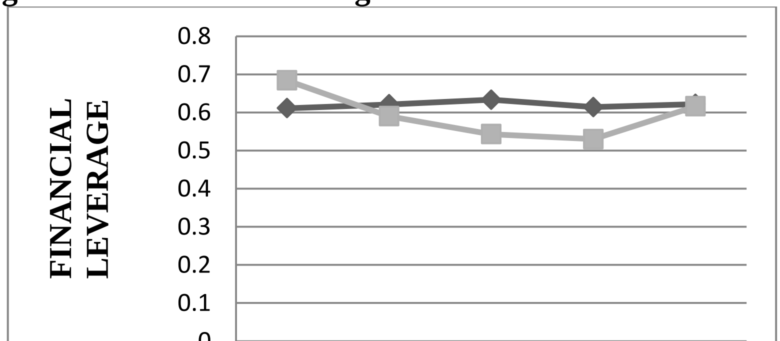
	t -1	t-2	t-3	t-4	t-5
non-failed	0.585	0.577	0.57	0.574	0.559
failed	0.456	0.453	0.442	0.436	0.44

Figure 25: Frequency of Board Meetings of Failed and Non-failed Firms



	t -1	t-2	t-3	t-4	t-5
non-failed	8.704	8.817	8.79	8.745	8.539
failed	8.957	8.731	8.484	8.319	8.967

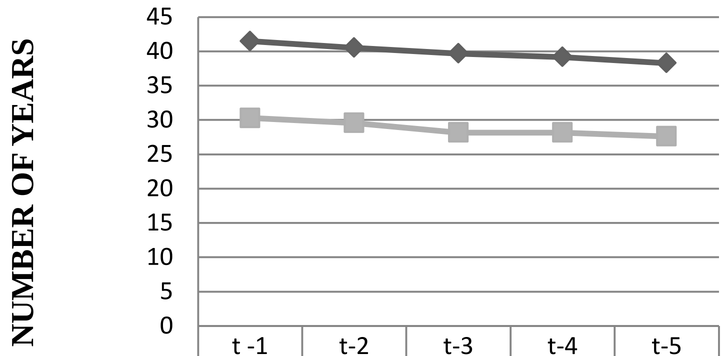
Figure 26: Financial Leverage of Failed and Non-failed Firms



	t -1	t-2	t-3	t-4	t-5
non-failed	0.611	0.621	0.633	0.614	0.622
failed	0.684	0.59	0.543	0.53	0.616

<u>**Appendix 12: Continuation 5 of 5**</u>

Figure 27: Firm Age of Failed and Non-failed Firms



	t -1	t-2	t-3	t-4	t-5
non-failed	41.462	40.523	39.677	39.169	38.273
failed	30.28	29.559	28.158	28.154	27.611

Appendix 13: Results of the Pooled Cross-Sectional Logit Model

		ESTIMATION SAMPLE (PANEL A)										
POOLED MODEL MAIN VARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Board composition												
H1A: BODC	-		-0.261**	-0.254**	-0.177	-0.127	-0.073	-0.241**	-0.244**	-0.218*	-0.146	-0.089
			(0.108)	(0.123)	(0.121)	(0.123)	(0.276)	(0.108)	(0.110)	(0.125)	(0.120)	(0.125)
H2A: FMALE	-		0.014	0.015	0.029	0.034	0.018	-0.093	0.018	0.022	0.036	0.040
			(0.039)	(0.039)	(0.040)	(0.040)	(0.039)	(0.084)	(0.039)	(0.039)	(0.040)	(0.039)
H3A: BODS	-		-0.012	-0.012	-0.009	-0.008	-0.010	-0.009	-0.004	-0.011	-0.007	-0.006
			(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.015)	(0.008)	(0.008)	(0.007)
Board structure												
H4A: NCE	-			-0.002						-0.016		
				(0.011)						(0.020)		
H5A: ACE	-				-0.027**						-0.057**	
					(0.013)						(0.025)	
H6A: RCE	-					-0.044***						-0.085***
						(0.013)						(0.024)
Board Functions												
BODM	-						0.022	0.007	0.014	0.009	0.003	0.001
							(0.016)	(0.005)	(0.013)	(0.007)	(0.009)	(0.010)
BINT3	-						-0.126	-0.070	0.019			
							(0.098)	(0.045)	(0.179)			
Interactions												
H1B i: BODC*BODM	-						-0.023					
							(0.030)					
H1B ii: BODC*BINT3	-						0.114					
							(0.189)					
H2B i: FMALE*BODM	-							0.013				
								(0.008)				
H2B ii: FMALE*BINT3	-							-0.009				
								(0.083)				
H3B i: BODS*BODM	-								-0.001			
									(0.001)			
H3B ii: BODS*BINT3	-								-0.012			
									(0.024)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.003	
											(0.002)	
H6B: RCE*BODM	-											0.004
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01

APPENDIX 13: Continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
POOLED MODEL CONTROLVARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Liquidity	-	0.007	0.020	0.019	0.012	0.009	0.030	0.025	0.021	0.028	0.017	0.012
		(0.070)	(0.068)	(0.068)	(0.066)	(0.067)	(0.065)	(0.062)	(0.066)	(0.066)	(0.064)	(0.063)
Profitability	-	-0.567***	-0.585***	-0.584***	-0.544***	-0.516***	-0.507***	-0.502***	-0.508***	-0.515***	-0.474***	-0.434***
		(0.167)	(0.171)	(0.170)	(0.165)	(0.154)	(0.167)	(0.166)	(0.170)	(0.173)	(0.162)	(0.143)
Leverage	+	0.077	0.099	0.099	0.092	0.084	0.088	0.075	0.080	0.083	0.065	0.058
		(0.071)	(0.069)	(0.069)	(0.070)	(0.068)	(0.067)	(0.067)	(0.069)	(0.069)	(0.069)	(0.065)
Firm Size	-	-0.110***	-0.092***	-0.091***	-0.080***	-0.070***	-0.094***	-0.095***	-0.094***	-0.092***	-0.085***	-0.073***
		(0.010)	(0.012)	(0.014)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.014)	(0.013)	(0.013)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.159***	5.376***	5.306***	4.939***	5.126***	3.646***	4.945***	4.209***	4.475***	4.825***	5.249***
		(1.195)	(1.358)	(1.388)	(1.442)	(1.416)	(1.916)	(1.335)	(1.611)	(1.466)	(1.494)	(1.540)
Parameters												
Observations		875	875	875	875	875	875	875	875	875	875	875
Wald chi2(9/15)		79.29***	83.78***	84.75***	93.10***	108.06***	100.34***	97.50***	98.92***	99.52***	106.24***	120.04***
Pseudo R2		0.435	0.449	0.449	0.457	0.471	0.469	0.471	0.468	0.462	0.473	0.494
Log pseudo		-285.255	-278.194	-278.161	-274.330	-267.286	-268.297	-267.128	-268.540	-271.510	-265.947	-255.739
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		81.62	82.80	82.26	81.48	81.28	80.30	82.54	80.63	81.91	82.56	81.63
Non-failed		88.41	88.82	88.68	88.78	88.52	89.36	89.07	88.74	88.79	89.71	89.54
Overall		86.97	87.54	87.31	87.20	86.97	87.31	87.66	86.97	87.31	88.11	87.77
Hosmer-Lemeshow (10)												
Chi2(8)		21.81	14.62	14.42	13.40	8.10	6.69	8.51	15.98	11.81	12.81	11.62
Prob>chi2		0.005	0.067	0.072	0.099	0.424	0.570	0.385	0.043	0.160	0.119	0.169
ROC		0.906	0.913	0.913	0.915	0.920	0.920	0.921	0.920	0.917	0.920	0.925

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 14: Results of the Pooled Cross-Sectional Logit Model

		HOLDOUT SAMPLE (PANEL B)										
POOLED MODEL MAIN VARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Board composition												
H1A: BODC	-		-0.140	-0.114	-0.096	-0.004	-0.239	-0.128	-0.135	-0.103	-0.088	0.012
			(0.124)	(0.132)	(0.128)	(0.129)	(0.240)	(0.124)	(0.119)	(0.133)	(0.126)	(0.127)
H2A: FMALE	-		0.034	0.036	0.041	0.049	0.038	0.022	0.036	0.035	0.042	0.046
			(0.039)	(0.039)	(0.038)	(0.038)	(0.039)	(0.082)	(0.038)	(0.039)	(0.038)	(0.038)
H3A: BODS	-		-0.014*	-0.013*	-0.012	-0.010	-0.011	-0.010	-0.029*	-0.012	-0.010	-0.007
			(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.016)	(0.008)	(0.008)	(0.008)
Board structure												
H4A: NCE	-			-0.007						-0.013		
				(0.011)						(0.020)		
H5A: ACE	-				-0.015						-0.036	
					(0.013)						(0.024)	
H6A: RCE	-					-0.039***						-0.057**
						(0.009)						(0.026)
Board Functions												
BODM	-						-0.004	0.001	-0.014	0.003	-0.002	0.001
							(0.016)	(0.006)	(0.014)	(0.007)	(0.009)	(0.011)
BINT3	-						-0.077	-0.065	-0.029			
							(0.106)	(0.044)	(0.160)			
Interactions												
H1B i: BODC*BODM	-						0.013					
							(0.028)					
H1B ii: BODC*BINT3	-						-0.036					
							(0.206)					
H2B i: FMALE*BODM	-							0.003				
								(0.008)				
H2B ii: FMALE*BINT3	-							-0.072				
								(0.087)				
H3B i: BODS*BODM	-								0.003			
									(0.002)			
H3B ii: BODS*BINT3	-								-0.009			
									(0.021)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.002	
											(0.002)	
H6B: RCE*BODM	-											0.002
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,, ** p<0.1, ** p<0.05 and *** p<0.01.

Appendix 14: Continuation 1 of 1

		HOLDOUT SAMPLE (PANEL B)										
POOLED MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.176**	-0.180**	-0.184***	-0.182**	-0.183**	-0.174**	-0.176**	-0.170**	-0.177**	-0.176**	-0.167**
		(0.071)	(0.072)	(0.072)	(0.071)	(0.072)	(0.072)	(0.070)	(0.070)	(0.072)	(0.072)	(0.073)
Profitability	-	-0.754***	-0.758***	-0.750***	-0.724***	-0.690***	-0.742***	-0.734***	-0.734***	-0.734***	-0.698***	-0.659***
		(0.152)	(0.152)	(0.150)	(0.155)	(0.143)	(0.157)	(0.154)	(0.154)	(0.153)	(0.157)	(0.143)
Leverage	+	-0.007	-0.006	-0.007	-0.013	-0.017	-0.012	-0.009	-0.003	-0.015	-0.028	-0.029
		(0.078)	(0.081)	(0.081)	(0.080)	(0.078)	(0.080)	(0.079)	(0.083)	(0.081)	(0.079)	(0.078)
Firm Size	-	-0.107***	-0.092***	-0.087***	-0.085***	-0.074***	-0.093***	-0.094***	-0.094***	-0.089***	-0.088***	-0.077***
		(0.009)	(0.013)	(0.015)	(0.014)	(0.013)	(0.014)	(0.013)	(0.014)	(0.015)	(0.015)	(0.013)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		6.155***	7.401***	7.188***	7.249***	7.305***	8.051***	7.509***	8.855***	6.837***	7.458***	7.107***
		(1.272)	(1.462)	(1.153)	(1.499)	(1.522)	(1.954)	(1.525)	(1.853)	(1.610)	(1.611)	(1.722)
Parameters												
Observations		873	873	873	873	873	873	873	873	873	873	873
Wald chi2 (9/12/16)		107.68***	108.47***	109.75***	111.08***	122.27***	115.66***	107.54***	106.88***	110.25***	114.70***	132.04***
Pseudo R2		0.491	0.501	0.501	0.503	0.518	0.514	0.516	0.516	0.503	0.506	0.523
Log pseudo		-256.589	-251.957	-251.528	-250.814	-243.402	-254.070	-244.355	-243.945	-250.535	-249.178	-240.568
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		79.40	82.65	82.05	82.14	80.10	83.42	83.67	83.00	82.23	82.99	80.79
Non-failed		89.17	89.81	89.53	89.66	89.58	90.36	90.10	90.34	89.79	89.69	90.00
Overall		86.94	88.20	87.86	87.97	87.40	88.77	88.66	88.66	88.09	88.20	87.86
Hosmer-Lemeshow (10)												
Chi2(8)		9.01	4.63	6.65	3.59	2.58	7.90	3.45	4.58	5.59	9.45	2.50
Prob>chi2		0.342	0.797	0.575	0.827	0.958	0.443	0.903	0.801	0.693	0.306	0.962
ROC		0.925	0.929	0.929	0.930	0.934	0.932	0.933	0.933	0.930	0.931	0.935

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 15: Results of the Cross-Sectional Logit Model; One Year (t – 1) Prior Failure

		ESTIMATION SAMPLE (PANEL A)										
t – 1 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.010	0.018	0.084	0.164	0.420	0.003	0.021	0.059	0.121	0.174
			(0.145)	(0.146)	(0.173)	(0.049)	(0.412)	(0.140)	(0.134)	(0.152)	(0.168)	(0.178)
H2A: FMALE	-		-0.026	-0.021	-0.016	-0.008	-0.030	-0.164	-0.017	-0.019	-0.016	-0.008
			(0.048)	(0.049)	(0.050)	(0.049)	(0.050)	(0.134)	(0.052)	(0.053)	(0.056)	(0.056)
H3A: BODS	-		-0.026	-0.024	-0.024	-0.019	-0.026*	-0.024*	-0.088**	-0.025*	-0.026*	-0.019
			(0.017)	(0.016)	(0.017)	(0.015)	(0.014)	(0.013)	(0.038)	(0.013)	(0.014)	(0.012)
Board structure												
H4A: NCE	-			-0.009						-0.017		
				(0.012)						(0.034)		
H5A: ACE	-				-0.021						-0.067*	
					(0.019)						(0.036)	
H6A: RCE	-					-0.044**						-0.075
						(0.017)						(0.047)
Board Functions												
BODM	-						0.031	0.006	-0.019	0.012	-0.002	-0.0014
							(0.022)	(0.007)	(0.022)	(0.010)	(0.011)	(0.016)
BINT3	-						-0.022	-0.154**	-0.517***			
							(0.123)	(0.071)	(0.195)			
Interactions												
H1B i: BODC*BODM	-						-0.042					
							(0.039)					
H1B ii: BODC*BINT3	-						-0.024					
							(0.283)					
H2B i: FMALE*BODM	-							0.012				
								(0.013)				
H2B ii: FMALE*BINT3	-							0.196				
								(0.159)				
H3B i: BODS*BODM	-								0.005			
									(0.003)			
H3B ii: BODS*BINT3	-								0.069**			
									(0.027)			
H4B: NCE*BODM	-									-0.000		
										(0.003)		
H5B: ACE*BODM	-										0.004	
											(0.003)	
H6B: RCE*BODM	-											0.003
												(0.005)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 15: Continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
t -1 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.054	-0.071	-0.071	-0.078	-0.090	-0.049	-0.064	-0.062	-0.062	-0.071	-0.085
		(0.083)	(0.091)	(0.090)	(0.092)	(0.100)	(0.068)	(0.066)	(0.064)	(0.069)	(0.066)	(0.079)
Profitability	-	-1.141**	-1.224**	-1.226**	-1.212***	-1.265**	-1.045***	-1.047***	-1.156***	-1.041**	-1.078**	-1.123**
		(0.540)	(0.495)	(0.513)	(0.468)	(0.527)	(0.402)	(0.397)	(0.388)	(0.488)	(0.440)	(0.490)
Leverage	+	0.085	0.079	0.083	0.088	0.063	0.046	0.012	0.086	0.048	0.047	0.028
		(0.108)	(0.109)	(0.107)	(0.116)	(0.111)	(0.089)	(0.094)	(0.101)	(0.090)	(0.094)	(0.099)
Firm Size	-	-0.088***	-0.072***	-0.065***	-0.066***	-0.062***	-0.068***	-0.067***	-0.073***	-	-0.062***	-0.060***
		(0.013)	(0.016)	(0.019)	(0.015)	(0.015)	(0.014)	(0.016)	(0.015)	0.059***	(0.014)	(0.015)
										(0.018)		
Firm Age	-	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000	-0.001	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	+/-	4.359***	5.984***	5.306***	5.348***	5.984***	1.610***	5.715***	10.324**	3.305	6.006	6.574**
		1.214)	(1.874)	(1.971)	(2.030)	(3.19)	(3.281)	(1.996)	(4.218)	(2.141)	(2.390)	(3.012)
Parameters												
Observations		177	177	177	177	177	177	177	177	177	177	177
Wald chi2(9)/12/16		59.72***	56.58***	54.12***	52.25***	54.86***	59.83***	62.09***	56.97***	57.05***	50.93***	56.55***
Pseudo R2		0.599	0.617	0.619	0.621	0.636	0.639	0.646	0.658	0.639	0.645	0.655
Log pseudo		-41.132	-39.274	-39.056	-38.792	-37.256	-37.008	-36.301	-35.065	-36.949	-36.360	-35.378
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		84.09	90.24	90.24	92.50	86.05	88.10	84.44	90.48	84.44	86.36	85.71
Non-failed		92.48	92.65	92.65	92.70	92.54	92.59	93.18	93.33	93.18	93.23	91.85
Overall		90.40	92.09	92.09	92.66	90.96	91.53	90.96	92.66	90.96	91.53	90.40
Hosmer-Lemeshow (10)												
Chi2(8)		4.73	3.77	8.02	4.33	7.03	9.06	3.04	6.61	8.32	10.18	3.71
Prob>chi2		0.786	0.877	0.432	0.826	0.534	0.337	0.932	0.580	0.403	0.252	0.883
ROC		0.948	0.950	0.950	0.952	0.956	0.957	0.960	0.963	0.958	0.959	0.963

