**The Influence of Corporate Governance on Management Earnings Forecast Behaviour in a Low Private Litigation Environment**


## Abstract

We examine the influence of three important external corporate governance mechanisms – continuous disclosure regulatory reform, analyst following and ownership concentration and one important internal corporate governance mechanism – board structure on the likelihood, frequency, horizon, precision and accuracy of management earnings forecasts in the low private litigation environment of New Zealand. Based on a sample of 1,082 management earnings forecasts issued by 125 firms listed on the New Zealand Exchange during the 1998-2007 financial reporting periods, we provide strong evidence that these four corporate governance mechanisms have a significant influence on management earnings forecast behaviour after effectively controlling for endogeneity, multicollinearity and self-selection bias problems. Specifically, firms monitored by effective corporate governance mechanisms were more inclined to pre-empt their earnings announcements with earnings forecasts (overall, non-routine and quantitative) and provide these earnings forecasts more frequently. These earnings forecasts issued by these firms were less optimistically biased. In addition, firms having more directors with accounting expertise on their boards and audit committees were more likely to provide earnings forecasts with longer horizon and smaller forecast error. Board size and the existence of a formally established audit committee are shown to have a positive impact on forecast error. A possible interpretation of our findings is that effective corporate governance mechanisms are able to be more beneficial in monitoring corporate behaviour in circumstances where private enforcement is a less viable alternative. Our findings should have important implications for the other low private litigation environments and thus contribute to the debate regarding the value of corporate governance internationally. These findings may also have important implications for other high private litigation environments such as the United States given the high economic and social costs that have been identified as being related to private litigation.

# 1 Introduction

Management earnings forecasts represent one of the key disclosure mechanisms through which management communicates their expectation of a firm's earnings to the capital markets prior to the release of mandatory earnings announcements. The important role performed by management earnings forecasts in the efficient functioning of the capital markets, including reducing information asymmetry, lowering cost of capital and improving investor confidence, has motivated a great deal of research investigating the various aspects of management earnings forecasts.

Despite the rich literature on management earnings forecasts, there is much less theory and empirical evidence about how firms choose certain forecast characteristics over which management has the most control, than about why firms decide to issue earnings forecasts and the subsequent impact of this earnings forecast behaviour on the capital markets. Prior research studies examining the association between corporate governance and management earnings forecast behaviour tend to focus on specific aspects of corporate governance rather than a combined set of external and internal corporate governance mechanisms.

In addition, most research on management earnings forecasts is conducted in the high private litigation environment of the United States (the U.S.) where the private litigation risk is posited to be a primary determinant of management earnings forecast behaviour. The threat of private enforcement might act as substitute for corporate governance mechanisms as an effective tool to manage and supervise management activities including their earnings forecast behaviour (La-Porta et al., 2006). This means that the impact of corporate governance mechanisms on management earnings forecast behaviour could be dependent on the effectiveness of the alternative mechanism of private enforcement. Therefore, a major impediment to researchers providing empirical evidence about the relative merits of various corporate governance mechanisms versus private enforcement is the difficulty associated with isolating the incremental impacts of corporate governance and private enforcement. This is especially the case in the U.S. where the strength of various external corporate governance mechanisms and private enforcement is high. It is possible that the incremental benefits of various corporate

governance mechanisms could be stronger and/or more easily identifiable in a low private litigation environment.

Similar to other low litigation environments, including Australia and Canada, the effectiveness of private litigation taken by shareholders and others in New Zealand impaired by a combination of high costs, an onerous burden of individual reliance proof, and damages determined by judges rather than juries resulting in low damage awards (Macfarlane, 2008). This low litigation environment is further reinforced in New Zealand where there is a prohibition on contingent fees and alternative funding, which results in the need for up-front payments for litigation. New Zealand also has a unique anti-litigious culture exemplified by the inception of the Accident Compensation Amendment Act 1974, which bars any compensation for personal injuries or death (Todd, 2005). While this disallowance to sue for personal injuries or death does not impact on the rights of investors to sue for financial losses, it does mean that there are very few incidences to sue for financial losses, and that there are very few incidences of high damage awards to encourage litigation. Therefore, New Zealand provides a unique opportunity to study the impact of corporate governance on management earnings forecast behaviour in the absence of any viable private enforcement alternative.

