

# **Board Monitoring and Firm performance: Controlling for Endogeneity and Multicollinearity**

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## **Abstract**

Purpose of this study is to investigate the relation between board monitoring and firm performance after controlling the endogeneity and multicollinearity problem that exist in most corporate governance research. Prior studies failed to establish any significant relationship between board monitoring and firm performance because of not properly control for endogeneity and multicollinearity problems. After controlling for both problems the coefficient of board monitoring increases and becomes significant.

This study use different board monitoring characteristics: board size, number of board meetings, proportion of independent directors, background of directors CEO/Chair duality; and different characteristics of audit, compensation and nomination committees: number of meetings and proportion of independent directors. Firm performance is measured using return on assets and earning per share. Panel data of the top 500 listed companies from Australian Stock Exchange (ASX) is used over 3 years, from 2001 to 2003. This study concludes that the difference in the result is because addressing the problem properly using structural equation modelling.

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# **Board Monitoring and Firm performance: Controlling for Endogeneity and Multicollinearity**

## **1. INTRODUCTION:**

This study examines whether board monitoring mechanisms affect firm performance after controlling the endogeneity and multicollinearity problem. The board monitoring mechanisms are more likely interrelated to each other and work together. For this possible interdependence, firm performance is likely to align manager-shareholder interest with the efficiency of a bundle of board variables, rather than with any single mechanism (Rediker and Seth, 1995; Agrawal and Knoeber, 1996; Fernández and Arrondo, 2005). If the board monitoring variables are considered to be work separately this might give rise to the multicollinearity problem (Fernández and Arrondo, 2005). Considering this we consider the interrelation among the monitoring devices of the board and its committees to avoid the problem of multicollinearity. We also consider the argument of endogeneity issue by MacAvoy and Millstein (1999), who address that failure of previous studies to find any relationship between board monitoring and performance could be because of considering current year performance. Therefore, to address the endogeneity issue we consider lagged years performance in this study.

Corporate governance research is especially based on agency theory. Agency theory is concerned with aligning the interests of owners and managers (Jensen and Meckling, 1976; Fama, 1980; Fama and Jensen, 1983) and is based on the premise that there is an inherent conflict between the interests of owners and management (Fama and Jensen, 1983). In the manager-shareholder conflict framework there are two potential problems: firstly, the moral hazard of managerial behaviour is pursuing self-interests at the expense of shareholders' interest; and secondly, information asymmetry regarding managerial action and firm performance. The first problem, moral hazard, is present at the core of every manager-shareholder relation. This is inherent in any situation whereby one person employs another to perform some

function in the other's interest, and which involves the delegation of decision making authority. Moral hazard problems are likely to be more evident in larger companies (Jensen, 1993). While large firms attract more external monitoring, increasing firm size expands the complexity of the firm's contracting nexus exponentially. In the presence of second problem, i.e., information asymmetry, a manager is in a better position to pursue self-interest, i.e., will choose a set of decisions that will maximise his or her own utility. These decisions in general differ from the set of decisions required to maximise the wealth of the shareholders (Berle and Means, 1932). For this reason, the demands of board monitoring through disclosure of information arise to reduce the agency conflict between management and shareholders.

There are three specific motivations for doing this study. Firstly, most of the studies which examine the use of board monitoring as a control mechanisms to reduce agency conflict are based on the US, UK, Japan and Germany. Little research has been done in Australian context (Bonn, 2004). After the failure of HIH, Ansett, One Tel and Harris Scarfe, Australian regulators have become more concerned about the effectiveness of board monitoring to reduce the agency problem. Investigation of the Australian board structure is important to differentiate between the roles of market specific factors versus governance characteristics in determining corporate monitoring. Secondly, some recent studies (for example, Fernández and Arrondo, 2005) have emphasised the interrelationships among the corporate governance variables. Using this idea, this study is motivated to consider the inter-relation among the monitoring variables and examine the effect on performance. Thirdly, this study is motivated by the regulatory importance of board monitoring. In response to the strong demand for improving corporate governance, the Australian Stock Exchange (ASX) has set up guideline for good corporate governance practice to improve standards of board monitoring. Findings of this study will add value to this policy setting process, which will in turn reduce agency cost and information asymmetry. This study will improve the confidence of the investors. After worldwide corporate collapse, investors' demand for effective scrutiny and better investors' protection from the market. Good corporate governance practice is generally argued as the preconditions for investors' protection and investment decisions. This study provides insights of