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 16: Results of the Cross-Sectional Logit Model; One Year (t-1) Prior Failure

		HOLDOUT SAMPLE (PANEL B)										
t - 1 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.062	-0.024	-0.043	-0.003	-0.507	-0.107	-0.068	-0.028	-0.044	0.002
			(0.195)	(0.195)	(0.202)	(0.192)	(0.447)	(0.183)	(0.188)	(0.185)	(0.187)	(0.173)
H2A: FMALE	-		-0.039	-0.033	-0.035	-0.024	-0.031	0.050	-0.048	-0.031	-0.038	-0.029
			(0.085)	(0.085)	(0.086)	(0.087)	(0.100)	(0.252)	(0.096)	(0.088)	(0.099)	(0.100)
H3A: BODS	-		-0.023*	-0.021*	-0.021*	-0.019	-0.019	-0.020	-0.040	-0.020	-0.017	-0.014
			(0.012)	(0.012)	(0.013)	(0.013)	(0.017)	(0.016)	(0.047)	(0.013)	(0.015)	(0.017)
Board structure												
H4A: NCE	-			-0.010						-0.058		
				(0.023)						(0.048)		
H5A: ACE	-				-0.007						-0.049	
					(0.021)						(0.046)	
H6A: RCE	-					-0.026						-0.063
						(0.223)						(0.057)
Board Functions												
BODM	-						-0.025	0.003	-0.010	-0.008	-0.009	-0.007
							(0.027)	(0.008)	(0.034)	(0.010)	(0.011)	(0.016)
BINT3	-						-0.099	-0.089	-0.328			
							(0.389)	(0.118)	(0.440)			
Interactions												
H1B i: BODC*BODM	-						0.051					
							(0.052)					
H1B ii: BODC*BINT3	-						-0.048					
							(0.555)					
H2B i: FMALE*BODM	-							-0.009				
								(0.025)				
H2B ii: FMALE*BINT3	-							-0.675				
								(0.511)				
H3B i: BODS*BODM	-								0.002			
									(0.005)			
H3B ii: BODS*BINT3	-								0.032			
									(0.049)			
H4B: NCE*BODM	-									0.005		
										(0.004)		
H5B: ACE*BODM	-										0.004	
											(0.005)	
H6B: RCE*BODM	-											0.004
												(0.006)

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 16: continuation 1 of 1

		HOLDOUT SAMPLE (PANEL B)										
t - 1 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.261*	-0.268	-0.271*	-0.271	-0.237	-0.262*	-0.252	-0.249	-0.273*	-0.279	-0.205
		(0.134)	(0.171)	(0.162)	(0.173)	(0.152)	(0.147)	(0.167)	(0.184)	(0.147)	(0.177)	(0.158)
Profitability	-	-0.740**	-0.670**	-0.672**	-0.657**	-0.610**	-0.687**	-0.657*	-0.673*	-0.689**	-0.641**	-0.555**
		(0.332)	(0.298)	(0.291)	(0.301)	(0.260)	(0.341)	(0.383)	(0.360)	(0.285)	(0.271)	(0.260)
Leverage	+	-0.056	-0.101	-0.107	-0.105	-0.088	-0.128	-0.091	-0.084	-0.151	-0.143	-0.092
		(0.112)	(0.129)	(0.144)	(0.124)	(0.118)	(0.124)	(0.140)	(0.150)	(0.154)	(0.126)	(0.129)
Firm Size	-	-0.089***	-0.059**	-0.051**	-0.056**	-0.042*	-0.050*	-0.049*	-0.051*	-0.049	-0.060**	-0.044*
		(0.016)	(0.025)	(0.033)	(0.026)	(0.023)	(0.029)	(0.029)	(0.030)	(0.034)	(0.027)	(0.024)
Firm Age	-	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		10.268**	12.311**	12.084*	12.167*	11.679**	17.517**	12.059*	14.829*	14.673*	14.317*	12.834**
		(4.042)	(6.044)	(6.522)	(6.252)	(5.783)	(8.502)	(6.543)	(7.920)	(8.217)	(7.294)	(7.111)
Parameters												
Observations		176	176	176	176	176	176	176	176	176	176	176
Wald chi2(9)/12/16		2.08**	1.36	1.30	1.19	1.15	0.63	1.08	0.83	0.79	0.88	0.80
Pseudo R2		0.648	0.673	0.676	0.674	0.685	0.702	0.697	0.649	0.683	0.683	0.695
Log pseudo		-35.589	-33.066	-32.790	-32.974	-31.894	-30.116	-30.681	-30.461	-31.379	-32.054	-30.858
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		93.02	89.13	91.11	89.13	93.33	91.30	90.91	88.89	93.02	93.18	93.33
Non-failed		95.49	96.15	96.18	96.15	96.95	96.92	95.45	95.42	95.49	96.21	96.95
Overall		94.89	94.32	94.89	94.32	96.02	95.45	94.32	93.75	94.89	95.45	96.02
Hosmer-Lemeshow (10)												
Chi2(8)		9.90	24.35	11.76	23.181	14.14	7.33	14.05	3.89	14.50	18.08	31.58
Prob>chi2		0.272	0.002	0.162	0.003	0.078	0.501	0.080	0.867	0.070	0.021	0.000
ROC		0.960	0.966	0.968	0.965	0.966	0.973	0.967	0.971	0.973	0.969	0.968

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 17: Results of the Cross-Sectional Logit Model; Two Years (t – 2) Prior Failure

		ESTIMATION SAMPLE (PANEL A)										
t -2 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.319*	-0.267	-0.273	-0.241	-0.449	-0.286*	-0.320*	-0.172	-0.199	-0.159
			(0.163)	(0.196)	(0.170)	(0.174)	(0.396)	(0.169)	(0.167)	(0.199)	(0.174)	(0.175)
H2A: FMALE	-		0.009	0.010	0.019	0.016	0.015	-0.238*	0.015	0.030	0.046	0.042
			(0.059)	(0.061)	(0.060)	(0.058)	(0.059)	(0.145)	(0.057)	(0.060)	(0.057)	(0.055)
H3A: BODS	-		-0.020	-0.019	-0.019	-0.016	-0.013	-0.009	-0.029	-0.014	-0.015	-0.012
			(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.025)	(0.015)	(0.015)	(0.012)
Board structure												
H4A: NCE	-			--0.011					-	-0.063**		
				(0.017)						(0.030)		
H5A: ACE	-				-0.018						-0.076**	
					(0.019)						(0.034)	
H6A: RCE	-					-0.029						-0.086**
						(0.019)						(-0.086)
Board Functions												
BODM	-						0.011	0.015**	0.002	0.012	0.005	0.006
							(0.027)	(0.007)	(0.025)	(0.008)	(0.010)	(0.014)
BINT3	-						-0.170	-0.170**	0.300			
							(0.213)	(0.073)	(0.376)			
Interactions												
H1B i: BODC*BODM	-						0.018					
							(0.051)					
H1B ii: BODC*BINT3	-						0.049					
							(0.368)					
H2B i: FMALE*BODM	-							0.029				
								(0.019)				
H2B ii: FMALE*BINT3	-							0.015				
								(0.157)				
H3B i: BODS*BODM	-								0.003			
									(0.004)			
H3B ii: BODS*BINT3	-								-0.065			
									(0.050)			
H4B: NCE*BODM	-									0.005		
										(0.003)		
H5B: ACE*BODM	-										0.005*	
											(0.003)	
H6B: RCE*BODM	-											0.005
												(0.004)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 17: Continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
t-2 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	0.022	0.071	0.071	0.063	0.059	0.094	0.106	0.077	0.078	0.056	0.066
		(0.098)	(0.097)	(0.097)	(0.095)	(0.092)	(0.084)	(0.089)	(0.081)	(0.087)	(0.089)	(0.086)
Profitability	-	-0.484**	-0.503***	-0.471**	-0.483**	-0.445**	-0.377**	-0.340**	-0.367**	-0.327*	-0.378**	-0.297*
		(0.190)	(0.192)	(0194)	(0.192)	(0.190)	(0.169)	(0.159)	(0.187)	(0.176)	(0.176)	(0.165)
Leverage	+	0.025	0.068	0.066	0.062	0.042	0.051	0.048	0.008	0.016	0.0013	-0.002
		(0.119)	(0.121)	(0.121)	(0.121)	(0.116)	(0.122)	(0.122)	(0.133)	(0.210)	(0.114)	(0.106)
Firm Size	-	-0.122***	-0.093***	-0.084***	-0.084***	-0.075***	-0.094***	-0.101***	-0.093***	-0.089***	-0.093***	-0.074***
		(0.013)	(0.018)	(0.022)	(0.020)	(0.021)	(0.018)	(0.017)	(0.015)	(0.022)	(0.020)	(0.021)
Firm Age	-	0.000	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000	0.001	0.000	0.000
		(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.772***	6.041***	5.457***	5.732***	5.957***	5.399***	5.489***	6.147**	4.619**	6.204***	6.017***
		(1.583)	(1.879)	(2.015)	(1.936)	(1.928)	(2.888)	(1.949)	(2.923)	(2.155)	(2.048)	(1.979)
Parameters												
Observations		176	176	176	176	176	176	176	176	176	176	176
Wald chi2(9)/12/16		40.39***	41.70***	45.46***	46.00***	49.68***	60.96***	52.76***	55.93***	50.25***	49.01***	59.89***
Pseudo R2		0.430	0.450	0.452	0.453	0.458	0.524	0.538	0.534	0.510	0.510	0.521
Log pseudo		-58.181	-56.228	-56.004	-55.867	-55.367	-48.576	-47.153	-47.556	-50.041	-50.059	-48.877
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		81.58	80.49	80.00	81.58	80.95	85.00	82.93	80.95	87.50	85.00	83.33
Non-failed		88.41	89.63	88.97	88.41	90.30	90.44	90.37	90.30	91.18	90.44	91.04
Overall		86.93	87.50	86.93	86.93	88.07	89.20	88.64	88.07	90.34	89.20	89.20
Hosmer-Lemeshow (10)												
Chi2(8)		8.51	9.10	4.94	10.64	7.51	6.30	3.86	2.44	5.68	14.74	8.40
Prob>chi2		0.386	0.334	0.764	0.223	0.483	0.613	0.870	0.965	0.683	0.064	0.396
ROC		0.899	0.911	0.913	0.910	0.911	0.937	0.942	0.942	0.932	0.931	0.930

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 18: Results of the Cross-Sectional Logit Model; Two Years (t – 2) Prior Failure

		HOLDOUT SAMPLE (PANEL B)										
t – 2 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.231	-0.230	-0.248	-0.003	0.243	-0.203	-0.163	-0.223	-0.233	0.005
			(0.256)	(0.266)	(0.264)	(0.282)	(0.672)	(0.234)	(0.229)	(0.274)	(0.263)	(0.286)
H2A: FMALE	-		0.061	0.062	0.060	0.087	0.073	0.153	0.073	0.066	0.062	0.097
			(0.059)	(0.058)	(0.059)	(0.066)	(0.058)	(0.164)	(0.059)	(0.058)	(0.058)	(0.067)
H3A: BODS	-		-0.028*	-0.028	-0.028*	-0.021	-0.029*	-0.028*	-0.028	-0.030*	-0.031*	-0.023
			(0.016)	(0.017)	(0.016)	(0.014)	(0.016)	(0.017)	(0.034)	(0.018)	(0.017)	(0.015)
Board structure												
H4A: NCE	-			-0.000						0.010		
				(0.017)						(0.038)		
H5A: ACE	-				0.005						0.023	
					(0.023)						(0.043)	
H6A: RCE	-					-0.058**						-0.067
						(0.026)						(0.059)
Board Functions												
BODM	-						0.012	-0.004	-0.004	-0.006	-0.002	-0.011
							(0.049)	(0.011)	(0.030)	(0.016)	(0.021)	(0.007)
BINT3	-						0.176	-0.191	-0.546**			
							(0.364)	(0.209)	(0.268)			
Interactions												
H1B i: BODC*BODM	-						-0.040					
							(0.091)					
H1B ii: BODC*BINT3	-						-0.528					
							(0.826)					
H2B i: FMALE*BODM	-							-0.010				
								(0.016)				
H2B ii: FMALE*BINT3	-							0.104				
								(0.257)				
H3B i: BODS*BODM	-								-0.001			
									(0.004)			
H3B ii: BODS*BINT3	-								0.056			
									(0.036)			
H4B: NCE*BODM	-									-0.001		
										(0.004)		
H5B: ACE*BODM	-										-0.002	
											(0.005)	
H6B: RCE*BODM	-											0.001
												(0.007)

