РАЗДЕЛ 2
СОВЕТ ДИРЕКТОРОВ

SECTION 2
BOARD OF DIRECTORS

BOARD MONITORING AND FIRM PERFORMANCE: CONTROLLING FOR ENDOGENEITY AND MULTICOLLINEARITY

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Abstract

Prior corporate governance studies have resulted in inconsistent findings on the significance of relationships between combinations of board monitoring characteristics and firm performance, due to a failure to properly control for endogeneity and multicollinearity problems inherent in the multivariate analysis of their data. In this study, panel data of the top 500 listed companies from the Australian Stock Exchange is used over three years. Results reveal that all but one of the five board characteristics and seven board committee characteristics considered in this study are significantly related to both return on assets and earnings per share in each of the three years. It is concluded that results in this study are much stronger and more consistent than prior governance-performance studies because the structural equation modelling and lagged measures of performance used are able to control for endogeneity and multicollinearity.

Key words: Boards monitoring, board committees, firm performance, endogeneity, multicollinearity.

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1. Introduction

This study examines whether board monitoring characteristics affect firm performance after controlling the endogeneity and multicollinearity problems in the data analysis. Multicollinearity occurs when independent variables are highly correlated with each other, which makes it difficult to come up with reliable estimates of their individual regression coefficients (Hermalin & Weisbach, 2003). The board monitoring mechanisms should work together in practice, and so are likely to be inherently interrelated to each other. Good corporate governance seeks to align managers' to shareholders' interests through the efficient use of a bundle of board monitoring variables, rather than any single mechanism (Boo & Sharma, 2008; Fernández & Arrondo, 2005; Agrawal & Knoeber, 1996; Rediker & Seth, 1995). If board monitoring variables are adopted with the intention of complementing each other, then they are unlikely to be independent, thus giving rise to the multicollinearity problem (Fernández & Arrondo, 2005). In order to avoid the problem of multicollinearity, multi-variate analysis needs to control for the interrelationships among the monitoring devices of the board and its committees.

To achieve this, structural equation modelling is used in this study to model the interrelationships.

Similarly, the issue of endogeneity needs to be dealt with in the analysis. Kole (1996) and Loderer & Martin (1997) present evidence of a reverse-causality or a two-way causality between managers' equity ownership and firm performance. They determine that at high levels of firm financial performance, management tends to liquidate part of their shareholding, confirming the existence of a relationship whereby managerial ownership derives from firm performance. However, evidence has not been provided in prior studies about the possibility that various board governance variables may not have a relationship with firm performance that is mono-directional running from governance to performance. MacAvoy & Millstein (1999) contend that the failure of previous studies to find significant relationships between board monitoring and performance is because current year performance, rather than lagged performance, has been used in prior studies. Intuitively, the progressive emergence in firms of their financial results during a current year may trigger steps to re-structure the board and its committees or to have them meet more frequently during that same year. That is, board monitoring characteristics may be changed during a current year in response to anticipated end-year financial results, or end-year financial results may be stronger due to improved board monitoring during the year. Therefore, to address this endogeneity issue, this study considers lagged years' performance.

There are three specific motivations for undertaking this study. First, recent studies (e.g., Boo & Sharma, 2008) have highlighted the interrelationships among corporate governance variables in terms of the way they complement and substitute for each other as a bundle, as well as the way they both drive and are being driven by corporate performance. Extending on these interrelationship issues, this study is motivated to provide a more robust test of the inter-relationships between the board (and board committees) monitoring variables and corporate financial performance. Second, this study is motivated by the regulatory importance of board monitoring. As has occurred in many countries, the Australian Stock Exchange (ASX) set up a code of good corporate governance practice to improve the standards of board monitoring. By providing findings about how board monitoring characteristics and devices work together in firms, this study can give better insights to securities market regulators about the relative effectiveness of such characteristics and devices which it includes in its code of good governance. Third, the study provides evidence from an under-researched country. The majority of studies which have examined board structures and directors' characteristics as mechanisms that can better align management-shareholder interests and improve performance have been conducted in the US, UK, Japan and Germany. Limited research has been undertaken in Australian (Bonn, 2004). The corporate regulatory regime in Australia draws on, but differs in its detail, from other countries. Australian corporate governance regulators responded to the specific circumstances that arose in the late-1990s and early-2000s from corporate collapses and scandals of HIH, Ansett, One Tel and Harris Scarfe.

The data analysis in this study is distinguished from prior research in two ways. First, structural equation modelling is used to model the inter-relationships that exist among the corporate governance variables in a way that can control the effects of multicollinearity. Second, a lagged-year model for the dependent variable is used to limit the problem of endogeneity that can plague multi-variable corporate governance research.

2. Framework of the Study

The analysis of governance-performance relationships in this study is limited to data on those governance variables concerned with aspects of board monitoring only. These board-monitoring variables are depicted in the framework in Figure. In this framework, key board-monitoring devices and characteristics are deemed to fall into the following categories:

- Structuring of the board (Audit Committee, Remuneration Committee, Nomination Committee)
- Operating of the board (duality of Chair-CEO, size of board, frequency of meetings)
- Characteristics of directors (financial literacy of directors, independence of directors)