board monitoring mechanisms which provide depth knowledge about how monitoring mechanisms work in firms and will eventually increase the confidence of the investors.

This study also contributes to statistical modelling. As this study use structural equation modelling for constructing the research question, this will open a new avenues for using structural equation modelling is accounting research. Other field of researches already use structural equation modelling; for example, this is popular in other field of study, including education, psychology, sociology, health, demography, biology, and genetics (Hair et al., 2006; Marcoulides and Schumacker, 1996). Many studies on business for example, management, marketing, finance, international business, organisational behaviour, human resources management are now using structural equation models to describe relationships among variables.

The rest of the paper is organised as follows. Section 2 provides a theoretical discussion on board and its committees monitoring. Section 3 outlines the research hypothesis. Section 4 discusses the method used in this study. Section 5 defines the variables used in this study. Section 6 presents the sample selection techniques and Section 7 discusses the results. And Section 8 provides the concluding comments.

## **2. LITERATURE REVIEW:**

The board of directors act as an active monitor of the corporate governance system. Boards are responsible for ensuring that management act for the interest of the owners. Boards of directors and its committees have the power to recruit and take any necessary action against the executive managers and to ratify and monitor important decisions (Jensen 1993; Fama and Jensen 1983). In the absence of any formal theory for constructing an effective board, different guidelie is followed for the construction of the board and to enhance its monitoring ability (Hermalin and Weisbach, 2001).

Previous researches provide emphasise on different characteristics of the board for effective monitoring. For example, Jensen (1993) considers board composition, board leadership and board size as the pre requisite to capture the monitoring ability. With

respect to board composition, greatest interest has been placed on the proportion of outside directors. For example, Agerwal and Knoeber (1996) examine a range of governance variables and find that board independence is the only governance mechanism which consistently affect corporate value. With respect to board leadership, researchers examine the conflict of interest due to the dual role of CEO and Chair by the same person. With respect to size, the general finding is that smaller boards are more effective (e.g., Jensen, 1993 and Lipton and Lorsch, 1992) because they can hold more candid discussions and make decisions more quickly; furthermore small boards are easy to control by the management than large boards.

Research by Hermalin and Weisbach (2001), which covers almost all aspects of board monitoring, report a number of findings. First, smaller boards and the greater proportion of outside directors each appear to lead management teams to take actions that are more in line with shareholders interests. Second, boards with greater proportions of outsiders are more likely to remove a poorly performing manager, as are smaller boards. Third, firms whose boards have greater proportions of outsiders appear to make better acquisition-related decisions. Fourth, firms with smaller boards set CEO compensation plans that are more sensitive to CEO performance. However, as their findings are based on the USA, it is will be interesting to know the extent to which they will apply in the Australian context.

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 board better represent stockholder interests when they are smaller, contain more outside directors and having separate person holding the CEO and chairperson position (Jensen, 1993). The background and the experience of the directors have an influence on the monitoring ability of the directors (DeZoort, 1997)