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 18: continuation 1 of 1

		HOLDOUT SAMPLE (PANEL B)										
t – 2 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.184	-0.224*	-0.224*	-0.226*	-0.250*	-0.224	-0.246	-0.257	-0.241*	-0.242*	-0.278*
		(0.127)	(0.132)	(0.133)	(0.137)	(0.131)	(0.154)	(0.152)	(0.161)	(0.140)	(0.142)	(0.146)
Profitability	-	-0.934***	-1.005***	-1.003***	-1.034***	-0.740***	-0.904***	-1.020***	-0.983***	-0.981***	-1.022***	-0.719***
		(0.296)	(0.307)	(0.308)	(0.346)	(0.234)	(0.323)	(0.327)	(0.319)	(0.310)	(0.351)	(0.256)
Leverage	+	0.079	0.070	0.070	0.071	0.049	0.075	0.054	0.068	0.088	0.093	0.058
		(0.141)	(0.141)	(0.144)	(0.140)	(0.142)	(0.168)	(0.177)	(0.164)	(0.156)	(0.150)	(0.154)
Firm Size	-	-0.097***	-0.071***	-0.071***	-0.074***	-0.051***	-0.064**	-0.061***	-0.061***	-0.068***	-0.070***	-0.049**
		(0.016)	(0.020)	(0.024)	(0.024)	(0.020)	(0.025)	(0.023)	(0.024)	(0.026)	(0.026)	(0.024)
Firm Age	-	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000	-0.001	-0.001	-0.001	-0.000
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	+/-	5.690**	8.768**	8.761**	8.871**	8.768**	8.324	10.729***	11.374**	9.796**	9.445**	10.499
		(2.715)	(3.534)	(3.700)	(3.633)	(4.450)	(7.103)	(4.001)	(4.882)	(4.293)	(4.271)	(5.231)
Parameters												
Observations		175	175	175	175	175	175	175	175	175	175	175
Wald chi2(9)/12/16		4.30***	2.97***	2.70**	2.66**	2.19	1.61	1.72**	1.80**	2.28*	2.26***	2.04**
Pseudo R2		0.543	0.576	0.576	0.576	0.609	0.607	0.602	0.609	0.583	0.584	0.616
Log pseudo		-46.061	-42.790	-42.790	-42.767	-39.434	-39.633	-40.115	-39.462	-41.996	-41.896	-38.700
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		82.50	79.07	79.07	79.07	80.95	85.00	85.37	85.00	82.50	82.50	82.50
Non-failed		90.37	90.91	90.91	90.91	90.98	91.11	91.79	91.11	90.37	90.37	90.37
Overall		88.57	88.00	88.00	88.00	88.57	89.71	90.29	89.71	88.57	88.57	88.57
Hosmer-Lemeshow (10)												
Chi2(8)		3.97	4.02	4.03	3.89	3.79	4.20	3.68	4.23	5.43	5.24	6.84
Prob>chi2		0.860	0.855	0.854	0.867	0.876	0.839	0.885	0.836	0.711	0.732	0.554
ROC		0.940	0.950	0.950	0.950	0.958	0.959	0.956	0.960	0.953	0.953	0.960

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 19: Results of the Cross-Sectional Logit Model; Three Years (t – 3) Prior Failure

		ESTIMATION SAMPLE (PANEL A)										
t – 3 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.324**	-0.287	-0.198	-0.114	0.521	-0.314*	-0.309*	-0.268	-0.175	-0.069
			(0.166)	(0.181)	(0.196)	(0.173)	(0.478)	(0.168)	(0.177)	(0.181)	(0.192)	(0.177)
H2A: FMALE	-		0.002	0.006	0.017	0.015	0.003	0.096	0.002	0.009	0.016	0.027
			(0.064)	(0.065)	(0.065)	(0.063)	(0.060)	(0.198)	(0.064)	(0.067)	(0.066)	(0.062)
H3A: BODS	-		-0.010	-0.008	-0.003	-0.005	-0.006	-0.010	0.015	-0.007	-0.000	0.010
			(0.015)	(0.015)	(0.016)	(0.015)	(0.016)	(0.017)	(0.037)	(0.015)	(0.016)	(0.014)
Board structure												
H4A: NCE	-			-0.009						0.000		
				(0.015)						(0.034)		
H5A: ACE	-				-0.035						0.020	
					(0.022)						(0.054)	
H6A: RCE	-					-0.068***						-0.038
						(0.018)						(0.039)
Board Functions												
BODM	-						0.058**	0.006	0.023	0.011	0.007	0.007
							(0.028)	(0.010)	(0.032)	(0.012)	(0.005)	(0.60)
BINT3	-						-0.251	-0.000	0.004			
							(0.221)	(0.076)	(0.354)			
Interactions												
H1B i: BODC*BODM	-						-0.111**					
							(0.055)					
H1B ii: BODC*BINT3	-						0.425					
							(0.386)					
H2B i: FMALE*BODM	-							-0.008				
								(0.022)				
H2B ii: FMALE*BINT3	-							-0.130				
								(0.167)				
H3B i: BODS*BODM	-								-0.003			
									(0.047)			
H3B ii: BODS*BINT3	-								-0.004			
									(0.047)			
H4B: NCE*BODM	-									-0.001		
										(0.004)		
H5B: ACE*BODM	-										-0.007	
											(0.006)	
H6B: RCE*BODM	-											-0.005
												(0.005)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 19: continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
t – 3 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.073	-0.047	-0.049	-0.059	-0.118	-0.030	-0.040	-0.033	-0.040	-0.058	-0.117
		(0.116)	(0.117)	(0.117)	(0.115)	(0.114)	(0.108)	(0.125)	(0.121)	(0.118)	(0.117)	(0.114)
Profitability	-	-0.426	-0.047	-0.436	-0.356	-0.295	-0.437	-0.464	-0.422	-0.408	-0.317	-0.248
		(0.295)	(0.117)	(0.313)	(0.291)	(0.233)	(0.295)	(0.328)	(0.302)	(0.310)	(0.285)	(0.212)
Leverage	+	-0.030	-0.013	-0.008	-0.030	-0.063	-0.004	-0.003	-0.002	-0.004	-0.026	-0.062
		(0.122)	(0.117)	(0.116)	(0.118)	(0.110)	(0.110)	(0.123)	(0.124)	(0.115)	(0.112)	(0.106)
Firm Size	-	-0.119***	-0.100***	-0.094***	-0.084***	-0.067***	-0.102***	-0.102***	-0.100***	-0.096***	-0.187***	-0.072***
		(0.014)	(0.017)	(0.019)	(0.019)	(0.019)	(0.017)	(0.017)	(0.018)	(0.019)	(0.019)	(0.020)
Firm Age	-	-0.001	-0.006	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	+/-	4.380**	5.629**	5.340**	5.020**	5.284***	1.371	5.287**	3.640***	4.559*	3.140	3.008
		(1.926)	(2.418)	(2.531)	(2.455)	(1.962)	(2.966)	(2.562)	(3.382)	(2.541)	(2.451)	(2.057)
Parameters												
Observations		176	176	176	176	176	176	176	176	176	176	176
Wald chi2(9)/12/16		37.20***	43.43***	44.85***	48.82***	54.10***	45.29***	46.86***	46.97***	49.45***	52.10***	57.33***
Pseudo R2		0.403	0.420	0.421	0.430	0.467	0.441	0.426	0.424	0.425	0.441	0.481
Log pseudo		-60.965	-59.283	-59.093	-58.171	-54.416	-57.070	-58.651	-58.832	-58.707	-57.117	-53.061
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		82.05	76.32	75.61	80.95	80.95	82.05	80.00	77.50	78.05	78.00	83.33
Non-failed		89.05	86.96	88.15	90.30	90.30	89.05	88.97	88.24	88.89	88.89	87.86
Overall		87.50	84.66	85.23	88.07	88.07	87.50	86.93	85.80	86.36	86.36	86.93
Hosmer-Lemeshow (10)												
Chi2(8)		5.30	7.23	7.09	10.37	3.66	11.57	8.25	6.79	6.93	8.81	5.33
Prob>chi2		0.725	0.512	0.528	0.240	0.887	0.172	0.409	0.559	0.544	0.358	0.722
ROC		0.893	0.904	0.906	0.903	0.918	0.911	0.906	0.902	0.904	0.907	0.920

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 20: Results of the Cross-Sectional Logit Model; Three Years (t – 3) Prior Failure

		HOLDOUT SAMPLE (PANEL B)										
t – 3 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.170	-0.196	-0.191	-0.08	-0.515	-0.075	-0.130	-0.176	-0.172	-0.013
			(0.071)	(0.274)	(0.262)	(0.269)	(0.721)	(0.211)	(0.225)	(0.288)	(0.250)	(0.252)
H2A: FMALE	-		0.120*	0.120*	0.118*	0.134*	0.146**	-0.193	0.132	0.120*	0.135*	0.132*
			(0.071)	(0.071)	(0.070)	(0.076)	(0.074)	(0.182)	(0.081)	(0.072)	(0.075)	(0.075)
H3A: BODS	-		-0.010	-0.011	0.010	-0.007	-0.005	0.005	-0.049	-0.006	-0.002	0.000
			(0.013)	(0.014)	(0.014)	(0.014)	(0.017)	(0.015)	(0.041)	(0.015)	(0.014)	(0.014)
Board structure												
H4A: NCE	-			0.005						-0.027		
				(0.023)						(0.041)		
H5A: ACE	-				0.006						-0.100*	
					(0.027)						(0.060)	
H6A: RCE	-					-0.034						-0.096
						(0.031)						(0.062)
Board Functions												
BODM	-						-0.016	-0.007	-0.035	-0.000	-0.022	-0.011
							(0.034)	(0.014)	(0.037)	(0.012)	(0.016)	(0.022)
BINT3	-						0.111	-0.067	0.101			
							(0.283)	(0.109)	(0.327)			
Interactions												
H1B i: BODC*BODM	-						0.052					
							(0.068)					
H1B ii: BODC*BINT3	-						-0.441					
							(0.591)					
H2B i: FMALE*BODM	-							0.035**				
								(0.017)				
H2B ii: FMALE*BINT3	-							-0.086				
								(0.187)				
H3B i: BODS*BODM	-								0.006			
									(0.005)			
H3B ii: BODS*BINT3	-								-0.027			
									(0.044)			
H4B: NCE*BODM	-									0.003		
										(0.004)		
H5B: ACE*BODM	-										0.011**	
											(0.005)	
H6B: RCE*BODM	-											0.008
												(0.006)

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses ,.* $p<0.1$, ** $p<0.05$ and *** $p<0.01$.

Appendix 20: continuation 1 of 1

		HOLDOUT SAMPLE (PANEL B)										
t – 3 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.057	-0.084	-0.084	-0.087	-0.091	-0.087	-0.072	-0.124	-0.089	-0.080	-0.091
		(0.131)	(0.147)	(0.149)	(0.148)	(0.148)	(0.155)	(0.157)	(0.148)	(0.155)	(0.153)	(0.165)
Profitability	-	-1.004***	-0.954***	-0.952***	-0.963***	-0.920***	-0.914***	-0.906**	-0.871***	-0879***	-0.804**	-0.871**
		(0.258)	(0.263)	(0.263)	(0.278)	(0.275)	(0.317)	(0.397)	(0.336)	(0.322)	(0.336)	(0.367)
Leverage	+	0.045	0.024	0.028	0.028	-0.014	-0.037	-0.078	-0.010	-0.027	-0.098	-0.090
		(0.148)	(0.160)	(0.160)	(0.028)	(0.157)	(0.191)	(0.171)	(0.195)	(0.164)	(0.160)	(0.158)
Firm Size	-	-0.095***	-0.090***	-0.094***	-0.093***	-0.077***	-0.109***	-0.077***	-0.106***	-0.100***	-0.103***	-0.191***
		(0.015)	(0.025)	(0.027)	(0.025)	(0.026)	(0.034)	(0.028)	(0.032)	(0.028)	(0.027)	(0.028)
Firm Age	-	0.000	-0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		6.101	8.314*	8.607	8.412*	8.314*	11.326	10.025*	12.946*	9.012*	12.170**	10.387*
		(3.933)	(4.791)	(5.172)	(4.914)	(4.949)	(7.687)	(5.463)	(6.850)	(5.264)	(5.258)	(6.137)
Parameters												
Observations		176	176	176	176	176	176	176	176	176	176	176
Wald chi2(9)/12/16		4.76***	2.73***	2.33***	2.44***	2.73***	1.46	1.62*	1.47	1.74**	1.48	1.59*
Pseudo R2		0.519	0.523	0.545	0.545	0..557	0.577	0.602	0.585	0.555	0.583	0.584
Log pseudo		-49.590	-49.224	-46.878	-46.887	-45.738	-43.624	-41.004	-42.834	-45.910	-43.050	-42.878
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		80.95	83.33	85.00	83.33	82.93	92.11	86.67	85.71	85.37	86.67	83.72
Non-failed		89.55	90.30	89.71	90.30	89.63	90.58	86.67	91.04	90.37	93.13	90.98
Overall		87.50	88.64	88.64	88.64	88.07	90.91	91.48	89.77	89.20	91.48	89.20
Hosmer-Lemeshow (10)												
Chi2(8)		6.31	7.13	4.59	5.67	9.01	2.981	3.97	7.37	8.82	6.26	5.17
Prob>chi2		0.613	0.523	0.801	0.684	0.341	0.936	0.860	0.497	0.358	0.618	0.740
ROC		0.932	0.940	0.939	0.939	0.943	0.945	0.953	0.947	0.940	0.948	0.950

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 21: Results of the Cross-Sectional Logit Model; Four Years (t – 4) Prior Failure

		ESTIMATION SAMPLE (PANEL A)										
t – 4 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.367**	-0.357**	-0.337**	-0.217	0.555	-0.345**	-0.359**	-0.341**	-0.315*	-0.177
			(0.155)	(0.170)	(0.167)	(0.160)	(0.489)	(0.146)	(0.158)	(0.172)	(0.166)	(0.163)
H2A: FMALE	-		0.068	0.068	0.075	0.101	0.076	-0.243	0.070	0.072	0.067	0.086
			(0.064)	(0.064)	(0.064)	(0.070)	(0.063)	(0.187)	(0.064)	(0.063)	(0.062)	(0.063)
H3A: BODS	-		-0.006	-0.006	-0.005	-0.005	-0.006	0.005	-0.003	-0.006	0.000	-0.000
			(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.031)	(0.012)	(0.013)	(0.011)
Board structure												
H4A: NCE	-			-0.002						0.016		
				(0.015)						(0.042)		
H5A: ACE	-				-0.012						-0.052	
					(0.021)						(0.055)	
H6A: RCE	-					-0.057***						-0.114**
						(0.021)						(0.051)
Board Functions												
BODM	-						0.061*	-0.005	0.003	0.012	-0.008	-0.007
							(0.031)	(0.012)	(0.027)	(0.014)	(0.021)	(0.017)
BINT3	-						-0.081	-0.058	0.264			
							(0.178)	(0.073)	(0.354)			
Interactions												
H1B i: BODC*BODM	-						-0.113*					
							(0.061)					
H1B ii: BODC*BINT3	-						0.089					
							(0.329)					
H2B i: FMALE*BODM	-							0.030*				
								(0.016)				
H2B ii: FMALE*BINT3	-							0.043				
								(0.120)				
H3B i: BODS*BODM	-								0.000			
									(0.004)			
H3B ii: BODS*BINT3	-								-0.041			
									(0.048)			
H4B: NCE*BODM	-									-0.002		
										(0.004)		
H5B: ACE*BODM	-										0.004	
											(0.005)	
H6B: RCE*BODM	-											0.006
												(0.005)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses,. * p<0.1, ** p<0.05 and *** p<0.01