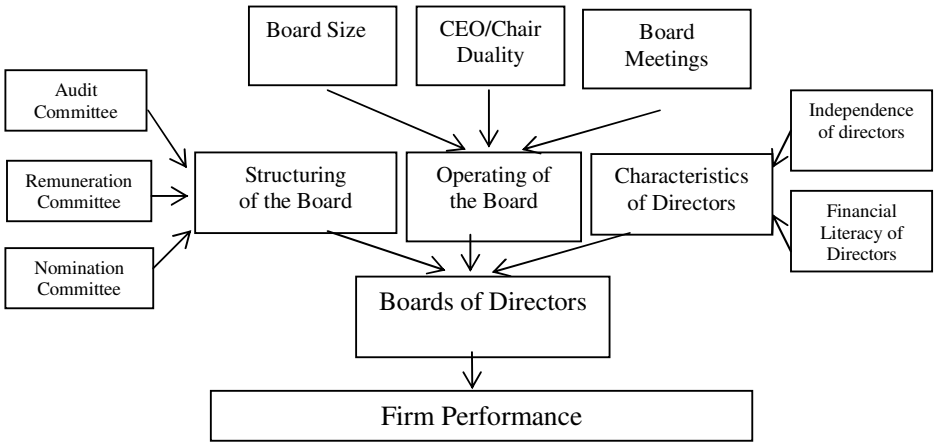

Figure 1. Framework of board monitoring

Fama and Jenson (1983) recognise the board as the most important control mechanism available because it forms the apex of a firm's internal governance structure. Boards are responsible for ensuring that management acts for the interests of the owners. Boards and their committees have the power to recruit, take action, ratify and monitor important decisions where executive managers are concerned (Jensen 1993). In the absence of any formal theory for constructing an effective board, different practices are followed for the construction of the board and the enhancing of its monitoring ability (Hermalin and Weisbach, 2001).

Previous research has emphasised different characteristics of the board. For example, Jensen (1993) considers board composition, board leadership and board size as the prerequisites to capture the board's monitoring ability. Agerwal and Knoeber (1996) examine a range of governance variables and find that board independence is the only governance mechanism which consistently affects corporate value. With respect to board leadership, the question of conflict of interest due to the dual role of CEO and Chairperson by the same person has been studied. With respect to size, the general finding is that smaller boards are more effective (e.g., Jensen, 1993 and Lipton and Lorsch, 1992). In support of these findings, Hermalin and Weisbach (2001) provide findings of the effects of the size of boards and their proportion of outside directors on several aspects of the effectiveness of monitoring of managers. They find smaller boards and higher proportions of outside directors to lead management teams to take actions that are more in line with shareholders interests, to be more inclined to remove poor performing managers and make better firm acquisition-related decisions.

The effectiveness of monitoring by the boards of directors varies with factors such as board size, board composition, number of meetings, background of directors, CEO/Chair duality and committees. Corporate boards better represent stockholder interests when they are smaller, contain more outside directors and having a separate person holding the CEO and chairperson position (Jensen, 1993). Further, the background and the experience of the directors have an influence on the monitoring ability of the directors (DeZoort, 1997)

3. Literature on Board Monitoring

The extent to which the board behaves as an active monitor in the corporate governance system depends on the way it is structured, its operating features and the characteristics of its directors. This section reviews the literature relating to each of the key board-monitoring variables shown in above Figure.

3.1 Board Size

Board size is an important factor for monitoring management. If the size of the board becomes too big, it increases problems of directors' free-riding and becomes more difficult for directors to express their ideas and opinions in the limited time available to them. It is also argued that large boards are relatively ineffective and are not easy for the CEO to control (Habib and Azim, 2008; Jensen, 1993 and Lipton and Lorsch, 1992). Empirical results in Eisenberg et al. (1998) support the notion that smaller boards enhance firm performance. In contradiction of this argument, Kiel and Nicholson (2003) find evidence in the Australian context that large size boards are not necessarily impediments to good performance.

There is also a potential monitoring problem if the board size is too small. Kiel and Nicholson (2003) suggest that there is an "inverted U" relationship between board size and performance in which adding directors can bring the board to an optimal skills/experience mix level. Beyond that point the difficult dynamics of a large board prevail over the skills/expertise advantage that additional directors might bring. Eight directors is cited as the upper limit

and 6.6 as the mean board size in a study by Kiel and Nicholson (2003: 194). Another study by Larcker et al. describes eight as "typical" (2004: 7), while Leblanc and Gillies note that eight to eleven is viewed as optimal (2004: 5).

3.2 Number of Meeting

Major decisions of the firm are made at the board meeting. Therefore, it is important that directors spend a considerable amount of time for board meetings. Board activity, measured by board meeting frequency, is an important dimension of board operations. Vafeas (1999) finds that the annual number of board meetings is inversely related to firm value. However, their results were driven by increases in board activity following share price declines.

Sometime, it is argued that the quality of time directors spend in board meetings is important rather than the quantity of time. However, quantity of director's time is emphasised by shareholder activist groups and labour unions, where their measure of a director's performance includes such factors as attendance and number of directorships. Therefore the number of board meetings is an important consideration in judging the effectiveness of monitoring mechanisms.

3.3 CEO/Chair Duality

The two most important positions of firms are the Chair of the board and Chief executive officer (CEO). The position of chairperson significantly influences the outcome of board decisions because he/she controls the board meetings, sets its agenda, makes committee assignments and also influences the selection of new directors. The position of CEO is also influential as he/she is responsible for any operating and financial decision making of the firm.

If the same person holds the position of both CEO and Chair there will be a problem of proper monitoring of the performance as the CEO will be able to control the board and will reduce the board's independence from management and make decisions in their self-interest and at the expense of shareholders. Therefore, to maintain independence, it is necessary that the board is independence from the CEO (Hermalin and Weisbach. 2001). Cadbury (1995) also recommends that the role of the chairman of the board of directors should be separate from that of the CEO.

A number of empirical studies have provided important insights into the relationship of leadership structure to performance (Heracleous, 2001; Leblanc and Gillies, 2004; Rechner and Dalton, 1989 and 1991; and Baliga, Moyer and Rao, 1996). However, the evidence is far from conclusive. For example, Heracleous (2001) provides a literature review of evidence that shows that whether the CEO and Chair are separate or the same person does not, on its own, appear to make much difference to performance. Leblanc and Gillies (2004) argue that empirical research has failed to find a clear link between the separation of CEO and Chair positions and enhanced firm performance. Rechner and Dalton (1989) examine shareholder returns over a five-year period (1978 – 1983) and find no significant distinction between the performances of separated and combined structure firms.