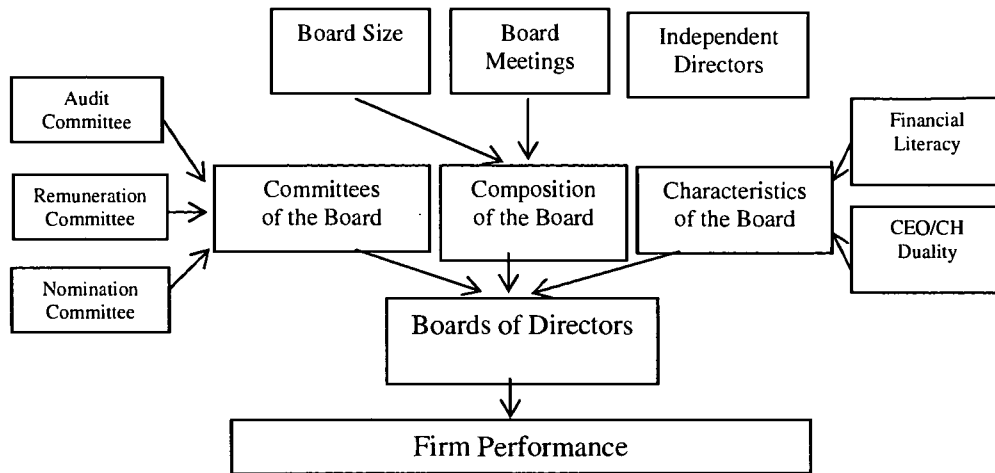


Figure 1: Board monitoring and firm performance

### 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 (Jensen, 1993 and Lipton and Lorsch, 1992). Empirical results in Eisenberg et al. (1998) support the notion that smaller boards enhance firm performance. In opposite to 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 are 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).

## **Board composition**

Independent directors<sup>1</sup> 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 of any financial benefit from the firm, are more likely to protect shareholders interest and reduce agency problem. Empirical results also support the argument that outside directors are more effective monitors and a critical disciplining device for managers (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.

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<sup>1</sup> 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.

Independent non-executive directors in 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<sup>2</sup> in the year 1985. 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.

### **Number of meeting**

Major decisions of the firm are made on the board meeting. Therefore, it is important that directors spend 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 meeting is important rather than quantity of time. However, quantity of director's time is emphasised by shareholder activist groups, 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.

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<sup>2</sup> They use Australian Accounting Standard AASB 1017: Related Party Disclosure to classify directors into three categories for better reflection of the board composition.



### **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.

### **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.

### **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<sup>3</sup>. 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

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<sup>3</sup> 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.

companies to have an audit committee<sup>4</sup>. 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, 2003).

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 independent 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 management from control (Barkema and Mejjia, 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.

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<sup>4</sup> 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.

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, 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 turn 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 mechanisms. In this framework key mechanisms 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).

### **3. HYPOTHESIS DEVELOPMENT**

In the presence of agency problem, a board of directors acts as an agent of shareholders. John and Senbet (1998) mention that the monitoring role of the board of directors is an important component of corporate governance. As per the basic principle of corporate governance, shareholders elect the board of directors and the board of directors selects the top management. Therefore, a company's board is the primary internal corporate governance mechanism responsible for monitoring management. Researchers have evaluated the effects of board monitoring through the use of proxy variables such as size of the board, number of meetings, proportion of outsiders, number of financial literate directors, separation of the role of CEO and Chair. Thus with the presence of these components it is expected that the board will provide better monitoring which will be reflected on firm performance. The above discussion leads to the following seven hypotheses related to boards of directors and firm performance:

The first hypothesis will measure the accounting performance of the firm, which will be 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 and will

eventually force them to report correct accounting information. This accounting information will have an impact on the accounting based performance of the firm.

*H<sub>1</sub> If other things remain the same, monitoring by boards of directors affects the return on asset of a firm.*

The following hypothesis will measure the market performance of the firm, which will be reflected in earning per share. In the presence of boards monitoring management will disclose correct accounting information which will have an impact on the market. These disclosures of information by management will have an impact on market performance measures of the firm.