We examine the influence of three important external corporate governance mechanisms – continuous disclosure regulatory reform, analyst following and ownership concentration and one important internal corporate governance mechanism – board structure on the likelihood, frequency, horizon, precision and accuracy of management earnings forecasts using a sample of 1,082 management earnings forecasts issued by 125 firms listed on the New Zealand Exchange (NZX) during the 31 January 1998 to 31 December 2007 financial reporting periods. Our results provide strong evidence that the four corporate governance mechanisms have a significant influence on management earnings forecast behaviour after effectively controlling for endogeneity, multicollinearity and self-selection bias problems. Specifically, firms monitored by effective corporate governance mechanisms were more inclined to pre-empt their earnings announcements with earnings forecasts (overall, non-routine and quantitative) and provide these earnings forecasts more frequently. The earnings forecasts issued by these firms were less optimistically biased. In addition, firms having more directors

with accounting expertise on their boards and audit committees were more likely to provide earnings forecasts with longer horizon and smaller forecast error. Board size and the existence of a formally established audit committee are shown to have a positive impact on forecast error.

Our study contributes to the literature in several ways. First, our study is the first study on management earnings forecasts in a low private litigation environment in general and in New Zealand in particular which comprehensively analyses the influence of a combined set of external and internal corporate governance mechanisms. Second, our findings provide strong evidence of the effectiveness of the monitoring role of these mechanisms and most of these findings are different from those reported in the prior literature. Third, we effectively combine the use of exploratory principal component factor analysis, two-stage least squares and controls for self-selection bias, which has not previously been combined in the prior management earnings forecast research. Our study also departs from all prior research studies of management earnings forecasts as it considers analyst following as an important component of the external corporate governance monitoring system faced by firms rather than as a control variable.

The remainder of our study is organised as follows. Section 2 summarises relevant corporate governance and management earnings forecast literature and describes the research hypotheses. An overview of the research design is provided in section 3. Section 4 presents the results and our study concludes in section 5.

## 2 Literature Review and Hypothesis Development

### *2.1 The Importance of Corporate Governance*

Corporate governance assumes its importance where an agency problem or conflict of interests exists among members of a firm. It is especially useful to ameliorate those issues arising from the separation of ownership and control and where such agency problems cannot be satisfactorily contracted away due to significant uncertainty, information asymmetry and contracting costs (Hart, 1995). According to Shleifer and Vishny (1997), corporate governance deals with mechanisms by which suppliers of finance to corporations could protect their own interests.

Healy and Palepu (2001) explain the demand for corporate disclosure arising from information asymmetry and agency conflicts between managers and outside investors which prevent investors from efficiently allocating financial resources. Mitigating this problem necessitates the use of some form of communication between managers and investors. Financial reporting and voluntary disclosure provide important means for managers to communicate their firms' performance to outside investors in order to facilitate and enhance resource allocation decisions (Healy and Palepu, 2001). Firms must provide disclosure through regulated financial reports (e.g. annual, half-yearly, quarterly reports) and other regulatory filings (e.g. the filing of intra-period disclosures for certain events in the U.S., or continuous disclosure requirements in the U.K., Australia and New Zealand). In the presence of information asymmetry, maintaining good communication about firm performance with outside investors can reduce the agency costs through signalling, increasing stock liquidity, reducing bid-ask spreads and cost of capital, avoiding or reducing litigation costs, and maintaining management reputation.

It is argued that the agency costs could be mitigated by effective corporate governance mechanisms through enhanced corporate disclosure. Corporate governance mechanisms are introduced to mitigate agency problems associated with inadequate disclosure and ensure that managers act in the best interests of shareholders (Jensen and Meckling, 1976). According to Bushman and Smith (2003), corporate governance mechanisms serve two important purposes: (1) to ensure that minority shareholders receive reliable information about the value of firms and that a company's managers and large shareholders do not cheat them out of the value of their investments, and (2) to motivate managers to maximise firm value instead of pursuing personal objectives. Therefore, it is posited that effective corporate governance mechanisms lead to improvement in corporate disclosure behaviour in general, and management earnings forecast behaviour in particular.