3.4 Independence of Directors

Independent directors[21] are directors who do not hold any executive position in the company or have any direct or indirect interest in the company. It is generally argued that independent directors, because of their lack of interest in any financial benefit from the firm, are more likely to protect shareholders interests and reduce the agency problem. Empirical results also support the argument that outside directors are more effective monitors and a critical disciplining device for managers (Ahmed, Hossain and Adams, 2006; Davidson, Goodwin-Stewart, and Kent, 2005; Hermalin and Weisbach, 1988). Fama (1980) and Fama and Jensen (1983) argue that board outsiders, by providing expert knowledge and monitoring services, add value to firms. Being financially independent of management, independent directors have the ability to withstand pressure upon management.

There is much professional and research interest in the role of non-executive directors' monitoring role in corporate governance. However, there are mixed findings. Pfeffer (1972) and Zald (1967) reveal a positive association between improved efficiency and corporate performance when boards of directors are dominated by non-executive directors. These results have been disputed by Kesner (1987), Pearce (1983) and Vance (1964 and 1978) who found a superior financial performance in firms that had boards dominated by executive directors. This finding was supported by Dechow, et al. (1996) and Beasley (1996) who conclude that there is a negative relationship between the number of independent directors and the incidence of financial statement fraud. However, Hermalin and Weisbach (1991) did not find any significant relationship in regression of board composition on firm performance.

Although there are conflicting findings in the previous research, in general this paper views that outside directors improve board quality by increasing its independence from management and working for the best interest of the shareholders (Cadbury 1995). Independent non-executive directors are regarded as being in a better position than non-independent directors to effectively monitor executive management. Independent non-executive directors in

[21] Suchard et al, (2001) mentioned that Australian board members can be classified into two broad categories, executives and non-executives. While the executives are employed by the firm, the non-executives can be further classified into two categories, independent and non-independent. For monitoring purpose independent directors are more effective.

turn have incentives to develop reputations as experts in decision control and monitoring (Fama and Jensen 1983).

One of the common limitations of the above studies is that most of them focused on the executive and non-executive classification as an indicator of the independence of the board. However, not all non-executive directors are independent (Psaros and Seamer, 2002). To capture the monitoring ability of independent directors they need to classify into three categories: insider, grey and outsider. This three way classification of the directors was first done by Baysinger and Butler (1985)[22]. Commonly, 'insider' directors refer to the directors with the executive position in the company; 'grey' directors are not full time employees of the company but are associated with the company in other capacities (such as acting as professional adviser or consultant, supplier or customer, or previous employee of the company); and 'outsiders' are those who have no affiliation with the firm except for their directorship. Previously, no monitoring effects were identified when 'grey' directors were excluded from non-executive directors.

3.5 Educational/Working Background of the Directors

Directors educational background and work experience is an important consideration in the monitoring process. The working experience and/or financial background is expected to lead to better monitoring of management. DeZoort (1997) and Bull and Sharp (1989) emphasise on the board members to have accounting and auditing expertise. Ramsay mentioned that financial literacy is an important component of the general standards of care, skill and diligence required of company directors (2001: 155). It is expected that the directors who are financially literate can monitor management efficiently. To capture the educational/experience background it is important to consider whether the directors had worked in any firm for more than five years as directors or whether they had any business or economics background. Higher levels of educational background and stronger work experience help better understand the business and properly monitor management.

3.6 Committees of the Board

Another factor in considering the monitoring ability of the board is the ability of different board committees, especially audit, compensation and nomination committees. The legislation requires that these committees be independent for the purpose of proper monitoring (Austin, 2002).

Audit Committee: The primary function of the audit committee is to review management information, financial statements and internal control system (Bosch, 1995; Klein, 1998). The importance of audit committees as a corporate monitoring mechanism has been emphasised by many researchers in recent years (e.g., Chen et al., 2005, Abbot and Parker, 2000).

An important recommendation by the Ramsay Report (2001) is the mandatory rule for all Australian Stock Exchange (ASX) listed companies to have an audit committee[23]. Australian companies have adopted the recommendation by Corporate Law Economic Reform Program Act 2004 (CLERP 9, Commonwealth of Australia 2004), where the top 500 companies listed on the Australian stock exchange are required to have an audit committee. A report issued by the Joint Committee of Public Accountants and Audit (JCPAA, 2002) also highlighted the need for all listed companies to have an audit committee[24]. According to the Australian Stock Exchange Corporate Governance Council (2003), the audit committee should consist of: (i) only non-executive directors; (ii) a majority of independent directors; (iii) the independent chairperson, who is not chairperson of the board; and (iv) at least three members (see recommendation 4.3: ASX CGC, 2007).

Similar to the board of directors, too many or too few meetings both are the threat to effective decision making of the audit committee. Again if the members of the audit committee are financially literate, it is expected that they will work as an effective monitor. It is expected that effective audit committee monitoring will have an impact on firm performance. Number of audit committee meetings with impendent and financially literate directors will work as an effective monitor for the audit committee. In general, monitoring ability of the audit committee is measured by: the number of audit committee meetings, the proportion of independent directors in the committee and the proportion of financial literate directors in the committee.

***Compensation Committee*:** Compensation committee has become more common in the wake of the Cadbury Committee's 1992 report. The existence of Compensation committees is consistent with agency theory, which advocates the separation of

[22] They use Australian Accounting Standard AASB 1017: Related Party Disclosure to classify directors into three categories for better reflection of the board composition.

[23] The Ramsay Report summarises and recommends limited adoption of best practices in the USA, UK and Canada. In addition to the proposal to mandate the formation of audit committees for all listed companies, the Ramsay Report proposes a threshold test of market capitalization to determine the proportion of independent audit committee member required. This initiative takes into consideration the disproportionate cost requirement for smaller listed companies to have an independent audit committee.