*H<sub>2</sub> If other things remain the same, monitoring by boards of directors affects the earning per share of a firm.*

#### **4. METHOD**

This paper use SEM to find out the relationship between the board monitoring and firm performance. Statistical tools such as multiple regressions, multivariate analysis of variance, discriminate analysis and other techniques provide researchers with powerful tools to address a wide range of corporate governance issues. However, the major limitation of these techniques is that it is only possible to examining a single relationship at a time. Although multivariate analysis of variance allow for multiple dependent variables, still they only represent a single relationship between the dependent and independent variables (Hair et al, 1998). The main difference between SEM and other multivariate techniques is the use of separate relationships for each of a set of dependent variables, i.e., SEM estimates a series of separate, but interdependent, multiple regression equations simultaneously by specifying the structural model. Same 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, these have the ability to incorporate latent variables into the analysis. A latent variable is a unobserved concept that can only be approximated by observable or measurable variables. Secondly, in all multivariate analysis it is assumed that there is no error in the variables. However, it is well known 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 improves 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 general 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.

## **5. 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 mechanisms 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 board size, number of

meetings, the proportion of independent directors, the financial literacy of the board members and separation of the CEO and Chair position, the proportion of independent directors in the audit committee, number of literate financial members on the audit committee, the number of meetings on audit, Compensation and nomination committees, and the proportion of non-executive directors in compensation and nomination committees.

Judge and Zeithaml (1992) suggest that the board size may be either positively or negatively associated with firm performance. Core et al. (1997) find that the large board may be associated with less effective monitoring. Lipton and Lorsch argue that “ the norms of behaviour in most boards are dysfunctional” (1992: 66); Too large a board creates the problem of cohesiveness and coordination. Conversely, a very small board cannot take advantage of the pool of experience and counsel (see e.g., Bonn, 2004). This study uses the variable “BSIZ” to reflect the number of directors on the board. This information is collected manually from the Aspect financial database.

The number of board meetings is closely monitored by the shareholders of the firm. Although there is no standard number of meetings set for the firm it is expected that the boards of directors will meet as many times as they need to make consensus decisions. Too many or too few meetings both are a sign of a problem. If there are too many meetings it reflects that there is a problem in the firm and directors meet frequently to solve that problem. Again very few meetings are an indication of less willingness of the directors to reach a consensus decision making. Therefore, the number of meetings is expected to have an impact on the monitoring of the performance. This study uses “BDM” to reflect the number of meetings held by the board in particular year. This information is collected manually from the Aspect financial database.

It is important to mention that this paper use the directors classification which is used in a number of previous studies, including Baysinger and Butler (1985); Brickley, Coles and Terry (1994); MacAvoy et al., (1983); Hermalin and Weisbach (1988). Directors who are currently employed by the firm are classified as insiders; directors



who are not an employee of the firm but have significant connection to the firm are consider as grey, and directors who are not an employee of the firm and have no substantial interest in the business, are consider as independent directors. This paper considers directors who are a major suppliers, lawyers, investment bankers, or member of outside consultants to the firm, as grey directors.

Shareholders are interested to see more independent directors on the board because independent directors are considered as effective and independent decision makers. Independent directors can act as idle monitor as they do not have any direct or indirect interest to the firm. Therefore, the proportion of the independent directors is captured as one of the monitoring components of board monitoring. This study uses the term “PBI” to reflect the proportion of independent directors on the board. This study excludes grey directors from the list of directors for having the number of independent directors on the board, and then divides the number of independent directors by the total number of directors. The information on number of non-executive and independent directors is collected manually from Aspect financial database.

In general it can be argued that the financial literacy of the directors helps them to better understand the performance of the firm. When directors have a strong background in any area of business such as accounting, finance, management, international business or in economics it is expected that they will work as an effective and efficient monitor. Similarly, if the directors have more than five years experience in business as top management (such as CEO, CFO or chair of the board) they become an expert in financial matters of the firm which can be a substitute of financial literacy. This study assumes that the financial literacy of the directors will help them to monitor the performance of the firm in a more effective and efficient manner. This study uses the term “BFL’ to reflect the number of financial directors on the board. This information is manually collected from the Aspect financial database.