Appendix 21: Continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
t – 4 MODEL CONTROLVARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Liquidity	-	0.070	0.048	0.047	0.041	0.038	0.060	0.076	0.028	0.060	0.046	0.062
		(0.117)	(0.116)	(0.116)	(0.021)	(0.112)	(0.121)	(0.121)	(0.126)	(0.120)	(0.116)	(0.121)
Profitability	-	-0.503	-0.469	-0.469	-0.456	-0.424	-0.469	-0.379	-0.450*	-0.461	-0.417	-0.391
		(0.360)	(0.364)	(0.364)	(0.356)	(0.295)	(0.376)	(0.336)	(0.390)	(0.355)	(0.341)	(0.255)
Leverage	+	0.040	0.020	0.019	0.012	0.014	0.032	-0.032	0.017	0.026	0.024	0.005
		(0.114)	(0.128)	(0.127)	(0.128)	(0.114)	(0.127)	(0.120)	(0.137)	(0.116)	(0.117)	(0.107)
Firm Size	-	-0.106***	-0.097***	-0.095***	-0.093***	-0.064***	-0.097***	-0.097***	-0.102***	-0.100***	-0.099***	-0.071***
		(0.015)	(0.020)	(0.023)	(0.022)	(0.020)	(0.023)	(0.023)	(0.023)	(0.025)	(0.025)	(0.021)
Firm Age	-	-0.001	-0.001	-0.000	-0.001	-0.000	-0.001	-0.001	-0.000	-0.000	-0.000	-0.001
		(0.015)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.521***	6.614***	6.546***	6.602***	6.791***	1.292***	6.917***	6.258***	5.462**	7.303	7.362***
		(1.516)	(1.732)	(1.750)	(1.744)	(1.746)	(3.108)	(2.190)	(2.833)	(2.206)	(2.806)	(2.577)
Model Parameters												
Observations		173	173	173	173	173	173	173	173	173	173	173
Wald chi2(9)/12/16		44.24***	47.85***	48.74***	47.80***	54.07***	60.93***	61.26***	58.22***	60.32***	56.57***	60.33***
Pseudo R2		0.402	0.428	0.428	0.429	0.463	0.445	0.448	0.436	0.432	0.435	0.476
Log pseudo		-59.262	-56.715	-56.705	-56.593	-53.263	-55.030	-54.697	-55.917	-56.295	-56.030	-51.945
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		80.00	81.08	81.08	75.68	82.50	78.95	86.11	82.05	81.08	76.92	80.00
Non-failed		87.68	88.97	88.97	87.50	90.98	88.89	89.11	90.30	88.97	88.81	90.23
Overall		86.13	87.28	87.28	84.97	89.02	86.71	89.02	88.44	87.28	86.13	87.86
Hosmer-Lemeshow (10)												
Chi2(8)		4.68	7.80	8.05	4.98	9.72	2.77	5.66	9.30	4.25	3.71	9.28
Prob>chi2		0.791	0.453	0.429	0.759	0.285	0.948	0.685	0.317	0.834	0.882	0.320
ROC		0.900	0.905	0.906	0.907	0.918	0.912	0.912	0.909	0.907	0.908	0.923

Marginal effects of each variable is reported in the first line, robust standard errors in parenthesis ,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 22: Results of the Cross-Sectional Logit Model; Four Years (t – 4) Prior Failure

		HOLDOUT SAMPLE (PANEL B)										
t – 4 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.014	-0.072	0.080	0.095	-1.147**	-0.015	-0.023	-0.022	-1.077**	0.185
			(0.198)	(0.233)	(0.205)	(0.201)	(0.477)	(0.238)	(0.234)	(0.263)	(-2.26)	(0.241)
H2A: FMALE	-		-0.013	-0.018	0.013	-0.004	0.009	0.002	0.004	0.002	0.043	0.018
			(0.074)	(0.077)	(0.083)	(0.073)	(0.080)	(0.194)	(0.082)	(0.081)	(0.086)	(0.076)
H3A: BODS	-		-0.026	-0.028	-0.019	-0.018	-0.023	-0.013	-0.013	-0.021	-0.010	-0.011
			(0.017)	(0.018)	(0.019)	(0.019)	(0.019)	(0.019)	(0.045)	(0.040)	(0.019)	(0.019)
Board structure												
H4A: NCE	-			0.014						-0.021		
				(0.025)						(0.040)		
H5A: ACE	-				-0.036						0.008	
					(0.032)						(0.005)	
H6A: RCE	-					-0.032						-0.093
						(0.026)						(0.063)
Board Functions												
BODM	-						-0.046*	0.012	0.009	0.008	0.008	0.001
							(0.027)	(0.009)	(0.037)	(0.013)	(0.005)	(0.025)
BINT3	-						-0.480*	-0.019	0.247			
							(0.267)	(0.087)	(0.599)			
Interactions												
H1B i: BODC*BODM	-						0.132***					
							(0.050)					
H1B ii: BODC*BINT3	-						0.770					
							(0.497)					
H2B i: FMALE*BODM	-							0.007				
								(0.025)				
H2B ii: FMALE*BINT3	-							-1.562***				
								(0.370)				
H3B i: BODS*BODM	-								0.001			
									(0.005)			
H3B ii: BODS*BINT3	-								-0.053			
									(0.083)			
H4B: NCE*BODM	-									0.004		
										(0.004)		
H5B: ACE*BODM	-										0.008	
											(0.005)	
H6B: RCE*BODM	-											0.007
												(0.007)

Marginal effects of each variable is reported in the first, Jackknife standard errors in parentheses ,. * p<0.1, ** p<0.05 and *** p<0.01.

Appendix 22: Continuation 1 of 1

HOLDOUT SAMPLE (PANEL B)												
t – 4 MODEL CONTROLVARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Liquidity	-	-0.095	-0.126	-0.134	-0.125	-0.115	-0.142	-0.108	-0.120	-0.122	-0.069	-0.079
		(0.134)	(0.141)	(0.136)	(0.146)	(0.145)	(0.164)	(0.144)	(0.152)	(0.137)	(0.126)	(0.129)
Profitability	-	-0.432	-0.399	-0.395	-0.336	-0.387	-0.340	-0.417	-0.413	-0.383	-0.289	-0.378
		(0.323)	(0.346)	(0.349)	(0.341)	(0.344)	(0.337)	(0.315)	(0.302)	(0.319)	(0.294)	(0.278)
Leverage	+	0.056	0.053	0.041	0.039	0.050	0.029	0.086	0.059	0.027	0.044	0.040
		(0.145)	(0.160)	(0.160)	(0.153)	(0.155)	(0.161)	(0.156)	(0.163)	(0.163)	(0.154)	(0.154)
Firm Size	-	-0.129***	-0.113***	-0.122***	-0.097***	-0.100***	-0.130***	-0.127***	-0.123***	-0.131***	-0.110***	-0.116***
		(0.017)	(0.025)	(0.032)	(0.026)	(0.028)	(0.028)	(0.027)	(0.028)	(0.034)	(0.032)	(0.032)
Firm Age	-	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.229*	5.413*	6.067**	4.629*	4.995*	11.371***	4.642*	4.370	5.548*	4.5807*	5.094
		(2.493)	(2.923)	(3.022)	(2.867)	(2.853)	(4.369)	(3.529)	(4.394)	(3.281)	(2.896)	(3.176)
Parameters												
Observations		173	173	173	173	173	173	173	173	173	173	173
Wald chi2(9)/12/16		3.83***	2.44***	3.32**	2.35***	2.35***	2.14***	3.13***	1.49	1.63*	1.74**	1.75**
Pseudo R2		0.423	0.435	0.423	0.445	0.445	0.508	0.497	0.473	0.460	0.480	0.484
Log pseudo		-57.864	-56.586	-56.275	-55.580	-55.593	-49.284	-50.420	-52.791	-54.082	-52.075	-51.681
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		73.68	77.14	82.86	78.95	76.32	76.19	80.95	82.50	86.49	80.95	79.07
Non-failed		86.67	86.23	87.68	88.15	87.41	89.31	90.84	90.23	89.71	90.84	90.77
Overall		83.82	84.39	86.71	86.13	84.97	86.13	88.44	88.44	89.02	88.44	87.86
Hosmer-Lemeshow (10)												
Chi2(8)		6.08	3.22	3.58	9.37	9.73	10.07	7.81	14.84	4.05	2.36	4.56
Prob>chi2		0.638	0.920	0.893	0.312	0.285	0.260	0.452	0.062	0.853	0.968	0.804
ROC		0.902	0.909	0.909	0.911	0.914	0.930	0.921	0.922	0.919	0.924	0.923

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses ,.,* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 23: Results of the Cross-Sectional Logit Model; Five Years (t – 5) Prior Failure

		ESTIMATION SAMPLE (PANEL A)										
t – 5 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.237	-0.356**	-0.018	-0.054	-0.571*	-0.214	-0.241	-0.311*	-0.021	-0.009
			(0.153)	(0.170)	(0.156)	(0.167)	(0.344)	(0.158)	(0.168)	(0.170)	(0.161)	(0.167)
H2A: FMALE	-		0.001	-0.017	0.035	0.023	0.013	-0.166	0.018	0.000	0.041	0.042
			(0.060)	(0.057)	(0.057)	(0.058)	(0.065)	(0.146)	(0.066)	(0.061)	(0.062)	(0.062)
H3A: BODS	-		-0.020	-0.024*	-0.007	-0.012	-0.019	-0.019	-0.001	-0.025*	-0.007	-0.012
			(0.013)	(0.013)	(0.012)	(0.012)	(0.014)	(0.015)	(0.021)	(0.013)	(0.012)	(0.012)
Board structure												
H4A: NCE	-			0.031						0.016		
				(0.013)						(0.032)		
H5A: ACE	-				-0.073***						-0.116***	
					(0.018)						(0.039)	
H6A: RCE	-					-0.053***						-0.107***
						(0.089)						(0.038)
Board Functions												
BODM	-						-0.014	0.004	0.018	0.003	-0.009	0.005
							(0.019)	(0.009)	(0.017)	(0.012)	(0.013)	(0.013)
BINT3	-						-0.042	-0.048	0.155			
							(0.153)	(0.074)	(0.242)			
Interactions												
H1B i: BODC*BODM	-						0.045					
							(0.036)					
H1B ii: BODC*BINT3	-						-0.049					
							(0.349)					
H2B i: FMALE*BODM	-							0.025				
								(0.015)				
H2B ii: FMALE*BINT3	-							-0.579**				
								(0.270)				
H3B i: BODS*BODM	-								-0.001			
									(0.002)			
H3B ii: BODS*BINT3	-								-0.035			
									(0.031)			
H4B: NCE*BODM	-									0.001		
										(0.003)		
H5B: ACE*BODM	-										0.005	
											(0.003)	
H6B: RCE*BODM	-											0.006*
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 23: Continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
t – 5 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	0.099	0.090	0.094	0.071	0.108	0.064	0.072	0.045	0.105	0.079	0.112
		(0.090)	(0.091)	(0.085)	(0.084)	(0.089)	(0.104)	(0.102)	(0.103)	(0.091)	(0.087)	(0.090)
Profitability	-	-0.497***	-0.549***	-0.533***	-0.474***	-0.461***	-0.525***	-0.505***	-0.535***	-0.494***	-0.426***	-0.354**
		(0.168)	(0.013)	(0.022)	(0.150)	(0.158)	(0.184)	(0.179)	(0.103)	(0.184)	(0.161)	(0.167)
Leverage	+	0.225***	0.240***	0.226***	0.234***	0.246***	0.202**	0.204***	0.228***	0.216**	0.203**	0.202**
		(0.078)	(0.085)	(0.084)	(0.077)	(0.079)	(0.088)	(0.083)	(0.086)	(0.088)	(0.083)	(0.084)
Firm Size	-	-0.114***	-0.189***	-0.109***	-0.060***	-0.065***	-0.092***	-0.088***	-0.095***	-0.109***	-0.062***	-0.066***
		(0.014)	(0.019)	(0.027)	(0.018)	(0.018)	(0.019)	(0.019)	(0.020)	(0.028)	(0.019)	(0.018)
Firm Age	-	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
		(0.001)	(0.001)	(0.027)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes)	Yes	Yes	Yes	Yes	Yes
Constant		4.075***	5.252***	6.690***	3.644***	4.265***	6.792***	5.248***	4.007***	6.480***	4.422***	5.136***
		(1.236)	(1.295)	(1.626)	(1.255)	(1.236)	(2.223)	(1.364)	(1.728)	(1.702)	(1.486)	(1.621)
Parameters												
Observations		173	173	173	173	173	173	173	173	173	173	173
Wald chi2(9)/12/16		61.02***	70.52***	71.11***	71.11***	72.80***	66.05***	66.54***	77.71***	72.68***	70.13***	50.76***
Pseudo R2		0.441	0.460	0.517	0.517	0.491	0.478	0.487	0.479	0.481	0.526	0.507
Log pseudo		-55.399	-53.555	-47.896	-47.896	-50.463	-51.799	-50.851	-51.633	-51.515	-47.052	-48.887
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		78.38	74.36	77.78	76.19	78.95	76.92	76.92	81.82	78.95	78.05	78.95
Non-failed		88.24	88.06	87.59	90.08	88.89	88.81	88.81	93.02	88.89	90.15	88.89
Overall		86.13	84.97	85..55	86.71	86.71	86.13	86.13	90.17	86.71	87.28	86.71
Hosmer-Lemeshow (10)												
Chi2(8)		5.70	4.63	6.21	6.16	6.09	7.77	4.78	5.92	3.96	7.57	6.87
Prob>chi2		0.681	0.796	0.624	0.629	0.637	0.456	0.781	0.656	0.860	0.477	0.551
ROC		0.908	0.915	0.921	0.935	0.928	0.920	0.926	0.923	0.922	0932	0.932

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses ,. .* p<0.1, ** p<0.05 and *** p<0.01

Appendix 24: Results of the Cross-Sectional Logit Model; Five Years (t -5) Prior Failure

		HOLDOUT SAMPLE (PANEL B)										
$t-5$ MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.137	0.045	-0.049	0.023	0.099	-0160	-0.155	0.078	-0.057	0.028
			(0.193)	(0.195)	(0.193)	(0.199)	(0.558)	(0.202)	(0.197)	(0.209)	(0.199)	(0.212)
H2A: FMALE	-		0.055	0.051	0.073	0.075	0.060	0.066	0.068	0.047	0.074	0.073
			(0.077)	(0.075)	(0.078)	(0.074)	(0.080)	(0.177)	(0.084)	(0.078)	(0.079)	(0.075)
H3A: BODS	-		0.014	0.021	0.021	0.020	0.014	0.015	-0.021	0.020	0.023	0.021
			(0.016)	(0.018)	(0.018)	(0.016)	(0.016)	(0.015)	(0.031)	(0.018)	(0.018)	(0.016)
Board structure												
H4A: NCE	-			-0.049**						-0.022		
				(0.022)						(0.059)		
H5A: ACE	-				-0.042						-0.062	
					(0.028)						(0.064)	
H6A: RCE	-					-0.052**						-0.065
						(0.026)						(0.061)
Board Functions												
BODM	-						0.012	-0.002	-0.038	0.010	0.007	-0.001
							(0.034)	(0.012)	(0.032)	(0.013)	(0.021)	(-0.233)
BINT3	-						-0.128	-0.020	0.156			
							(0.197)	(0.087)	(0.625)			
Interactions												
H1B i: BODC*BODM	-						-0.031					
							(0.071)					
H1B ii: BODC*BINT3	-						0.148					
							(0.429)					
H2B i: FMALE*BODM	-							0.003				
								(0.021)				
H2B ii: FMALE*BINT3	-							-0.148				
								(0.134)				
H3B i: BODS*BODM	-								0.005			
									(0.004)			
H3B ii: BODS*BINT3	-								-0.033			
									(0.089)			
H4B: NCE*BODM	-									-0.004		
										(0.006)		
H5B: ACE*BODM	-										0.002	
											(0.007)	
H6B: RCE*BODM	-											0.002
												(0.007)