[24] The JCPAA recommendations on the composition and responsibilities of audit committees are the same as those prescribed in the Ramsay Report. Furthermore, the JCPAA argued that the cost of setting up an audit committee should be an obligation for companies seeking to access the Australian capital market via a listing on the Australian Stock Exchange.

management from control (Barkema and Gomez-Mejia, 1998). The main function of compensation committees is to determine and review remuneration packages for senior management of the company (Klein, 1998). When determining compensation it is necessary to consider the company's needs together with the interests of its shareholders and other stakeholders (Bosch, 1995). There has been an increasing demand for greater accountability for remuneration, substantially contributing to the growth in adoption of the compensation committee (Bosch, 1995). This report recommended that the appointment of Compensation committees consisting wholly or mainly of non-executive directors and chaired by non-executive director.

Compensation committees have an important role in the monitoring of boardroom control. The Compensation committee supports and advises the board in fulfilling its responsibilities to shareholders by appropriately design the Compensation policy for directors, chief executive officer and other senior executives. Monitoring by the Compensation committee is captured by the number of meetings held by the committee and the proportion of independent directors in the committee.

***Nomination Committee*:** The ability of non-executive directors to perform the monitoring function is related to their independence, which in turn is related to director selection by the nomination committee (Conyon and Peck, 1998). Theoretically, directors are selected by the shareholders but, in practice, shareholders simply ratify candidates selected by the board itself (see Vaefas, 1999). Therefore, the appointment of the directors is a critical issue to determine monitoring ability; especially if outside board directors are selected by an incumbent CEO heightening the prospect that they may not execute their duties in a manner congruent with shareholder interests (Hart, 1995). Jensen (1993) also argues that the nomination process is often dominated by a powerful CEO who selects directors under his influence in order to contain the intensity of board monitoring. Board control is more effective in companies that have introduced a nomination committee to select and recruit directors.

The presence of the nomination committee ensures that the board is comprised of individuals who are best able to discharge the responsibilities of a director, having regard to the law and the highest standards of governance, by assessing the skills, knowledge, experience and diversity required on the board and the extent to which each are represented; nomination committee also establish processes for the review of the performance of individual directors and the board as a whole (Conyon and Peck, 1998).

In this selection process presence of nomination committee ensure effective and efficient monitoring through the non-executive directors and frequent meeting. Therefore, this study considers the monitoring of the nomination committee by the number of meetings and the proportion of independent directors in the committee. The number of nomination committee meetings captures the willingness to select the right person for the firm. A successful nomination decision requires a good discussion of the companies' needs and proper selection of the committee members which in tern requires directors to meet several times. And the proportion of non-executive directors demonstrates the independence of the nomination committees.

The following framework is developed from the above discussion on different board monitoring characteristics. In this framework key characteristics of board monitoring are: compositions (board size, number of meeting, and proportion of independent directors); characteristics (background of directors, separation of CEO and Chair) and committees (audit, Compensation and nomination committees).

4. Hypothesis Development

The above literature review and discussion leads to the following hypotheses related to boards of directors and firm performance:

The first hypothesis is based on the accounting performance of the firm, as reflected in return on assets. It is expected that the boards of directors' monitoring will influence the management to work for the best interest of the company, including the reporting to shareholders of relevant and reliable accounting information. This quality of accounting information will be reflected in the accounting based performance of the firm.

> *H_1 If other things remain the same, monitoring by boards of directors is positively related to the return on assets of a firm.*

The second hypothesis is based on the market performance of the firm, as reflected in earning per share. In the presence of boards monitoring, management will disclose better quality accounting information which will have an impact on the market. These disclosures of information by management are expected to have a positive impact on market performance measures of the firm.

> *H_2 If other things remain the same, monitoring by boards of directors is positively related to the earning per share of a firm.*

5. Method of Analysis

This paper uses structural equation modelling (SEM) to find out the relationship between the board monitoring and firm performance. Multiple regressions, multivariate analysis of variance and discriminate analysis provide researchers with powerful statistical tools to address a wide range of corporate governance issues. They have been widely used in prior empirical studies on governance-performance relationships. However, the major limitation of these analytical techniques is that it is only possible to examining a single relationship at a time. Although MANOVA allows for multiple

independent and dependent variables, it only represents a single relationship between the dependent and independent variables (Hair et al., 2006). Likewise, multiple regression represents single path relationships between each independent variable and the dependent variable. The main difference between SEM and other multivariate techniques is the use of independent relationships between sets of variables. That is, SEM estimates a series of separate, but interdependent, multiple regression equations simultaneously by specifying the structural model. A structural model can express relationships among independent and dependent variables, even when dependent variables become independent variables in other relationships.

Moreover, in SEM it is possible to include both observed and latent variables in the model. Observed variables have data and are also usually continuous. Latent variables are not directly observed. To observe latent variables, the model should be built which expresses latent variables in terms of observed variables. The latent variables in SEM are continuous variables and can, in theory, have an infinite number of values. Due to the interrelations among the variables, this study selects structural equation modelling as an appropriate statistical tool to test the research questions. No previous corporate governance research has used structural equation modelling to consider the complex interrelationship among the monitoring variables.

There are three advantages of using SEM in this study. Firstly, it has the ability to incorporate latent variables into the analysis. A latent variable is an unobserved concept that can only be approximated by observable or measurable variables. Secondly, in all multivariate analysis it is assume that there is no error in the variables. However, it is well know both in practical and theoretical perspectives, that it is not possible to perfectly measure the concept as there is always some degree of measurement error. By considering this type of error SEM improve the statistical estimation. Thirdly, SEM is a powerful method to deal with multicollinearity in sets of predictor variables. Multicollinearity occurs when two or more variables are not independent. In genera there is a strong interdependence among the corporate monitoring variables. If this interdependence is not considered there is a possibility that the result will be poor and misleading. This study handles the problem of multicollinearity by using the structural equation modelling.

Like all other statistical methods, SEM requires a careful consideration of some basic factors which might affect the research design and analysis of the models. Following are some assumptions on which SEM is based:

(i) The first assumption of the SEM is that the sample should be of a reasonable size. Sample size in SEM generally varies depending on analysis procedures used and with the model characteristics.