### *2.2 Four Aspects of Corporate Governance and the Measures of their Effectiveness*

According to Gillan (2006), corporate governance mechanisms are put in place to reduce agency problems. In the broadest sense, these mechanisms could arise externally from: law/regulation, capital, control, labour and product markets, capital market information and analysis, the market for services, and private sources of external oversight. Alternatively, they could be internal mechanisms, for example: board of directors, managerial incentives, a firm's capital structure, bylaw and charter provisions, and internal control systems. As discussed in section 2.1, effective corporate governance mechanisms are expected to lead to enhanced corporate disclosure transparency which should include improved management earnings forecast behaviour. In the context of this study, there are three external corporate governance mechanisms – continuous disclosure regulatory reform, analyst following and ownership concentration and one internal corporate governance mechanism – board structure that are considered to be the most relevant.

### *2.2.1 Continuous Disclosure Regulatory Reform*

In 2002, as part of a broad reform of securities regulation in New Zealand, the Securities Markets Act 1988 was amended to include statutory sanctions to support the NZX's continuous disclosure listing rules. The intention of this continuous disclosure reform in New Zealand was to create a fully informed environment where firms update the market with all material information on a timely basis (Securities Markets Amendment Act 2002, Section 19A). The amended Act requires NZX-listed firms to disclose any material information to investors as they arise. Failure to comply with the amended Act, and/or orders made by the Securities Commission in relation to continuous disclosure, can lead to civil penalties of up to $300,000 and criminal penalties of up to $30,000.

Even though the effectiveness of this continuous disclosure regulatory reform has been challenged due to a lack of evidence of strong enforcement by either the NZX or the Securities Commission, several New Zealand research studies provide consistent empirical evidence supporting the effectiveness of this regulatory intervention. The information component of the bid-ask spread for less liquid stocks, the dispersion of analysts' earnings forecasts and the stock market reaction to earnings announcements

and management earnings forecasts, all decreased in the post-reform period (Frijns et al., 2008; Dunstan et al., 2009; Huang et al., 2009).

Some studies have documented the positive impact of this regulatory reform on corporate behaviour. Huang et al. (2009) reveal that firms increased the number of price-sensitive disclosures released to the capital market and improved the timeliness of their earnings announcements in the post-reform period. Dunstan et al. (2010) find that firms were more likely to issue an earnings forecast to pre-empt their earnings announcements and that forecasting firms provided a greater number of earnings forecasts which were also more precise and accurate in the post-reform period.

### *2.2.2 Analyst Following*

Analysts, employed by investment banks, brokerage houses and large institutional investors, are argued to perform a monitoring role reducing the opportunities available to managers to capture excessive pecuniary and non-pecuniary benefits from shareholders (Jensen and Meckling, 1976). The monitoring activities by analysts are specialised due to the expertise developed by these institutions and individuals in respect of each specific institution. Given that managers' decisions are closely monitored and publicised by analysts, their monitoring activities could help to discipline managers. All else constant, managers will be more likely to engage in opportunistic activities in the absence of such monitoring activities by analysts.

Prior research studies provide evidence consistent with the monitoring role by analysts. Using the number of analysts following a firm as a proxy for the level of analysts' monitoring activities, Moyer et al. (1989) document that analysts' monitoring acted as an efficient device to reduce agency costs associated with the separation of ownership and control. Chung and Jo (1996) argue that the monitoring activities of analysts motivate managers, thus reducing agency costs. In fact, they provide consistent evidence that the intensity of analysts' monitoring activities had a positive impact on the market value of firms. Additionally, Chan et al. (2008) show that firms which were followed by a greater number of analysts were more likely to issue earnings forecasts and inclined to forecast earnings more frequently.

### *2.2.3 Ownership Concentration*

The theoretical debate on the benefits of concentrated ownership as an effective corporate governance mechanism results into two competing hypotheses: the efficient-monitoring and the opportunistic hypotheses. The supporters of the efficient-monitoring hypothesis propose that large shareholders are better at monitoring managers' activities compared to small shareholders as they are able to absorb greater monitoring and takeover costs (Shleifer and Vishny, 1986), execute their vested fiduciary responsibilities with greater expertise (Pound, 1988), and acquire more precise signals of management efforts (Berle and Means, 1932; Huddart, 1993). According to the opportunistic hypothesis, large shareholders could exercise their absolute controlling rights in the firm, exerting a powerful influence on managers in order to maximise their own benefits at the cost of small shareholders (Makhija and Patton, 2004). Large shareholders and managers could also find it mutually advantageous to work together and this co-operation would reduce the ability of other shareholders to monitor managers' activities (Pound, 1988; Holmstrom and Tirole, 1993).