Marginal effects of each variable is reported in the first line, Jackknife standard errors in parentheses ,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 24: Continuation 1 of 1

		HOLDOUT SAMPLE (PANEL B)										
t – 5 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.200	-0.218	-0.269	-0.272	-0.287*	-0.204	-0.237	-0.263	-0.242	-0.291	-0.288
		(0.153)	(0.165)	(0.194)	(0.177)	(0.170)	(0.167)	(0.170)	(0.191)	(0.191)	(0.188)	(0.179)
Profitability	-	-0.953***	-0.967***	-0.938***	-0.961***	-0.982***	-0.899**	-0.931***	-0.977***	-0.886**	-0.979**	-0.983**
		(0.328)	(0.354)	(0.364)	(0.354)	(0.347)	(0.354)	(0.396)	(0.376)	(0.386)	(0.388)	(0.386)
Leverage	+	-0.164	-0.195	-0.234	-0.248*	-0.221*	-0.183	-0.209	-0.212	-0.220	-0.261	-0.227*
		(0.146)	(0.138)	(0.150)	(0.150)	(0.129)	(0.138)	(0.146)	(0.158)	(0.150)	(0.156)	(0.135)
Firm Size	-	-0.103***	-0.111***	-0.087***	-0.097***	-0.094***	-0.108***	-0.113***	-0.115***	-0.089***	-0.098***	-0.096***
		(0.145)	(0.026)	(0.029)	(0.026)	(0.026)	(0.026)	(0.027)	(0.031)	(0.031)	(0.028)	(0.029)
Firm Age	-	0.000	0.000	0.001	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		6.530***	6.989***	6.119***	7.580***	7.762***	6.073***	7.676**	10.708**	4.790	8.379	7.868***
		(2.108)	(2.379)	(2.499)	(2.719)	(2.555)	(3.906)	(3.029)	(4.487)	(3.130)	(3.672)	(3.602)
Parameters												
Observations		173	173	173	173	173	173	173	173	173	173	173
F(9-16,-172)		4.36***	2.93***	2.08**	2.59***	2.93***	1.88**	1.95**	1.74**	1.74**	2.04**	1.81**
Pseudo R2		0.457	0.471	0.508	0.484	0.498	0.480	0.483	0.491	0.512	0.485	0.499
Log pseudo		-53.855	-52.423	-48.831	-51.132	-49.818	-51.548	-51.299	-50.438	-48.413	-51.040	-49.717
Accuracy												
Failed		77.50%	73.17%	76.92%	76.92%	80.00%	74.36%	74.36%	76.92%	78.95%	77.50%	77.50%
Non-failed		89.47%	88.64%	88.81%	88.81%	90.23%	88.06%	88.06%	88.81%	88.89%	89.47%	89.47%
Overall		86.71%	84.97%	86.13%	86.13%	87.86%	84.97%	84.97%	86.13%	86.71%	86.71%	86.71%
Hosmer-Lemeshow (10)												
Chi2(8)		3.48	1.76	7.24	4.65	3.42	3.17	1.93	3.32	11.68	3.23	1.34
Prob>chi2		0.901	0.988	0.511	0.795	0.905	0.923	0.983	0.912	0.166	0.919	0.995
ROC		0.916	0.922	0.934	0.924	0.926	0.926	0.926	0.926	0.934	0.925	0.927

First line shows the marginal effects of each variable line, Jackknife standard errors in parentheses ,. .* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 25: Results of the Four and Five Year (t – 4/5) Period Logit Model

		ESTIMATION SAMPLE (PANEL A)										
t - 4/5 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.298**	-0.352***	-0.186	-0.132	-0.185	-0.276**	-0.281**	-0.330**	-0.153	-0.090
			(0.121)	(0.132)	(0.133)	(0.130)	(0.325)	(0.122)	(0.127)	(0.134)	(0.136)	(0.134)
H2A: FMALE	-		0.039	0.033	0.058	0.062	0.043	-0.160	0.045	0.039	0.058	0.062
			(0.054)	(0.052)	(0.054)	(0.055)	(0.055)	(0.133)	(0.054)	(0.052)	(0.054)	(0.054)
H3A: BODS	-		-0.012	-0.013	-0.010	-0.008	-0.010	-0.007	-0.004	-0.013	-0.003	-0.005
			(0.009)	(0.009)	(0.010)	(0.009)	(0.010)	(0.010)	(0.016)	(0.009)	(0.010)	(0.008)
Board structure												
H4A: NCE	-			-0.013						-0.011		
				(0.015)						(0.026)		
H5A: ACE	-				-0.039**						-0.073*	
					(0.017)						(0.039)	
H6A: RCE	-					-0.054***						-0.112***
						(0.017)						(0.035)
Board Functions												
BODM	-						0.013	0.001	0.009	0.007	-0.004	-0.010
							(0.019)	(0.008)	(0.014)	(0.011)	(0.014)	(0.012)
BINT3	-						-0.029	-0.044	0.168			
							(0.127)	(0.064)	(0.253)			
Interactions												
H1B i: BODC*BODM	-						-0.011					
							(0.036)					
H1B ii: BODC*BINT3	-						-0.040					
							(0.268)					
H2B i: FMALE*BODM	-							0.023*				
								(0.012)				
H2B ii: FMALE*BINT3	-							-0.041				
								(0.111)				
H3B i: BODS*BODM	-								-0.000			
									(0.002)			
H3B ii: BODS*BINT3	-								-0.031			
									(0.033)			
H4B: NCE*BODM	-									-0.000		
										(0.003)		
H5B: ACE*BODM	-										0.004	
											(0.004)	
H6B: RCE*BODM	-											0.006*
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 25: Continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
t – 4/5 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	0.063	0.053	0.056	0.038	0.059	0.052	0.059	0.025	0.065	0.051	0.078
		(0.083)	(0.083)	(0.081)	(0.080)	(0.081)	(0.088)	(0.088)	(0.093)	(0.084)	(0.084)	(0.085)
Profitability	-	-0.532***	-0.545***	-0.540***	-0.504***	-0.479***	-0.503**	-0.497**	-0.516**	-0.514***	-0.453**	-0.405**
		(0.181)	(0.185)	(0.184)	(0.171)	(0.167)	(0.208)	(0.202)	(0.211)	(0.199)	(0.189)	(0.175)
Leverage	+	0.128*	0.143*	0.143*	0.129*	-0.138*	0.132*	0.113	0.117	0.138*	0.105	0.110
		(0.074)	(0.077)	(0.077)	(0.077)	(0.074)	(0.079)	(0.077)	(0.080)	(0.078)	(0.078)	(0.076)
Firm Size	-	-0.108***	-0.092***	-0.100***	-0.077***	-0.064***	-0.095***	-0.093***	-0.096***	-0.102***	-0.081***	-0.067***
		(0.012)	(0.015)	(0.020)	(0.016)	(0.015)	(0.017)	(0.017)	(0.017)	(0.021)	(0.018)	(0.015)
Firm Age	-	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.149***	5.583***	6.044***	5.158***	5.296***	4.619***	5.527***	4.846***	5.479***	5.415***	6.107***
		(1.075)	(1.189)	(1.267)	(1.262)	(1.147)	(2.052)	(1.380)	(1.518)	(1.528)	(1.716)	(1.866)
Parameters												
Observations		346	346	346	346	346	346	346	346	346	346	346
Wald chi2(9)/12/16		66.06***	67.94***	67.68***	76.57***	85.22***	76.24***	75.58***	78.53***	71.04***	78.76***	88.41***
Pseudo R2		0.413	0.431	0.434	0.446	0.463	0.439	0.448	0.442	0.437	0.454	0.480
Log pseudo		-116.355	-112.894	-112.334	-109.959	-106.475	-111.277	-109.492	-110.625	-111.582	-108.338	-103.181
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		80.28	80.00	80.28	78.67	80.26	78.67	80.82	85.19	81.43	78.95	80.77
Non-failed		88.00	87.68	88.00	88.56	89.26	88.56	88.64	91.14	88.04	88.89	89.93
Overall		86.42	86.13	86.42	86.42	87.28	86.42	86.99	89.77	86.71	86.71	87.86
Hosmer-Lemeshow (10)												
Chi2(8)		5.06	3.55	4.67	5.80	8.63	2.87	4.43	4.43	5.56	2.82	6.36
Prob>chi2		0.751	0.895	0.792	0.670	0.093	0.943	0.816	0.816	0.696	0.945	0.607
ROC		0.903	0.907	0.909	0.915	0.919	0.910	0.914	0.913	0.910	0.917	0.923

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 26: Results of the Four and Five Year (t – 4/5) Period Logit Model

HOLDOUT VALIDATION TEST (PANEL B)												
t-4/5 MODEL MAIN VARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Board composition												
H1A: BODC	-		-0.079	-0.020	-0.006	0.059	-0.434	-0.079	-0.086	0.005	0.016	0.091
			(0.140)	(0.149)	(0.145)	(0.146)	(0.315)	(0.147)	(0.139)	(0.153)	(0.144)	(0.149)
H2A: FMALE	-		0.019	0.021	0.039	0.031	0.022	0.069	0.026	0.022	0.042	0.034
			(0.060)	(0.060)	(0.060)	(0.057)	(0.058)	(0.116)	(0.060)	(0.058)	(0.059)	(0.055)
H3A: BODS	-		-0.004	-0.003	0.002	0.003	-0.001	0.001	-0.014	-0.000	0.005	0.006
			(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.011)	(0.023)	(0.012)	(0.012)	(0.012)
Board structure												
H4A: NCE	-			-0.015						-0.020		
				(0.016)						(0.027)		
H5A: ACE	-				-0.034*						-0.062*	
					(0.018)						(0.036)	
H6A: RCE	-					-0.041**						-0.069*
						(0.018)						(0.035)
Board Functions												
BODM	-						-0.010	0.007	-0.010	0.010	0.001	0.005
							(0.019)	(0.007)	(0.023)	(0.008)	(0.012)	(0.015)
BINT3	-						-0.256**	-0.031	0.168			
							(0.127)	(0.059)	(0.293)			
Interactions												
H1B i: BODC*BODM	-						0.037					
							(0.038)					
H1B ii: BODC*BINT3	-						0.337					
							(0.253)					
H2B i: FMALE*BODM	-							-0.001				
								(0.014)				
H2B ii: FMALE*BINT3	-							-0.246*				
								(0.139)				
H3B i: BODS*BODM	-								0.003			
									(0.003)			
H3B ii: BODS*BINT3	-								-0.038			
									(0.039)			
H4B: NCE*BODM	-									0.000		
										(0.003)		
H5B: ACE*BODM	-										0.003	
											(0.004)	
H6B: RCE*BODM	-											0.003
												(0.004)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 26: Continuation 1 of 1

		HOLDOUT SAMPLE (PANEL B)										
MODEL T-4/5		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.130	-0.123	-0.124	-0.141	-0.137	-0.109	-0.124	-0.132	-0.107	-0.121	-0.115
		(0.099)	(0.099)	(0.102)	(0.099)	(0.098)	(0.101)	(0.100)	(0.102)	(0.102)	(0.100)	(0.095)
Profitability	-	-0.612***	-0.609***	-0.602***	-0.566***	-0.589***	-0.557***	-0.569***	-0.588***	-0.584***	-0.553**	-0.580***
		(0.228)	(0.226)	(0.224)	(0.221)	(0.211)	(0.207)	(0.017)	(0.203)	(0.210)	(0.207)	(0.188)
Leverage	+	-0.070	-0.066	-0.064	-0.088	-0.076	-0.077	-0.075	-0.082	-0.072	-0.100	-0.089
		(0.097)	(0.101)	(0.099)	(0.096)	(0.092)	(0.098)	(0.095)	(0.100)	(0.100)	(0.097)	(0.092)
Firm Size	-	-0.114***	-0.107***	-0.099***	-0.094***	-0.091***	-0.112***	-0.114***	-0.113***	-0.100***	-0.098***	-0.097***
		(0.012)	(0.017)	(0.019)	(0.017)	(0.018)	(0.018)	(0.017)	(0.017)	(0.020)	(0.018)	(0.018)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		5.041***	5.395***	4.933***	5.117***	5.337***	6.764***	5.119***	6.142***	3.982***	5.018***	4.921***
		(1.417)	(1.525)	(1.507)	(1.517)	(1.513)	(2.178)	(1.691)	(2.413)	(1.701)	(1.674)	(1.637)
Parameters												
Observations		346	346	346	346	346	346	346	346	346	346	346
Wald chi2(9-16)		74.37***	76.51***	77.17***	77.86***	80.02***	85.00***	78.48***	80.86***	76.08***	77.66***	81.17***
Pseudo R2		0.426	0.428	0.431	0.437	0.444	0.449	0.455	0.450	0.439	0.445	0.457
Log pseudo		-114.444	-114.107	-113.460	-112.318	-110.850	-109.822	-108.555	-109.615	-111.948	-110.615	-108.216
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		74.68	76.32	77.92	75.95	72.73	77.03	86.90	76.62	78.38	77.22	75.61
Non-failed		88.01	87.78	88.48	88.39	86.99	87.50	92.88	88.10	87.87	88.76	89.02
Overall		84.97	85.26	86.13	85.55	83.82	85.26	91.45	85.55	85.84	86.13	85.84
Hosmer-Lemeshow (10)												
Chi2(8)		5.96	8.63	4.24	2.72	18.37	7.20	13.48	6.98	7.45	5.03	6.05
Prob>chi2		0.652	0.374	0.835	0.951	0.019	0.515	0.096	0.539	0.489	0.755	0.642
ROC		0.904	0.906	0.906	0.909	0.911	0.916	0.917	0.910	0.907	0.914	0.916

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 27: Results of the One and Two Year (t – 1/2) Period Logit Model

		ESTIMATION SAMPLE (PANEL A)										
t-1/2 MODEL MAIN VARIABLES	Expected Sign	1	2	3	4	5	6	7	8	9	10	11
Board composition												
H1A: BODC	-		-0.168	-0.131	-0.113	-0.084	-0.201	-0.156	-0.171	-0.083	-0.071	-0.045
			(0.143)	(0.162)	(0.146)	(0.160)	(0.358)	(0.146)	(0.148)	(0.164)	(0.142)	(0.160)
H2A: FMALE	-		-0.005	-0.001	0.006	0.010	0.005	-0.142	0.005	0.010	0.022	0.025
			(0.045)	(0.045)	(0.046)	(0.045)	(0.042)	(0.101)	(0.043)	(0.045)	(0.044)	(0.043)
H3A: BODS	-		-0.017	-0.016	-0.015	-0.013	-0.013	-0.012	-0.025	-0.015	-0.015	-0.013
			(0.013)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.027)	(0.011)	(0.012)	(0.010)
Board structure												
H4A: NCE	-			-0.009						-0.042*		
				(0.012)						(0.022)		
H5A: ACE	-				-0.018***						-0.068**	
					(0.016)						(0.028)	
H6A: RCE	-					-0.029**						-0.073**
						(0.014)						(0.032)
Board Functions												
BODM	-						0.014	0.011**	0.006	0.112	0.003	0.003
							(0.021)	(0.005)	(0.021)	(0.007)	(0.009)	(0.013)
BINT3	-						-0.131	-0.144**	-0.067			
							(0.151)	(0.062)	(0.247)			
Interactions												
H1B i: BODC*BODM	-						0.003					
							(0.040)					
H1B ii: BODC*BINT3	-						0.053					
							(0.268)					
H2B i: FMALE*BODM	-							0.014				
								(0.011)				
H2B ii: FMALE*BINT3	-							0.077				
								(0.111)				
H3B i: BODS*BODM	-								0.001			
									(0.003)			
H3B ii: BODS*BINT3	-								-0.005			
									(0.033)			
H4B: NCE*BODM	-									0.003		
										(0.002)		
H5B: ACE*BODM	-										0.005*	
											(0.003)	
H6B: RCE*BODM	-											0.004
												(0.004)