(ii) Dependent variables are continuously and normally distributed. According to the normal distribution, it is expected that the sample mean and sample variance tend to be normally distributed as the sample size becomes large. SEM is designed for variables that are assumed to have an underlying continuous distribution. Theoretical basis for model specification is particularly important for SEM because it is considered a confirmatory analysis; that is, it is useful for testing and potentially confirming theory.

(iii) SEM models can never be accepted; they can only fail to be rejected. This assumption leads to provisionally accepting a given model. In SEM in most instances it is recognized that there are equivalent models that fit equally as well as their own provisionally accepted model. Any of these models may be correct because they fit the data as well as the preferred model. This is an attempt to eliminate alternative models, and by extension alternative explanations, but this is not always possible. The use of SEM thus entails some uncertainty, particularly with cross-sectional data that are not collected under controlled conditions.

5.1 Fitness of the Structural Models

Evaluating the model is one of the most difficult issues connected with research based on structural equation modelling. The overall goodness-of-fit for structural equation models depends on many factors. There is no single statistical test that describes the goodness-of-fit. As mentioned by Hair et al. (2006), '*No single magic value for the fit indices separates good from poor models, and it is not practical to apply a single set of cutoff rules to all measurement models and for that matter to all SEM models of any type*' (p.705) . The application of multiple fit measures will enable a consensus across types of measures regarding acceptability of the proposed model to be attained. Various goodness-of-fit measures assess the results from three perspectives:

Normed Chi-Squire (X^2/df): Joreskog and Sorbom (1994) proposed that the chi-square be adjusted by the degrees of freedom to assess model fitness. This measure can be termed the normed chi-square (X^2/df), and is the ratio of the chi-square divided by the degrees of freedom. A normed chi-squire statistics, parallel to the F-change statistics consulted in hierarchical regression analysis, is used to determine which model is better for the observed data (Hoyle, 1995). This measure provides two ways to assess inappropriate models: firstly, a model that may be over-fitted, thereby capitalising on chance, typified by values less than 1.0; and secondly, models that are not yet truly representative of the observed data and thus need improvement, having values greater than an upper threshold. However, because the chi-square value is the major component of this measure, it is subject to sample size effects. The normed chi-square, however, has been shown to be somewhat unreliable. Marsh and Hocevar (1985) find

that different researchers have recommended using ratios as low as 2 or as high as 5 to indicate a reasonable fit. Carmines and McIver (1981) find that degrees of freedom with a range of 2 to 1 or 3 to 1, indicate an acceptable fit between the hypothetical model and the sample data.

Goodness–of-Fit Index: The goodness-of-fit index (GFI) is based on the squared residuals from prediction compared to the actual data but is not adjusted for the degrees of freedom. It ranges from 0 (poor fit) to 1.0 (perfect fit) and higher values indicate better fit, but no absolute threshold levels for acceptability have been established (Hair et al., 2006). In this research, GFI is used to compare the fit of different models.

Adjusted Goodness-of-Fit Index (AGFI): The adjusted goodness-of-fit is an extension of the goodness-of-fit index, adjusted by the ratio of degrees of freedom for the proposed model to the degrees of freedom for the null model. It is quite similar to the parsimonious normal fit index (PNFI) described below, and a recommended acceptance level is a value greater than or equal to .90 (Hair et al., 2006).

Comparative Fit Index (CFI): Comparative fit index[25] (CFI) represents comparisons between the estimated model and a null model. Values lie between 0 and 1.0 and larger values indicate superior goodness-of-fit. If the CFI is less than one, then the CFI is always greater than the TLI. Because CFI has many desirable properties including its relative, but not complete, insensitivity to model complexity, it is among the most widely used indices. The CFI has been found to be more appropriate in a model development strategy (Hair et al., 2006).

Root Mean Square Error of Approximation (RMSEA): The root mean square error of approximation (RMSEA) calculates the discrepancy from the population per degree of freedom.[26] The value is representative of the goodness-of-fit that could be expected if the model was estimated in the population, not just the sample drawn for the estimation. Browne and Cudeck (1993) suggest that a value of the RMSEA of about .05 or less indicates a close fit of the model in regard to the degrees of freedom, while a value of about 0.08 or less provides a reasonable error of approximation. A model with a RMSEA greater than 0.1 should be rejected. Browne and Cudeck (1993) report that, based on an empirical examination of several measures, the RMSEA is best suited in a confirmatory or competing models strategy with large samples. These accords with the models developed in this research.

The ultimate goal of any of these fit is to assist the researcher in discriminating between acceptability and unacceptably specified models. However, the *standard indicates good fit* is still a question. Academic journals are replete with SEM results citing a .90 value on key indices, such as the CFI or GFI, as indicating an acceptable model. Some may cite precedent from a previously published paper. Others times the .90 rule is simply cited as a reasonable ad hoc rule with no support from previous research. However, the main aim of using SEM in this research is not to get the good fit but to test the existing theory and practice in corporate governance. SEM is not used to get a good fit; it is used to test theory (Hair, et. al., 2006).

5.2 Definition of the Variables

Latent Variable: Boards of Directors Monitoring

According to agency theory, the main task of the board is to monitor and control management on behalf of the shareholders. Boards of directors are responsible in adopting monitoring characteristics to ensure that management behaviour and actions are consistent with the interest of the owners. To ensure this there are different observed variables that reflect the monitoring ability of the board of directors. This study captures the monitoring ability of the board through the various board and board committee characteristics as detailed in the literature review section. This paper manually collected the information of number of directors, non-executive and independent directors, background expertise of directors and number of meetings of boards and the various committees from the Aspect financial database.

Observed Variable: Firm Performance

Previous empirical studies use different types of performance measures to observe the relationship between monitoring variables and performance. As an indicator of performance, this study uses return on assets (ROA) and earning per share (EPS).