The separation of the role of Chair and CEO is important for better monitoring of performance. When the same person holds both positions they might not work for the

best interest of the shareholder and there is a possibility that they will employ his/her own people in the board. Although duality role is rare in the Australian context, this study considers the possible implication of this variable (See for example, Boyd, 1994; Daily and Dalton, 1994; Main et al., 1994; Zajac and Westphal, 1994). This study uses the term “CECH” to reflect whether the CEO and Chair is the same person. The duality variable was defined as a dummy variable equal to “1” if the position of CEO and the chairperson were combined and “0” otherwise. This information is manually collected from the Aspect financial database.

To properly monitor the board, audit committees need to consist of independent directors. This study uses the term “PAI” to reflect the proportion of independent directors in the audit committee. To calculate the independent director this study excludes grey directors from the total number of non-executive directors in the audit committee and divides them by the total number of directors on audit committees. This paper manually collected the information of number of directors, non-executive and independent directors in audit committees from the Aspect financial database.

Financial literacy of audit committee members is another important factor for properly monitor management. The criteria for considering the audit committee members as financially literate are similar to the board. This study uses the term ‘AFL’ to reflect the number of financial directors in the audit committee, which is collected from Aspect financial database.

The number of meetings of different committees i.e., audit, compensation and nomination committees was used to capture the time spent by the directors to monitor through committees. Although there is no standard number of meetings set for each committee, it is expected that the committees will meet as frequently as needed to make consensus decisions. This study uses the term “ACM”, “RCM” and “NCM” to reflect the number of meetings in the audit, compensation and nomination committees and is collected from the Aspect financial database.

The proportion of non-executive directors in the compensation and nomination committee is collected using the same method as Lambert et. al., (1993) and Westphal and Zajac (1994). This measure is an important factor to determine monitoring function of the committee. When the proportion is higher the committees are expected to function more independently and provide more effective and efficient decision. This study uses the term “PRNE” and “PNNE” to reflect the proportion of non-executive directors in the compensation and nomination committees; a similar measure is use by Daily et. al., (1993). This information is collected 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 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:

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

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, Australia's one of the most comprehensive source data for listed companies, was used to collect performance measures information. This information is 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 use 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 mechanisms on the lagged year performance. It is reasonable to believe that the affect of monitoring mechanisms will be reflected in the next year's performance. Considering this when use monitoring of year 2001 this study examines affect on lagged year (2002). This study also includes effect on current year performance for compare with lagged year. Because of this performance measurements for the year 2001 – 2004 are collected.

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

### **Characteristics of the board monitoring variables**

In the study 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, 239 companies have 1 to 4 nomination committee meetings per annum. Only in three committees there are no non-executive directors (Table 1).

**[TABLE 1 ABOUT HERE]**

## **7. RESULTS**

In this section results of relationships between board monitoring variables and firm performance will be presented and discussed. The first research question is whether board monitoring mechanisms have an effect on return on assets of a firm:

*H<sub>1</sub> If other things remain the same, monitoring by boards of directors affects the return on asset of a firm.*

And the second research question is whether board monitoring mechanisms have an effect on earning per share of a firm.

*H<sub>2</sub> If other things remain the same, monitoring by boards of directors affects the earning per share of a firm.*

The results were generally consistent across different years (2001 – 2003) 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.

## [TABLE 2 - 7 ABOUT HERE]

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.

The data for monitoring and accounting performance for 2001 lagged year (Table 3) show that the impacts of board of directors on ROA is significant. This result is consistent with other lagged year models of 2002 and 2003 (Table 4 and Table 6). Same result was found when examining the relationship between board monitoring and EPS. Lagged year model of 2001, 2002 and 2003 (Table 3, Table 5 and Table 7) shows 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. 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 exist 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 suggest 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 and their influence on firm performance. Specially, the current emphasise on improving the monitoring mechanisms will be helpful with this findings.