Marginal effects of each variable is reported in the first line, robust standard errors in parenthesis clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 27: Continuation 1 of 1

		ESTIMATION SAMPLE (PANEL A)										
t-1/2 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.024	-0.004	-0.004	-0.011	-0.017	-0.016	0.013	0.012	0.001	-0.016	-0.020
		(0.084)	(0.083)	(0.083)	(0.081)	(0.082)	(0.062)	(0.064)	(0.063)	(0.066)	(0.066)	(0.065)
Profitability	-	-0.685***	-0.701***	-0.679***	-0.673***	-0.648***	-0.552***	-0.552***	-0.556***	-0.534***	-0.556***	-0.516***
		(0.216)	(0.224)	(0.220)	(0.217)	(0.203)	(0.180)	(0.183)	(0.180)	(0.185)	(0.066)	(0.161)
Leverage	+	0.058	0.085	0.087	0.087	0.073	0.059	0.037	0.053	0.034	0.024	0.021
		(0.102)	(0.104)	(0.103)	(0.105)	(0.101)	(0.088)	(0.090)	(0.096)	(0.088)	(0.091)	(0.086)
Firm Size	-	-0.108***	-0.088***	-0.081***	-0.081***	-0.075***	-0.088***	-0.088***	-0.088***	-0.079***	-0.083***	-0.074***
		(0.012)	(0.016)	(0.018)	(0.016)	(0.016)	(0.014)	(0.014)	(0.014)	(0.016)	(0.015)	(0.015)
Firm Age	-	-0.000	-0.001	-0.000	-0.000	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	+/-	4.615***	5.698***	5.175***	5.315***	5.622***	4.771*	5.370***	5.577**	4.054**	5.752***	5.905***
		(1.486)	(1.704)	(1.820)	(1.780)	(1.768)	(2.515)	(1.574)	(2.434)	(1.759)	(1.724)	(1.927)
Parameters												
Observations		353	353	353	353	353	353	353	353	353	353	353
Wald chi2(9)/12/16		69.10***	68.20***	72.72***	76.13***	81.79***	86.46***	85.71***	92.53***	78.84***	87.04***	95.68***
Pseudo R2		0.491	0.503	0.505	0.506	0.512	0.547	0.555	0.548	0.542	0.546	0.552
Log pseudo		-104.136	-101.726	-101.350	-101.018	-99.871	-92.668	-91.049	-92.553	-93.649	-92.901	-91.563
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		80.77	83.33	82.28	85.53	82.28	87.01	87.18	88.16	87.01	87.34	85.19
Non-failed		88.73	89.45	89.42	89.53	89.42	90.22	90.55	90.25	90.22	90.88	90.81
Overall		86.97	88.10	87.82	88.67	87.82	89.52	89.80	89.80	89.52	90.08	89.52
Hosmer-Lemeshow (10)												
Chi2(8)		10.15	8.66	7.59	6.36	4.78	8.31	3.41	7.44	4.05	3.77	3.89
Prob>chi2		0.254	0.372	0.474	0.607	0.781	0.404	0.906	0.490	0.853	0.877	0.867
ROC		0.919	0.925	0.926	0.925	0.927	0.941	0.944	0.941	0.939	0.938	0.939

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,. * p<0.1, ** p<0.05 and *** p<0.01.

Appendix 28: Results of the One and Two Year (t – 1/2) Period Logit Model

		HOLDOUT SAMPLE (PANEL B)										
t – 1/2 MODEL		1	2	3	4	5	6	7	8	9	10	11
MAIN VARIABLES	Expected Sign											
Board composition												
H1A: BODC	-		-0.146	-0.137	-0.131	-0.035	-0.098	-0.144	-0.106	-0.137	-0.132	-0.037
			(0.145)	(0.145)	(0.144)	(0.144)	(0.234)	(0.127)	(0.134)	(0.142)	(0.143)	(0.141)
H2A: FMALE	-		0.025	0.027	0.028	0.046	0.034	0.100	0.027	0.029	0.030	0.045
			(0.035)	(0.034)	(0.035)	(0.036)	(0.035)	(0.093)	(0.035)	(0.035)	(0.035)	(0.036)
H3A: BODS	-		-0.027***	-0.027***	-0.026***	-0.023**	-0.026***	-0.027***	-0.037*	-0.028***	-0.028***	-0.023***
			(0.009)	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)	(0.022)	(0.010)	(0.010)	(0.009)
Board structure												
H4A: NCE	-			-0.003						-0.015		
				(0.010)						(0.020)		
H5A: ACE	-				-0.005***						-0.009	
					(0.014)						(0.024)	
H6A: RCE	-					-0.038**						-0.054**
						(0.015)						(0.025)
Board Functions												
BODM	-						-0.004	-0.001	-0.008	-0.005	-0.004	-0.007
							(0.015)	(0.006)	(0.016)	(0.008)	(0.009)	(0.010)
BINT3	-						0.049	-0.151**	-0.407**			
							(0.159)	(0.064)	(0.181)			
Interactions												
H1B i: BODC*BODM	-						0.001					
							(0.026)					
H1B ii: BODC*BINT3	-						-0.329					
							(0.294)					
H2B i: FMALE*BODM	-							-0.009				
								(0.009)				
H2B ii: FMALE*BINT3	-							0.063				
								(0.087)				
H3B i: BODS*BODM	-								0.001			
									(0.002)			
H3B ii: BODS*BINT3	-								0.040			
									(0.022)			
H4B: NCE*BODM	-									0.001		
										(0.002)		
H5B: ACE*BODM	-										0.000	
											(0.002)	
H6B: RCE*BODM	-											0.002
												(0.003)

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 28: Continuation 1 of 1

		HOLDOUT SAMPLE (PANEL B)										
t – 1 / 2 MODEL		1	2	3	4	5	6	7	8	9	10	11
CONTROLVARIABLES	Expected Sign											
Liquidity	-	-0.246***	-0.262***	-0.264***	-0.261***	-0.256***	-0.268***	-0.276***	-0.278***	-0.273***	-0.270***	-0.254***
		(0.080)	(0.080)	(0.078)	(0.080)	(0.075)	(0.081)	(0.080)	(0.084)	(0.079)	(0.081)	(0.073)
Profitability	-	-0.749***	-0.761***	-0.755***	-0.744***	-0.640***	-0.795***	-0.831***	-0.831***	-0.764***	-0.746***	-0.630***
		(0.174)	(0.163)	(0.158)	(0.169)	(0.133)	(0.166)	(0.166)	(0.161)	(0.160)	(0.168)	(0.134)
Leverage	+	-0.007	-0.027	-0.028	-0.028	-0.021	-0.030	-0.027	-0.018	-0.034	-0.029	-0.025
		(0.083)	(0.077)	(0.077)	(0.077)	(0.075)	(0.078)	(0.078)	(0.080)	(0.076)	(0.076)	(0.075)
Firm Size	-	-0.099***	-0.073***	-0.070***	-0.070***	-0.053***	-0.064***	-0.062***	-0.065***	-0.070***	-0.070***	-0.054***
		(0.010)	(0.013)	(0.016)	(0.015)	(0.013)	(0.013)	(0.013)	(0.014)	(0.016)	(0.015)	(0.013)
Firm Age	-	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes)	Yes
Constant	+/-	7.874***	10.649***	10.649***	10.546***	10.218***	11.780***	11.582***	13.062***	11.455***	11.117***	11.238***
		(1.847)	(2.354)	(2.379)	(2.419)	(2.362)	(2.649)	(2.265)	(2.754)	(2.405)	(2.470)	(2.714)
Parameters												
Observations		351	351	351	351	351	351	351	351	351	351	351
Wald chi2 (9/12/16)		78.51***	77.04***	77.54***	83.70***	80.58***	86.80***	87.81***	85.38***	80.09***	84.78***	85.35***
Pseudo R2		0.580	0.604	0.606	0.605	0.625	0.628	0.629	0.632	0.607	0.605	0.626
Log pseudo		-85.024	-79.708	-79.656	-79.825	-76.807	-75.061	-74.764	-74.291	-79.375	-79.500	-75.564
Accuracy		%	%	%	%	%	%	%	%	%	%	%
Failed		85.37	85.54	85.54	85.54	90.12	87.06	86.90	85.88	84.34	86.59	86.75
Non-failed		91.82	92.16	92.16	92.16	92.96	93.23	92.88	92.86	91.79	92.19	92.54
Overall		90.31	90.60	90.60	90.60	92.31	91.74	91.45	91.17	90.03	90.88	91.17
Hosmer-Lemeshow (10)												
Chi2(8)		6.88	5.38	8.51	7.41	2.53	2.59	1.96	2.67	7.79	7.33	3.22
Prob>chi2		0.549	0.716	0.385	0.493	0.960	0.958	0.982	0.953	0.455	0.501	0.920
ROC		0.946	0.955	0.955	0.955	0.960	0.961	0.960	0.960	0.955	0.956	0.960

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* $p<0.1$, ** $p<0.05$ and *** $p<0.01$.

Appendix 29: Results of the Split Nomination Committee Effectiveness Logit Model

MODEL 12:			POOLED			t - 1/2			t - 4/5	
PANEL		A	B	C	A	B	C	A	B	C
VARIABLES	Expected Sign									
H4C: NCP	-	-0.045	-0.030	-0.032	-0.027	0.007	-0.008	-0.045	-0.085	-0.066
		(0.050)	(0.041)	(0.040)	(0.059)	(0.043)	(0.041)	(0.060)	(0.055)	(0.046)
H4D:NCI	-	0.115**	0.110***	0.109***	0.154***	0.118**	0.124***	0.097*	0.116**	0.105**
		(0.047)	(0.037)	(0.038)	(0.055)	(0.046)	(0.039)	(0.056)	(0.050)	(0.046)
H4E: NCCI	-	-0.011	-0.012	-0.009	-0.014	-0.026	-0.012	-0.004	-0.007	-0.002
		(0.039)	(0.035)	(0.033)	(0.053)	(0.043)	(0.038)	(0.045)	(0.048)	(0.040)
H4F: NCS	-	-0.094**	-0.100**	-0.097***	-0.131**	-0.119***	-0.118***	-0.074	-0.088	-0.080*
		(0.040)	(0.035)	(0.034)	(0.052)	(0.031)	(0.032)	(0.047)	(0.056)	(0.044)
H4G: NCM1	-	0.011	-0.032	-0.005	-0.025	-0.031	-0.032	0.059	-0.021	0.024
		(0.043)	(0.037)	(0.035)	(0.042)	(0.044)	(0.034)	(0.052)	(0.060)	(0.046)
CONTROLS										
Liquidity	-	0.016	-0.186***	-0.078	0.005	-0.260***	-0.133**	0.064	-0.136	-0.008
		(0.068)	(0.069)	(0.061)	(0.076)	(0.080)	(0.062)	(0.081)	(0.100)	(0.074)
Profitability	-	-0.552***	-0.701***	-0.612***	-0.648***	-0.695***	-0.648***	-0.487***	-0.571***	-0.527***
		(0.163)	(0.151)	(0.137)	(0.173)	(0.198)	(0.169)	(0.182)	(0.218)	(0.154)
Leverage	+	0.095	0.005	0.056	0.147	-0.024	0.061	0.113	-0.041	0.063
		(0.070)	(0.075)	(0.068)	(0.090)	(0.076)	(0.068)	(0.070)	(0.093)	(0.069)
Firm Size	-	-0.097***	-0.087***	-0.094***	-0.093***	-0.077***	-0.088***	-0.104***	-0.087***	-0.097***
		(0.014)	(0.013)	(0.011)	(0.016)	(0.014)	(0.012)	(0.018)	(0.017)	(0.014)
Firm Age	-	-0.000	-0.000	-0.000	-0..000	-0.000	-0.000	-0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		3.711***	4.824***	4.167***	4.064***	6.164***	4.971***	3.402***	4.164***	3.523***
		(0.932)	(0.899)	(0.813)	(1.163)	(1.686)	(0.774)	(0.953)	(1.013)	(0.785)
Parameters										
Observations		875	873	1748	353	351	704	346	346	692
Wald chi2(9/13)		87.52***	129.87***	128.02***	83.56***	88.48***	127.11***	71.29***	86.74***	113.41***
Pseudo R2		0.456	0.509	0.475	0.531	0.602	0.554	0.427	0.449	0.426
Log pseudo		-274.538	-247.909	-530.488	-95.892	-80.336	-181.286	-113.716	-109.883	-228.438
Accuracy		%	%	%	%	%	%	%	%	%
Failed		84.86	81.37	82.77	87.18	86.75	85.63	81.43	74.68	77.55
Non-failed		89.28	90.28	89.38	90.55	92.54	90.99	88.04	88.01	87.71
Overall		88.34	88.20	87.93	89.80	91.17	89.77	86.71	84.97	85.55
Hosmer-Lemeshow(10)										
Chi2(8)		31.62	8.00	24.45	19.28	9.65	24.89	4.59	3.03	11.32
Prob>chi2		0.000	0.434	0.000	0.013	0.290	0.002	0.801	0.933	0.184
ROC		0.914	0.931	0.920	0.934	0.952	0.941	0.906	0.913	0.907