Measuring Accounting Performance: Return on Assets (ROA)

To measure the accounting performance this study uses the ROA measures. ROA is calculated on the basis of accounting information that is disclosed in the financial report of the firm. The following discussion describes the particular calculation procedure followed to calculate these ratios.

ROA tells an investor how much profit a company generated for each dollar in assets. ROA measures a company's earnings in relation to all of the resources it had at its disposal (the shareholders' capital plus short and long-term borrowed funds). Thus, it is considered the most stringent test of return to shareholders. If a company has no debt, the return

25 $CFI = \frac{d(\text{Null Model}) - d(\text{Proposed Model})}{d(\text{Null Model})}$

26 $RMSEA = v[(c^2/df - 1) /(N - 1)]$

on assets and return on equity figures will be the same.

There are two acceptable ways to calculate ROA. The lower the profit per dollar of assets, the more asset-intensive a business is. The higher the profit per dollar of assets, the less asset-intensive a business is. All things being equal, the more asset-intensive a business, the more money must be reinvested into it to continue generating earnings. ROA is a key measure of a company's profitability; it is calculated by earnings-before-interest divided by its total assets. Return on assets essentially shows how much profit a company is making on the assets used in its business:

$$\text{Return on Asset (ROA)} = \frac{\text{Earning before interest}}{\text{Total assets less outside equity interest}}$$

Judge and Zeithaml (1992) in using the LISREL statistical method, found a positive relationship between board involvement in the strategic decision process and the average return on assets of companies.

Measuring Market Performance: Earning per Share (EPS)

EPS is a key ratio used in share valuations. It shows how much of the company's profits, after tax, each shareholder owns. This is the single most popular variable in dictating a share's price. EPS is an important measure as it indicates the profitability of a company. The portion of a company's profit allocated to each outstanding share of common stock is calculated as:

$$\text{Earning Per Share (EPS)} = \frac{\text{Net Income - Dividends on preferred stock}}{\text{Average outstanding shares}}$$

In a study involving 139 companies from Fortune 500 firms, Pearce II and Zahra (1991) found that there is a positive relationship between participative boards and earnings per share of firms.

Control Variables: Industry and Size

Industry may have several effects on monitoring. For example, banking and finance, and insurance companies have higher monitoring costs involved which results in greater scrutiny of the firms and increased incentives for high quality financial statements. This study controls for the industry effect on firm performance by using the industry adjusted performance measurement. To obtain industry adjusted performance measures firms are classified in different industry categories according to the four digits GICS industry classification. Industry averages are calculated for each performance measures and then find the difference with each performance measures for the firm.

Another variable that this study controls for is the size of the firm. As mentioned before moral-hazard problems are more prominent in large firms (Jensen, 1993). Large firms are under more internal and external monitoring which eventually increases the difficulty of monitoring and also increase the cost of monitoring. This study uses total assets as a proxy of firm size as a control valuable to make the result easily comparable.

6. Sample Selection and Data Sources

This study uses archival sources, such as the *Aspect Financial Analysis* database (hereafter Aspect) and the *Connect 4* and the *Aspect Huntley Financial Analysis* (hereafter Aspect Huntley), for collecting data. The Aspect provides comprehensive data for all ASX listed companies. Similarly the Connect 4 provides annual reports of the top listed companies. The information provided in these two websites is used to track and collect information on corporate monitoring variables, i.e., boards of directors, committees, external auditors and shareholders information. The Aspect Huntley, one of Australia's most comprehensive sources of data for listed companies, was used to collect performance measures information. This information was cross-checked with the annual reports obtained from Aspect and Connect 4. The ASX website was used to obtain industry classifications for each company.

This study uses data of three years observations from top 500 companies listed in the Australian Stock Exchange (ASX). This observation period of 2001 – 2003 was chosen to include the most recent data available at the time of commencing this study. And the choice of publicly listed companies was based on the most efficient data available and the presence of audited financial statements. Initially all the listed companies are downloaded from the ASX website for the year 2001. Next step is to sort them according to their market capitalisation. Form the total list the top 500 companies are selected for 2001. The same procedures are followed for year 2002 and 2003. All corporate governance and financial information are based on year end financial information, which helps to keep consistency in the collected information. In this study a repeated measures design is used, where the same data are collected on each variables across three consecutive periods. In relation to industry classification, most of the companies in the sample operate in the financial sector (22%), followed by material sector (18%). Remaining 60 percent are involved in energy, industrials, consumer discretionary, consumer staples, health care, information technology, telecommunication and utilities.

In examining the relationship between monitoring and performance, this study addressed the impact of monitoring characteristics on the lagged year performance. It is reasonable to believe that the affect of monitoring characteristics will be reflected in the next year's performance. For example, when assessing the effects of board monitoring in 2001 this study relates it to performance in 2002. Because of

this lag, performance measurements for the years 2001 – 2004 are collected.

The details of the sample selection procedures are shown in Table 1. Since performance measures are the independent variables any companies without having the required information on firm performance in the lagged year are excluded from the sample. Therefore, companies de-listed or suspended in the following year are excluded. Consequently, 25 companies in year 2001, 28 companies in 2002 and 37 companies in year 2003 were excluded. In total this study excludes 90 firms from the sample of 1500. It includes the companies that changed their name during the study period. Of these 1500 companies, 1410 have all the required information for this analysis.

Characteristics of the Board Monitoring Variables

Results in Table 1 reveal that average board size is 6 directors (maximum=17, minimum=3). Average number of board meetings is 10 per annum (maximum=37, minimum=2). More than 82% of the firms (1,158) have a board with a majority of independent members. In the sample, there are 168 firms (12%) where the roles of chair and CEO are occupied by one person. One hundred fifty three firms (7%) do not have any audit committee meetings, and 66% of firms (929) have 2 to 4 audit committee meetings per annum. Eighty percent of firms (1,143) have 1 to 4 independent directors on the board. In 383 (27%) companies there are no financially literate members on the board and in 229 (16%) all directors are financially literate. In the sample, 79% (1,117 firms) have between 1 to 3 meetings per annum. Only 288 (20%) firms have a nomination committee. Amongst these firms, 239 have 1 to 4 nomination committee meetings per annum. Only in three committees are there no non-executive directors (Table 1).