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 do not includes all the companies listed in the ASX. The result might be different if all the companies are included in the sample. Secondly, this study was done for the year 2001 – 2003, which do not include the change that take place in the year 2004.

Future study can be done by taking into consideration of these limitations. The findings suggest that there is a relation between the board monitoring mechanisms and firm performance. Therefore, there is a need for additional study to address how the monitoring variables work as a 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)

Monitoring Variables	Combined Sample				2001				2002				2003			
	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	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)**

<b>Latent Variable</b>	<b>Measurement Variable</b>	<b>Standardized Regression Weights</b>	<b>Sig.</b>	<b>Sq Multiple Correlation</b>
Board	BSIZ	.749	.000	.561
	BDM	.232	.000	.054
	PBIND	.277	.000	.077
	PBFL	.094	.080	.009
	CECH	-.269	.000	.073
Audit	ACM	.603	.000	.363
Committees	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-Square (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 fit index (0 = no fit at all, 1 = perfect fit)

RMSES = Root mean square (.05 or less indicate a close fit)

(Source: Hair, et al. 2006)

**Table 3: EPS 2001 (T+1)**

<b>Latent Variable</b>	<b>Measurement Variable</b>	<b>Standardized Regression Weights</b>	<b>Sig.</b>	<b>Sq Multiple Correlation</b>
Board	BSIZ	.743	.000	.552
	BDM	.224	.000	.050
	PBIND	.278	.000	.077
	PBFL	.096	.074	.009
	CECH	-.267	.000	.071
Audit	ACM	.606	.000	.368
Committees	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 4: ROA 2002 (T+1)**

<b>Latent Variable</b>	<b>Measurement Variable</b>	<b>Standardized Regression Weights</b>	<b>Sig.</b>	<b>Sq Multiple Correlation</b>
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
Compensation Committees	PAFL	.211	.000	.044
	RCM	.483	.000	.233
Nomination Committees	PRNE	.414	.000	.171
	NCM	.395	.000	.156
Control Variable Performance	PNNE	.481	.000	.231
	SIZE	.695	.000	.483
	ROA 2002 (T+1)	.105	.046	.011

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

**Table 5: EPS 2002 (T+1)**

<b>Latent Variable</b>	<b>Measurement Variable</b>	<b>Standardized Regression Weights</b>	<b>Sig.</b>	<b>Sq Multiple Correlation</b>
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
Compensation Committees	PAFL	.206	.000	.042
	RCM	.476	.000	.227
Nomination Committees	PRNE	.410	.000	.168
	NCM	.391	.000	.153
Control Variable Performance	PNNE	.481	.000	.231
	SIZE	.704	.000	.495
	EPS 2002 (T+1)	.267	.000	.071

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

**Table 6: ROA 2003 (T+1)**

<b>Latent Variable</b>	<b>Measurement Variable</b>	<b>Standardized Regression Weights</b>	<b>Sig.</b>	<b>Sq Multiple Correlation</b>
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
Compensation Committees	PAFL	.285	.000	.081
	RCM	.566	.000	.320
Nomination Committees	PRNE	.500	.000	.250
	NCM	.476	.000	.226
Control Variable Performance	PNNE	.529	.000	.280
	SIZE	.665	.000	.443
	ROA 2003 (T+1)	.097	.065	.009

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

**Table 7: EPS 2003 (T+1)**

<b>Latent Variable</b>	<b>Measurement Variable</b>	<b>Standardized Regression Weights</b>	<b>Sig.</b>	<b>Sq Multiple Correlation</b>
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
Compensation Committees	PAFL	.274	.000	.075
	RCM	.560	.000	.314
Nomination Committees	PRNE	.487	.000	.237
	NCM	.471	.000	.222
Control Variable Performance	PNNE	.526	.000	.276
	SIZE	.680	.000	.463
	EPS 2003 (T+1)	.200	.000	.040

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