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 29: Continuation 1 of 1

MODEL 12: PANEL VARIABLES	Expected Sign	t -1 A	t -1 B	t -1 C	t-2 A	t-2 B	t-2 C	t-3 A	t-3 B	t-3 C	t-4 A	t-4 B	t-4 C	t -5 A	t -5 B	t -5 C
H4C: NCP	-	0.023	0.027	0.020	-0.103	0.003	-0.028	-0.051	0.035	-0.022	-0.078	-0.042	-0.056	0.018	-0.108	-0.070
		(0.063)	(0.067)	(0.040)	(0.073)	(0.088)	(0.049)	(0.077)	(0.082)	(0.051)	(0.069)	(0.076)	(0.046)	(0.084)	(0.085)	(0.050)
H4D:NCI	-	0.147**	0.075	0.107**	0.151**	0.157*	0.138***	0.084	0.130	0.095**	0.097	0.149*	0.126**	0.075	0.078	0.091*
		(0.066)	(0.072)	(0.043)	(0.064)	(1.091)	(0.043)	(0.062)	(0.094)	(0.043)	(0.075)	(0.086)	(0.051)	(0.063)	(0.097)	(0.050)
H4E: NCO	-	0.035	-0.024	0.017	-0.063	-0.036	-0.039	-0.045	-0.033	-0.020	0.005	0.051	0.022	-0.029	-0.036	-0.025
		(0.066)	(0.053)	(0.041)	(0.063)	(0.086)	(0.046)	(0.062)	(0.067)	(0.042)	(0.070)	(0.080)	(0.046)	(0.055)	(0.076)	(0.043)
H4F: NCS	-	-0.152***	-0.109*	-0.123***	-0.060	-	-0.112***	-0.054	-0.078	-0.083*	-0.069	-0.169	-0.112**	-0.049	-0.062	-0.052
		(0..057)	(0.064)	(0.036)	(0.071)	0.148***	(0.040)	(0.067)	(0.101)	(0.046)	(0.063)	(0.113)	(0.053)	(0.064)	(0.080)	(0.047)
						(0.057)										
H4G: NCM1	-	-0.021	-0.023	-0.038	0.021	-0.047	-0.016	-0.021	-0.021	0.003	-0.013	0.033	0.014	0.120*	-0.080	0.039
		(0.050)	(0.067)	(0.036)	(0.079)	(0.088)	(0.049)	(0.071)	(0.073)	(0.044)	(0.0074)	(0.088)	(0.048)	(0.061)	(-0.129)	(0.047)
CONTROLS																
Liquidity	-	0.027	-0.236	-0.147**	0.031	-0.233*	-0.119	-0.088	-0.054	-0.059	0.077	-0.125	-0.035	0.101	-0.170	0.013
		(0.027)	(0.153)	(0.065)	(0.097)	(0.138)	(0.073)	(0.119)	(0.143)	(0.086)	(0.118)	(0.148)	(0.077)	(0.089)	(0.169)	(0.080)
Profitability	-	-0.939***	-0.709*	-0.716***	-0.459**	-	-0.627***	-0.377	-	-	-0.491	-0.420	-0.466**	-0.463**	-0.937**	-0.632***
		(0.103)	(0.406)	(0.183)	(0.187)	1.047***	(0.191)	(0.308)	1.033***	0.658***	(0.348)	(0.333)	(0.211)	(0.183)	(0.389)	(0.145)
						(0.342)			(0.283)	(0.212)						
Leverage	+	0.207**	-0.087	0.034	0.123	0.075	0.083	-0.022	0.046	0.018	0.054	0.087	0.046	0.196***	-0.138	0.080
		(0.102)	(0.136)	(0.066)	(0.110)	(0.143)	(0.081)	(0.116)	(0.154)	(0.088)	(0.109)	(0.173)	(0.080)	(0.074)	(0.173)	(0.070)
Firm Size	-	-0.079***	-0.066**	-0.082***	-0.105***	-	-0.097***	-	-	-	-	-	-	-0.131***	-0.063	-0.093***
		(0.022)	(0.032)	(0.013)	(0.023)	0.071***	(0.015)	0.099***	0.098***	0.098***	0.084***	0.114***	0.103***	(0.028)	(0.023)	(0.016)
						(0.025)		(0.020)	(0.022)	(0.014)	(0.021)	(0.030)	(0.015)			
Firm Age	-	-0.001	0.000	-0.000	0.001	-0.001	-0.000	-0.001	0.000	-0.000	-0.001	0.001	0.000	0.001	-0.000	0.000
		(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		3.405**	10.026**	6.967***	4.134**	5.511	4.926***	4.158*	6.990	4.717***	4.198***	3.878	4.008***	5.000***	6.009***	4.232***
		(1.534)	(4.940)	(1.624)	(1.831)	(3.532)	(1.490)	(2.130)	(4.305)	(2.75)	(1.441)	(2.579)	(3.15)	(1.572)	(2.190)	(0.060)
Parameters																
Observations		177	176	353	176	175	351	176	176	352	173	173	346	173	173	346
F(14, 175)			0.96			1.45			2.57***			2.48***			2.12**	
Wald chi2(9)		73.85***		82.70***	55.35***		101.72***	43.38***		86.65***	47.08***	0.003	90.53***	54.97***		109.82***
Pseudo R2		0.676	0.674	0.631	0.468	0.602	0.498	0.419	0.538	0.454	0.419	0.457	0.420	0.473	0.496	0.442
Log pseudo		-33.236	-32.916	-75.159	-54.326	-40.076	-101.806	-59.357	-47.665	-112.104	-57.626	-54.364	-115.540	-52.252	-50.024	-110.593
Accuracy		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Failed		84.44	95.24	90.36	88.89	85.71	83.54	82.05	81.82	82.05	86.11	76.32	81.08	81.08	72.50	79.45
Non-failed		93.18	95.52	93.33	89.29	92.48	90.07	89.05	90.91	88.69	89.78	87.41	88.60	88.97	87.97	88.28
Overall		90.96	95.45	92.63	89.20	90.86	88.60	87.50	88.64	87..22	89.02	84.97	86.99	87.28	84.39	86.42
Hosmer-Lemeshow(10)																
Chi2(8)		6.75	12.73	11.67	11.02	1.51	13.06	9.93	7.55	7.66	12.55	9.99	4.97	8.79	4.72	11.31
Prob>chi2		0.564	0.121	0.167	0.200	0.993	0.110	0.270	0.478	0.467	0.128	0.266	0.761	0.360	0.788	0.185
ROC		0.970	0.960	0..957	0.916	0.955	0.925	0.902	0.931	0.912	0.905	0.917	0.905	0.919	0.924	0.909

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses ,, ** p<0.1, ** p<0.05 and *** p<0.01.

Appendix 30: Results of the Split Audit Committee Effectiveness Logit Model

MODEL 13			POOLED			t - 1/2			t - 4/5	
PANEL		A	B	C	A	B	C	A	B	C
VARIABLES	Expected Sign									
H5C: ACP	-	-0.191**	-0.034	-0.099	-0.071	-0.005	-0.049	-1.481***	-0.086	-0.169
		(0.079)	(0.074)	(0.076)	(0.072)	(0.059)	(0.064)	(0.178)	(0.109)	(0.112)
H5D:ACI	-	0.015	-0.017	-0.002	0.026	0.018	0.021	0.017	-0.035	-0.013
		(0.039)	(0.034)	(0.033)	(0.043)	(0.043)	(0.034)	(0.050)	(0.046)	(0.042)
H5E: ACX	-	-0.061*	-0.050	-0.059*	-0.046	-0.058	-0.057*	-0.081*	-0.066*	-0.079**
		(0.035)	(0.034)	(0.031)	(0.038)	(0.039)	(0.031)	(0.043)	(0.042)	(0.035)
H5F: ACS	-	-0.059	0.019	-0.022	-0.059	-0.037	-0.041	-0.068	0.059	-0.007
		(0.039)	(0.037)	(0.032)	(0.049)	(0.048)	(0.036)	(0.046)	(0.046)	(0.038)
H5G: ACM1	-	-0.001	-0.022	-0.010	-0.006	0.001	-0.005	-0.005	-0.037	-0.017
		(0.036)	(0.041)	(0.034)	(0.052)	(0.044)	(0.037)	(0.047)	(0.052)	(0.041)
CONTROLS										
Liquidity	-	0.006	-0.168**	-0.076	-0.009	-0.238***	-0.133**	0.036	-0.113	-0.021
		(0.067)	(0.068)	(0.061)	(0.085)	(0.082)	(0.065)	(0.081)	(0.096)	(0.071)
Profitability	-	-0.505***	-0.684***	-0.579***	-0.658***	-0.670***	-0.646***	-0.458***	-0.603***	-0.513***
		(0.145)	(0.152)	(0.129)	(0.199)	(0.181)	(0.155)	(0.145)	(0.209)	(0.138)
Leverage	+	0.083	0.004	0.045	0.077	0.012	0.045	0.118*	-0.055	0.060
		(0.068)	(0.078)	(0.067)	(0.103)	(0.080)	(0.072)	(0.071)	(0.095)	(0.068)
Firm Size	-	-0.084***	-0.096***	-0.090***	-0.089***	-0.088***	-0.090***	-0.076***	-0.098***	-0.087***
		(0.013)	(0.014)	(0.011)	(0.016)	(0.016)	(0.012)	(0.015)	(0.015)	(0.012)
Firm Age	-	-0.000	0.000	-0.000	-0.001	-0.000	-0.000	-0.000	0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		5.365***	5.478***	5.259***	5.168***	6.189***	5.762***	18.242***	5.579***	5.155***
		(1.035)	(1.192)	(1.077)	(1.316)	(1.490)	(1.186)	(1.046)	(1.460)	(1.363)
Model Parameters										
Observations		875	873	1748	353	351	704	346	346	692
Wald chi2(10/13)		100.75***	113.62***	112.59***	83.81***	86.20***	110.58***	1595.33***	84.75***	97.76***
Pseudo R2		0.463	0.496	0.469	0.505	0.577	0.531	0.459	0.449	0.435
Log pseudo		-271.49	-254.349	-535.922	-101.332	-85.374	-190.507	-107.274	-109.798	-224.752
Accuracy		%	%	%	%	%	%	%	%	%
Failed		83.42	81.63	81.54	80.49	83.91	82.61	81.94	78.67	79.59
Non-failed		89.74	89.51	89.40	89.67	92.80	90.24	88.69	88.19	88.26
Overall		88.34	87.74	87.64	87.54	90.60	88.49	87.28	86.13	86.42
Hosmer-Lemeshow(10)										
Chi2(8)		14.08	9.25	28.51	4.27	5.37	11.48	6.34	4.49	10.52
Prob>chi2		0.080	0.322	0.000	0.832	0.718	0.176	0.609	0.811	0.230
ROC		0.916	0.925	0.916	0.926	0.946	0.933	0.919	0.914	0.908

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 30: Continuation

MODEL 13			t -1			t -2			t-3			t -4			t-5	
PANEL		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
VARIABLES	Expected Sign															
H5C: ACP	-	0.006	-0.012	-0.024	-0.160*	0.020	-0.067	-1.554***	0.018	-0.102	-1.562***	-0.096	-0.146	-2.367***	-0.101	-0.183*
		(0.082)	(0.058)	(0.057)	(0.091)	(1.178)	(0.072)	(0.217)	(0.128)	(0.077)	(0.231)	(1.476)	(0.116)	(0.498)	(0.088)	(0.108)
H5D:ACI	-	0.013	-0.006	0.030	0.014	0.029	0.008	-0.035	-0.028	-0.022	-0.019	-0.032	-0.023	0.042	-0.039	-0.007
		(0.052)	(0.064)	(0.032)	(0.057)	(0.072)	(0.040)	(0.057)	(0.062)	(0.040)	(0.072)	(0.070)	(0.044)	(0.050)	(0.075)	(0.042)
H5E: ACX	-	-0.057	-0.057	-0.062**	-0.036	-0.057	-0.059	-0.081	0.014	-0.030	-0.077	-0.046	-0.057	-0.169***	-0.080	-0.105***
		(0.042)	(0.064)	(0.028)	(0.046)	(0.080)	(0.037)	(0.050)	(0.078)	(0.038)	(0.089)	(0.070)	(0.037)	(0.049)	(0.063)	(0.034)
H5F: ACS	-	-0.081	0.058	-0.026	-0.027	-0.105	-0.052	-0.015	-0.001	-0.010	0.015	-0.005	-0.001	-0.094**	0.129**	-0.010
		(0.051)	(0.085)	(0.036)	(0.063)	(0.073)	(0.041)	(0.064)	(0.071)	(0.042)	(0.066)	(0.070)	(0.042)	(0.063)	(0.074)	(0.042)
H5G: ACM1	-	0.031	-0.067	-0.011	-0.016	0.074	0.006	0.015	0.026	0.013	0.024	-0.035	-0.007	-0.036	-0.054	-0.034
		(0.054)	(0.077)	(0.038)	(0.655)	(0.072)	(0.042)	(0.054)	(0.080)	(0.043)	(0.063)	(0.082)	(0.045)	(0.060)	(0.076)	(0.044)
CONTROLS																
Liquidity	-	-0.035	-0.267**	-0.192***	0.032	-0.139	-0.081	-0.085	-0.043	-0.042	0.039	-0.070	-0.022	0.054	-0.188	-0.020
		(0.083)	(0.120)	(0.071)	(0.103)	(0.143)	(0.074)	(0.116)	(0.149)	(0.078)	(0.127)	(0.142)	(0.077)	(0.077)	(0.161)	(0.076)
Profitability	-	-1.066**	-0.740*	-0.764***	-0.434**	-0.892**	-0.578***	-0.296	-0.949***	-0.597***	-0.428	-0.378	-0.405**	-0.493***	-1.048***	-0.665***
		(0.453)	(0.381)	(0.203)	(0.183)	(0.357)	(0.160)	(0.241)	(0.283)	(0.187)	(0.316)	(0.339)	(0.188)	(0.163)	(0.308)	(0.137)
Leverage	+	0.134	-0.037	0.023	0.018	0.169	0.062	-0.033	0.054	0.017	0.032	-0.052	0.035	0.198**	-0.171	0.068
		(0.110)	(0.153)	(0.073)	(0.119)	(0.184)	(0.081)	(0.118)	(0.173)	(0.085)	(0.119)	(0.149)	(0.080)	(0.080)	(0.159)	(0.067)
Firm Size	-	-0.081***	-0.079***	-0.083***	-0.098***	-0.094***	-0.098***	-0.088***	-0.100***	-0.098***	-0.097***	-0.098*	-0.098***	-0.050***	-0.096**	-0.076***
		(0.016)	(0.020)	(0.012)	(0.021)	(0.027)	(0.014)	(0.018)	(0.022)	(0.014)	(0.020)	(0.053)	(0.014)	(0.018)	(0.022)	(0.012)
Firm Age	-	-0.001	0.001	-0.000	-0.000	-0.001	-0.001	-0.001	0.000	-0.000	-0.001	0.000	-0.000	0.001	-0.000	0.000
		(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		4.005**	11.351	6.540***	5.661***	4.388	5.465***	18.829***	4.335***	5.220***	20.178***	4.894	5.224***	18.168***	9.438	5.861***
		(1.723)	(5.052)	(1.525)	(1.749)	(15.390)	(1.141)	(1.589)	(2.157)	(1.080)	(1.958)	(15.224)	(5.224)	(1.755)	(2.811)	(1.529)
Model Parameters																
Observations		177	176	353	176	175	351	176	176	352	173	173	346	173	173	346
F(13 , 175)			1.27			2.01**			2.89***			2.64**			3.13***	
Wald chi2(10)		65.45***	n/a	76.93***	51.73***	n/a	103.46***	986.39***	n/a	88.48***	440.26***	n/a	88.84***	112.05***	n/a	96.97***
Pseudo R2		0.618	0.647	0.601	0.447	0.565	0.478	0.450	0.513	0.449	0.421	0.439	0.414	0.565	0.513	0.469
Log pseudo		-39.148	-32.867	-81.310	-56.450	-43.892	-105.861	-56.131	-50.218	-113.181	-57.441	-56.251	-116.793	-43.135	-48.330	-105.305
Accuracy		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Failed		86.05	83.72	89.29	80.00	80.95	79.49	86.49	85.00	79.75	82.35	78.95	79.73	84.21	75.00	82.43
Non-failed		92.54	92.48	93.31	88.97	90.98	88.64	89.21	89.71	88.28	87.77	88.15	88.24	90.37	88.72	89.34
Overall		90.96	90.34	92.35	86.93	88.57	86.61	88.64	88.64	86.36	86.71	86.13	86.42	89.02	85.55	87.86
Hosmer-Lemeshow (10)																
Chi2(8)		8.80	1.90	22.23	11.16	2.59	10.01	9.99	6.18	9.65	4.43	3.41	6.44	1.94	11.38	8.39
Prob>chi2		0.359	0.984	0.005	0.193	0.957	0.264	0.266	0.627	0.290	0.817	0.906	0.598	0.983	0.181	0.396
ROC		0.957	0.962	0.950	0.903	0.950	0.918	0.906	0.926	0.908	0.903	0.909	0.901	0.949	0.931	0.917