[TABLE 1 ABOUT HERE]

7. Results

The results were generally consistent across different year's models when examining the impacts on board monitoring on firm performance. The discussion of the results will begin with observing the overall fitness of the model followed by discussion on research findings. This study found that hypothesised models fit the data well in terms of absolute, relative and parsimonious fitness for the year 2001, 2002 and 2003.

Boards of directors are the most active monitors of management. The efficiency in monitoring improves when independent, financially literate directors make up the board, and the CEO and Chair are separate persons. Yet, whether monitoring by boards affects firm performance remains unresolved in the literature. The following results show that such monitoring has a consistent and statistically significant relationship with firm performance after controlling for endogeneity and multicollinearity problem.

[TABLE 2 - 4 ABOUT HERE]

The data for monitoring and accounting performance for 2001 lagged year (Table 2, 3 and 4) show that the impacts of board of directors on ROA is statistically significant ($P<0.01$), suggesting different board and its' committees' monitoring work together to have an effect on the return on assets. This result is consistent with other lagged year models of 2002 and 2003.

[TABLE 5 - 7 ABOUT HERE]

Same result was found when examining the relationship between board monitoring and EPS. Lagged year model of 2001, 2002 and 2003 showing a statistically significant relation, suggesting that different board and committees' monitoring mechanisms work together to have an effect on the earning per share (Table 5, 6 and 7) show a consistent finding of a significant result in all of the above year.

This study contradict previous research by Hermalin and Weisbach (1991), Mehran (1995), Klein (1998) and Bhagat and Black (2000), who examined the influence of board monitoring on firm performance and failed to find any relationships. However, those studies (mentioned above) did not consider the multicollinearity and endogeneity issues of board monitoring. MacAvoy and Millstein (1999) argue that one reason for not finding any relationship is because they have used "old" data – that is, data that preceded the board monitoring role in the current-year and performance rather than using lagged year performance. Therefore, after controlling the endogeneity and multicollinearity issues, this study finds difference result when examining board monitoring with performance.

Sensitivity Tests

Although not reported, this study examined the robustness of the results by taking only the firms which existed in the three year sample period. In this respect there are 285 companies among the top 500 which are listed throughout the study periods of 2001 – 2003. However, the results are consistent with the full sample.

8. Conclusion

This study examines the effect of board monitoring on firm performance in Australian context. SEM analysis suggests that there is a significant relation of monitoring by boards of directors and firm performance. In a broader context the finding of this study will add value in the discussion of the board

monitoring features and their influence on firm performance.

There are already some steps to enhance the corporate governance code of conduct, which have initiated some changes in the corporate governance and reporting practices. For example the Australian Stock Exchange (ASX) has recently released their corporate governance guidelines will sets out the principles of best practice for companies listed on the ASX. Among others Government's Corporate Law Economic Reform Program (CLERP 9) also suggests reforming and adopting principles that provide good governance practice.

There are some limitations of this study: firstly, this study does not includes all the companies listed on the ASX. The result might be different if all the companies are included in the sample. Secondly, this study was done for the years 2001 – 2003, which do not include the change that took place in the year 2004.

Future studies should take into consideration of these limitations. The findings suggest that there are significant positive direct relationships between the board monitoring characteristics and firm performance. There remains a need for additional studies to address how the monitoring variables specifically work as complementary and substitute mechanisms to each other as suggested by Rediker and Seth (1995); Agrawal and Knoeber (1996); Fernández and Arrondo (2005).

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Table 1. Descriptive statistics regarding monitoring measures

(Sample Size: 1410 Company –years)

	Combined Sample				2001				2002				2003			
Monitoring Variables	Minimum	Maximum	Mean	S.D	Minimum	Maximum	Mean	S.D	Minimum	Maximum	Mean	S.D.	Minimum	Maximum	Mean	S.D
Size of the Boards (number)	3	17	6.31	2.11	3	17	6.24	2.153	3	17	6.31	2.132	3	15	6.38	2.07
Boards of Directors' meetings (per year)	2	37[27]	10.78	4.33	2	33	10.7	4.284	2	32	10.8	4.217	2	37	10.80	4.52
Proportion of Independent directors on the Boards	0	1	0.71	0.195	0	1	0.71	0.203	0	1	0.7	0.202	0	1	0.71	0.18
Proportion of Financial Literate directors on the Boards	0	1	.4139	.2529	0	1	.4365	.2508	0	1	.4350	.2486	0	1	0.36	.25
Dual role of Chair and CEO (0,1)	0	1	0.12	0.320	0	1	0.14	0.344	0	1	0.14	0.343	0	1	0.08	0.27
Number of Audit Committee Meetings (per year, N = 1265)	0	15	3.03	2.02	0	12	2.83	1.85	0	14	3.04	2.024	0	15	3.24	2.16
Proportion of Independent members on Audit Committee (N=1265)	0	1	0.69	0.35	0	1	0.67	0.351	0	1	0.7	0.357	0	1	0.71	0.36
Proportion of Financially Literate directors on the AC (N=1265)	0	1	0.44	0.34	0	1	0.46	0.34	0	1	0.46	0.34	0	1	0.39	0.34
Number of Compensation Committee Meetings (per year, N = 815)	0	15	1.49	2.12	0	14	1.32	1.98	0	15	1.51	2.245	0	15	1.64	2.11
Proportion of Non-Executive Directors on RC (N = 815)	0	1	0.87	0.223	0	1	0.87	0.218	0	1	0.88	0.196	0	1	0.85	0.249
Number of Nomination Committee Meetings (per year, N =288)	0	17	0.55	1.57	0	17	0.45	1.626	0	13	0.56	1.674	0	13	0.66	1.41
Proportion of Non-Executive Directors on NC (N = 288)	0	1	0.89	0.208	0	1	0.91	0.208	0	1	0.90	0.203	0	1	0.88	0.213

Table 2. ROA 2001 (T+1)

Latent Variable	Measurement Variable	Standardized Regression Weights	Sig.	Sq Multiple Correlation
Board	BSIZ	.749	.000	.561
	BDM	.232	.000	.054
	PBIND	.277	.000	.077
	PBFL	.094	.080	.009
	CECH	.269	.000	.073
Audit Committees	ACM	.603	.000	.363
	PAI	.388	.000	.150
	PAFL	.306	.000	.094
Compensation	RCM	.428	.000	.183
Committees	PRNE	.399	.000	.159
Nomination	NCM	.252	.000	.064
Committees	PNNE	.499	.000	.249
Control Variable	SIZE	.701	.000	.491
Performance	ROA 2001 (T+1)	.209	.000	.044

(CMIN/DF = 3.165, GFI = .942, AGFI = .902, CFI - .925, RMSEA = .039)*
*Here,
CMIN/DF = Normed Chi-Squire (Acceptable limit 1 – 5; 1 = best fit, 5 = reasonable fit)
GFI = Goodness of fit index (acceptable limit => .90)
AGFI = Adjusted goodness of fit index (acceptable limit => .90)
CFI = Comparative fir index (0 = no fit at all, 1 = perfect fit)
RMSEA = Root mean squire (.05 or less indicate a close fit)
(Source: Hair, et al. 2006)

Table 3. ROA 2002 (T+1)

Latent Variable	Measurement Variable	Standardized Regression Weights	Sig.	Sq Multiple Correlation
Board	BSIZ	.704	.000	.496
	BDM	.139	.018	.019
	PBIND	.217	.000	.047
	PBFL	.046	.395	.002
	CECH	.238	.000	.057
Audit Committees	ACM	.617	.000	.380
	PAI	.396	.000	.157
	PAFL	.211	.000	.044
Compensation	RCM	.483	.000	.233
Committees	PRNE	.414	.000	.171
Nomination	NCM	.395	.000	.156
Committees	PNNE	.481	.000	.231
Control Variable	SIZE	.695	.000	.483
Performance	ROA 2002 (T+1)	.105	.046	.011

(CMIN/DF =3.165, GFI = .942, AGFI = .902, CFI = .925, RMSEA = .039)

Table 4. ROA 2003 (T+1)

Latent Variable	Measurement Variable	Standardized Regression Weights	Sig.	Sq Multiple Correlation
Board	BSIZ	.671	.000	.450
	BDM	.254	.000	.064
	PBIND	.239	.000	.057
	PBFL	.201	.000	.040
	CECH	.178	.000	.032
Audit Committees	ACM	.644	.000	.414
	PAI	.448	.000	.201
	PAFL	.285	.000	.081
Compensation	RCM	.566	.000	.320
Committees	PRNE	.500	.000	.250
Nomination	NCM	.476	.000	.226
Committees	PNNE	.529	.000	.280
Control Variable	SIZE	.665	.000	.443
Performance	ROA 2003 (T+1)	.097	.065	.009

(CMIN/DF =3.165, GFI = .942, AGFI = .902, CFI = .925, RMSEA = .039)

Table 5. EPS 2001 (T+1)

Latent Variable	Measurement Variable	Standardized Regression Weights	Sig.	Sq Multiple Correlation
Board	BSIZ	.743	.000	.552
	BDM	.224	.000	.050
	PBIND	.278	.000	.077
	PBFL	.096	.074	.009
	CECH	.267	.000	.071
Audit Committees	ACM	.606	.000	.368
	PAI	.392	.000	.154
	PAFL	.300	.000	.090
Compensation	RCM	.433	.000	.187
Committees	PRNE	.397	.000	.158
Nomination	NCM	.264	.000	.069
Committees	PNNE	.509	.000	.259
Control Variable	SIZE	.702	.000	.492
Performance	EPS 2001(T+1)	.267	.000	.071

(CMIN/DF =3.252, GFI = .940, AGFI = .898, CFI = .923, RMSEA = .040)

Table 6. EPS 2002 (T+1)

Latent Variable	Measurement Variable	Standardized Regression Weights	Sig.	Sq Multiple Correlation
Board	BSIZ	.705	.000	.498
	BDM	.128	.028	.016
	PBIND	.217	.000	.047
	PBFL	.053	.320	.003
	CECH	.233	.000	.055
Audit Committees	ACM	.613	.000	.375
	PAI	.394	.000	.155
	PAFL	.206	.000	.042
Compensation	RCM	.476	.000	.227
Committees	PRNE	.410	.000	.168
Nomination	NCM	.391	.000	.153
Committees	PNNE	.481	.000	.231
Control Variable	SIZE	.704	.000	.495
Performance	EPS 2002 (T+1)	.267	.000	.071

(CMIN/DF =3.252, GFI = .940, AGFI = .898, CFI = .923, RMSEA = .040)

Table 7. EPS 2003 (T+1)

Latent Variable	Measurement Variable	Standardized Regression Weights	Sig.	Sq Multiple Correlation
Board	BSIZ	.681	.000	.464
	BDM	.237	.000	.056
	PBIND	.242	.000	.058
	PBFL	.201	.000	.040
	CECH	.170	.001	.029
Audit Committees	ACM	.637	.000	.405
	PAI	.436	.000	.190
	PAFL	.274	.000	.075
Compensation	RCM	.560	.000	.314
Committees	PRNE	.487	.000	.237
Nomination	NCM	.471	.000	.222
Committees	PNNE	.526	.000	.276
Control Variable	SIZE	.680	.000	.463
Performance	EPS 2003 (T+1)	.200	.000	.040

(CMIN/DF =3.252, GFI = .940, AGFI = .898, CFI = .923, RMSEA = .040)