Marginal effects of each variable is reported in the first line, robust (Jackknife) standard errors in parentheses for panel A and C(B) ,. * p<0.1, ** p<0.05 and *** p<0.01

Appendix 31: Results of the Split Remuneration Committee Effectiveness Logit Model

MODEL 14			POOLED			t - 1/2			t - 4/5	
PANEL		A	B	C	A	B	C	A	B	C
VARIABLES	Exp. Sign									
H6C: RCP	-	-0.131	0.068	0.003	-0.057	0.049	-0.019	-1.159***	0.070	0.004
		(0.099)	(0.064)	(0.069)	(0.089)	(0.065)	(0.077)	(0.162)	(0.085)	(0.077)
H6D:RCI	-	-0.014	-0.024	-0.018	0.051	-0.003	0.027	-0.041	-0.053	-0.048
		(0.039)	(0.033)	(0.033)	(0.043)	(0.038)	(0.034)	(0.047)	(0.043)	(0.039)
H6E: RCCI	-	-0.166***	-0.168***	-0.169***	-0.171***	-0.145***	-0.165***	-0.182***	-0.170***	-0.170***
		(0.028)	(0.025)	(0.024)	(0.032)	(0.028)	(0.024)	(0.029)	(0.032)	(0.027)
H6F: RCS	-	-0.016	0.032	0.007	-0.072*	-0.001	-0.039	0.014	0.067	0.043
		(0.041)	(0.035)	(0.033)	(0.044)	(0.044)	(0.035)	(0.056)	(0.046)	(0.041)
H6G: RCM1	-	0.020	-0.025	-0.002	0.054	-0.033	0.008	0.005	-0.028	-0.016
		(0.043)	(0.034)	(0.035)	(0.048)	(0.036)	(0.034	(0.050)	(0.043)	(0.039)
CONTROLS										
Liquidity	-	-0.033	-0.136**	-0.080	-0.060	-0.180***	-0.141***	0.059	-0.131	-0.005
		(0.066)	(0.060)	(0.054)	(0.073)	(0.065)	(0.049)	(0.080)	(0.097)	(0.073)
Profitability	-	-0.423***	-0.580***	-0.491***	-0.563***	-0.471***	-0.511***	-0.361**	-0.596***	-0.469***
		(0.135)	(0.126)	(0.117)	(0.188)	(0.131)	(0.132)	(0.146)	(0.178)	(0.138)
Leverage	+	0.053	0.021	0.037	0.036	0.037	0.023	0.128**	-0.025	0.083
		(0.062)	(0.064)	(0.057)	(0.073)	(0.069)	(0.054)	(0.065)	(0.096)	(0.066)
Firm Size	-	-0.067***	-0.079***	-0.073***	-0.068***	-0.065***	-0.066***	-0.061***	-0.096***	-0.079***
		(0.012)	(0.012)	(0.010)	(0.013)	(0.012)	(0.010)	(0.015)	(0.016)	(0.012)
Firm Age	-	-0.000	-0.000	-0.000	-0.001	-0.000	-0.000	0.000	0.000	0.000
		(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		5.629***	4.971***	4.890***	5.929***	5.748	6.101	16.892***	4.830***	3.946***
		(1.335)	(1.136)	(1.070)	(1.606)	(1.442)	(1.376)	(0.977)	(1.280)	(1.065)
Parameters										
Observations		875	873	1748	353	351	704	346	346	692
Wald chi2(10/13/16)		100.42***	98.99***	123.24***	72.08***	96.69***	115.26***	1038.05***	69.38***	104.60***
Pseudo R2		0.515	0.568	0.532	0.581	0.648	0.603	0.519	0.494	0.487
Log pseudo		-245.181	-217.920	-472.009	-85.750	-71.045	-161.362	-95.359	-100.912	-203.885
Accuracy		%	%	%	%	%	%	%	%	%
Failed		83.25	83.96	81.95	87.21	83.53	85.88	81.08	79.76	81.41
Non-failed		90.12	91.98	90.58	92.88	92.11	92.51	88.97	90.84	89.93
Overall		88.57	90.03	88.73	91.50	90.03	90.91	87.28	88.15	88.01
Hosmer-Lemeshow(10)										
Chi2(8)		12.89	6.89	19.63	7.78	5.26	6.64	9.10	6.02	7.68
Prob>chi2		0.118	0.548	0.012	0.455	0.729	0.576	0.334	0.645	0.466
ROC		0.934	0.946	0.938	0.949	0.964	0.953	0.939	0.927	0.927

Marginal effects of each variable is reported in the first line, robust standard errors in parentheses clustered at firm level,.* p<0.1, ** p<0.05 and *** p<0.01.

Appendix 31: Continuation 1 of 2

MODEL 14		t-1			t-2			t-3		
PANEL		A	B	C	A	B	C	A	B	C
VARIABLES	Exp.Sign									
H6C: RCP	-	0.070	-0.635	-0.015	-1.157***	0.192**	-0.024	-1.279***	0.094	0.026
		(0.072)	(0.416)	(0.064)	(0.219)	(0.076)	(0.089)	(0.214)	(0.093)	(0.071)
H6D:RCI	-	0.068	0.030	0.042	0.056	-0.036	0.010	-0.073	0.023	-0.032
		(0.044)	(0.049)	(0.032)	(0.057)	(0.048)	(0.041)	(0.066)	(0.080)	(0.044)
H6E: RCCI	-	-0.159***	-0.152***	-0.159***	-0.205***	-0.169***	-0.175***	-0.160***	-0.190***	-0.186***
		(0.034)	(0.056)	(0.023)	(0.044)	(0.042)	(0.027)	(0.048)	(0.037)	(0.028)
H6F: RCS	-	-0.094*	-0.024	-0.033	-0.110*	0.015	-0.038	0.028	0.001	0.036
		(0.047)	(0.054)	(0.030)	(0.062)	(0.070)	(0.047)	(0.078)	(0.097)	(0.049)
H6G: RCM1	-	-0.064	0.048	0.017	0.132*	-0.122***	-0.003	-0.046	0.028	-0.005
		(0.049)	(0.067)	(0.031)	(0.064)	(0.043)	(0.040)	(0.051)	(0.070)	(0.039)
CONTROLS										
Liquidity	-	-0.032	-0.145	-0.163***	-0.064	-0.158	-0.129**	-0.179*	0.016	-0.075
		(0.058)	(0.095)	(0.047)	(0.095)	(0.102)	(0.062)	(0.109)	(0.105)	(0.071)
Profitability	-	-1.127***	-0.442	-0.600***	-0.293**	-0.667***	-0.454***	-0.260	-0.639***	-0.470***
		(0.394)	(0.294)	(0.150)	(0.146)	(0.190)	(0.143)	(0.173)	(0.231)	(0.152)
Leverage	+	0.102	0.003	0.031	-0.039	0.080	0.013	-0.049	0.046	-0.009
		(0.083)	(0.113)	(0.051)	(0.080)	(0.108)	(0.064)	(0.102)	(0.090)	(0.070)
Firm Size	-	-0.049***	-0.050**	-0.060***	-0.065***	-0.065**	-0.072***	-0.069***	-0.070***	-0.076***
		(0.012)	(0.024)	(0.009)	(0.022)	(0.019)	(0.013)	(0.018)	(0.023)	(0.013)
Firm Age	-	-0.001	0.000	-0.000	-0.000	-0.001	-0.001	-0.001	0.000	-0.000
		(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant		3.209*	23.761***	7.007***	19.728***	4.478	5.839***	18.783***	3.582	4.967***
		(1.679)	(8.102)	(1.718)	(1.752)	(2.311)	(1.359)	(1.493)	(2.447)	(4.09)
Parameters										
Observations		177	176	353	176	175	351	176	176	352
Wald chi2(13)		45.03***	1.53	82.26***	1021.53***	1.69*	96.74***	950.56***	1.26	85.41***
Pseudo R2		0.692	0.746	0.678	0.565	0.642	0.547	0.496	0.635	0.529
Log pseudo		-31.590	-25.682	-65.523	-44.425	-36.044	-92.018	-51.452	-37.630	-96.589
Accuracy		%	%	%	%	%	%	%	%	%
Failed		90.70	89.13	88.89	84.09	85.71	83.53	82.93	87.23	82.56
Non-failed		94.03	96.15	95.06	92.42	92.48	91.73	90.37	94.57	90.98
Overall		93.22	94.32	93.48	90.34	90.86	89.74	88.64	92.61	88.92
Hosmer-Lemeshow(10)										
chi2(8)		5.86	14.57	7.59	9.23	2.38	10.17	5.32	3.28	5.15
Prob>chi2		0.663	0.068	0.475	0.323	0.967	0.253	0.723	0.915	0.742
ROC		0.972	0.973	0.966	0.945	0.964	0.941	0.924	0.960	0.936

Marginal effects of each variable is reported in the first line, robust(jackknife) standard errors in parentheses for panel A and C(B) ,.* p<0.1, ** p<0.05 and *** p<0.01

Appendix 31: Continuation 2 of 2

MODEL 14		t-4			t-5		
PANEL		A	B	C	A	B	C
VARIABLES	Exp.Sign						
H6C: RCP	-	-1.187***	0.078	0.029	-1.983***	0.043	-0.013
		(-0.204)	(0.117)	(0.077)	(-0.315)	(0.119)	(0.076)
H6D:RCI	-	-0.083	-0.001	-0.048	-0.002	-0.113*	-0.053
		(0.061)	(0.066)	(0.041)	(0.060)	(0.067)	(0.041)
H6E: RCCI	-	-0.150***	-0.221***	-0.187***	-0.203***	-0.098*	-0.152***
		(0.044)	(0.041)	(0.027)	(0.069)	(0.056)	(0.030)
H6F: RCS	-	0.051	0.033	0.039	-0.027	0.097	0.050
		(0.064)	(0.076)	(0.044)	(0.069)	(0.080)	(0.048)
H6G: RCM1	-	-0.049	0.030	-0.008	0.057	-0.093	-0.026
		(0.069)	(0.061)	(0.041)	(0.053)	(0.063)	(0.039)
CONTROLS							
Liquidity	-	0.058	-0.107	-0.020	0.080	-0.251	0.014
		(0.241)	(0.142)	(0.076)	(0.080)	(0.161)	(0.079)
Profitability	-	-0.362	-0.454*	-0.405	-0.326***	-1.028***	-0.575***
		(0.240)	(0.260)	(0.159)	(0.127)	(0.315)	(0.142)
Leverage	+	0.065	0.001	0.055	0.179**	-0.110	0.109
		(0.104)	(0.001)	(0.068)	(0.075)	(0.151)	(0.073)
Firm Size	-	-0.058***	-0.097***	-0.080***	-0.057***	-0.087***	-0.078***
		(0.018)	(0.025)	(0.014)	(0.016)	(0.024)	(0.013)
Firm Age	-	-0.001	0.001	0.000	0.001	-0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Industry Effects	+/-	Yes	Yes	Yes	Yes	Yes	Yes
Constant		17.579***	5.053**	4.140***	17.876***	7.997**	4.278***
		(1.630)	(2.224)	(1.101)	(1.543)	(2.861)	(1.126)
Parameters							
Observations		173	173	346	173	173	346
Wald chi2(13)		646.72***	2.26***	93.45***	586.01***	2.09	101.05***
Pseudo R2		0.488	0.545	0.490	0.594	0.498	0.492
Log pseudo		-50.790	-45.574	-101.589	-40.235	-49.763	-100.848
Accuracy		%	%	%	%	%	%
Failed		76.32	81.82	79.75	82.50	80.95	82.89
Non-failed		88.15	92.25	89.51	90.98	91.60	90.00
Overall		85.55	89.60	87.28	89.02	89.02	88.44
Hosmer-Lemeshow(10)							
chi2(8)		3.71	7.10	6.76	5.32	11.31	4.90
Prob>chi2		0.883	0.526	0.562	0.723	0.185	0.768
ROC		0.929	0.939	0.928	0.958	0.929	0.936

Marginal effects of each variable is reported in the first line, robust (jackknife) standard errors in parentheses for panel A and C(B) ,. * p<0.1, ** p<0.05 and *** p<0.01

Appendix 32: Re-estimation of Taffler's (1983) Model

Taffler's Model	expected sign	t - 1	t - 2	t - 3	t - 4	t - 5	POOLED
intercept	+/-	-3.305***	-2.312***	-2.139***	-2.079***	-2.087***	-2.240***
		(0.461)	(0.406)	(0.387)	(0.402)	(0.440)	(0.315)
Profitability	-	0.014	0.037*	0.045	0.034	0.060	0.037
		(0.024)	(0.021)	(0.034)	(0.034)	(0.051)	(0.024)
Working Capital	-	0.114***	0.060*	0.058	0.054	-0.029	0.031
		(0.037)	(0.035)	(0.040)	(0.036)	(0.028)	(0.032)
Financial Risk	+	0.482***	0.295**	0.200	0.199	0.350***	0.338***
		(0.094)	(0.119)	(0.134)	(0.130)	(0.116)	(0.089)
Liquidity	-	-0.001*	0.000	0.000*	0.000***	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PARAMETERS							
Taffler's Model							
Wald Chi2		31.39***	18.06**	13.75*	18.55***	9.75**	20.42***
Pseudo R2		0.135	0.057	0.066	0.078	0.05	0.058
Accuracy		%	%	%	%	%	%
Failed		76.67	66.67	64.71	86.67	81.82	67.12
Non-failed		78.33	75.30	74.93	76.44	75.82	75.34
Overall		78.19	74.93	74.43	76.88	76.01	75.00
Hosmer-Lemeshow(10)							
Hosmer Prob>Chi2		15.57	11.25	18.51	5.21	6.77	20.5
Chi2(8)		0.049	0.188	0.018	0.735	0.0562	0.009
ROC		0.733	0.658	0.669	0.643	0.649	0.654
Model 1							
Wald Chi2		74.63***	92.68***	80.50***	84.95***	98.31***	107.51***
Pseudo R2		0.593	0.464	0.440	0.399	0.426	0.456
Log pseudo		-82.864	-108.706	-114.890	-119.838	-113.811	-549.665
Accuracy		%	%	%	%	%	%
Failed Accuracy		89.02	78.95	80.52	76.71	77.03	80.31
Non-failed Accuracy		92.62	88.00	88.00	87.18	87.87	88.59
Overall Accuracy		91.78	86.04	86.36	84.97	85.55	86.78
Hosmer-Lemeshow(10)							
Hosmer Prob>Chi2		12.92	12.94	6.95	6.19	7.34	22.05
Chi2(8)		0.115	0.114	0.543	0.626	0.500	0.005
ROC		0.947	0.913	0.908	0.896	0.904	0.913
observations		353	351	352	346	346	1748

Notes:

1. Marginal effects of each variable is reported in the first line, robust standard errors clustered at firm in parentheses, * $p<0.1$, ** $p<0.05$ and *** $p<0.01$.
2. Profitability = profit before interest and tax/current liabilities
3. Working Capital = current assets/ total assets
4. Financial Risk = current liabilities/ total assets
5. Liquidity = No credit interval = (quick assets – current liabilities)/daily operating expenses
6. Daily operating expenses = (sales – profit before interest and tax – depreciation)/365