Prior research studies provide empirical evidence consistent with both the efficient-monitoring and opportunistic hypotheses. Bethel et al. (1998) document that firms experienced improvements in performance after activist shareholders purchased a block of shares. According to Kang and Shivdasani (1995), firms with large shareholders were more likely to have a high management turnover rate. Luo et al. (2006) show that the existence of outside block ownership is associated with improved corporate disclosure behaviour. However, firms with more concentrated ownership were less likely to provide voluntary earnings disclosures (Lakhal, 2005).

Prior research studies also provide evidence for an increase (a decrease) in the benefits of concentrated ownership at a low (high) level of ownership concentration. For instance, Makhija and Patton (2004) find that the extent of voluntary disclosure is positively related to ownership concentration at a low level of ownership concentration but is negatively related to ownership concentration at a high level of ownership concentration. Navissi and Naiker (2006) report a non-linear relationship between institutional ownership and firm value by documenting a positive (negative) association with firm value at lower (higher) levels of ownership.

It is apparent from both theoretical arguments and empirical evidence that the efficient-monitoring hypothesis is supported at low levels of ownership concentration while the opportunistic hypothesis is supported high levels of ownership concentration. Therefore, it could be argued that concentrated ownership would only enhance the effectiveness of the overall corporate governance structure at a low level of ownership concentration.

*2.2.4 Board Structure*

The board of directors are viewed as being "the lynchpin of corporate governance" (Gillan, 2006, p. 385). Fama and Jensen (1983) characterise the responsibilities of the board of directors as being both the ratification of management decisions and the monitoring of management performance. The board of directors has the power to hire, fire, and compensate the senior management team and to ratify and monitor important corporate decisions. The board of directors are also responsible for the oversight of managers' actions on behalf of the shareholders to ensure that these actions are aligned with shareholders' interests (Fama and Jensen, 1983). It is posited that the monitoring role of the board of directors as an effective corporate governance mechanism is dependent on the degree of independence, size, meeting frequency, and the degree of financial expertise of the board itself and its sub-committees (John and Senbet, 1998; Karamanou and Vafeas, 2005).

First, the separated appointment of a Chairman from a CEO and the larger proportion of non-executive directors on the board and its sub-committees are argued to enhance the monitoring performance of the board (Fama and Jensen, 1983). Ho and Wong (2001) find that firms which combined the roles of Chairman and CEO tended to withhold unfavourable information. The duality of the Chairman and CEO roles is also associated with lower levels of voluntary disclosure (Gul and Leung, 2004; Cheng and Courtenay, 2006). According to Chen and Jaggi (2000), firms with a higher percentage of non-executive directors on the board were more engaged and provided more comprehensive statutory disclosures. Firms with a higher level of board and audit committee independence were less likely to engage in earnings management (Klein, 2002).

Second, board size is argued to enhance board monitoring performance, as appointing more relevant directors to the board would enhance board knowledge and provide

greater capacity to share the monitoring responsibilities (Song and Windram, 2004; Karamanou and Vafeas, 2005). However, larger boards are posited to be less flexible and less efficient due to higher coordination costs and less effective communication (John and Senbet, 1998; Coles et al., 2008). According to Bradbury et al. (2006), firms with a greater number of directors on the board tended to have high earnings quality. However, Yermack (1996) documents a negative relationship between board size and firm value. Given that most NZX-listed firms are relatively small, the first effect could be reasonably argued to dominate the second.

Third, board meeting frequency is argued to be indicative of the amount of time the board spends on monitoring management, thus enhancing the board monitoring performance (Vafeas, 1999). According to Vafeas (1999), the board of directors of firms which had experienced share price declines were inclined to meet more frequently and, as a result, operating performance improved in the following year. Carcello et al. (2002) document that greater board meeting frequency is associated with higher audit fees. Therefore, they conclude that board meetings complement auditor oversight. Additionally, Abbott et al. (2004) show that firms where the audit committee met at least four times per year were less likely to be required to restate their financial reports.

Lastly, the presence of directors with accounting or financial expertise on the board and audit committee is argued to enhance the board monitoring performance (Karamanou and Vafeas, 2005). According to Felo et al. (2003), firms with a higher percentage of directors with accounting or financial expertise on the audit committee tended to have higher financial reporting quality. Firms which had at least one financial expert on board were less likely to be required to restate earnings (Abbott et al., 2004). Interestingly, Defond et al. (2005) document that accounting expertise, not the overall financial expertise, is a determinant of the improvement of an audit committee's ability to ensure high financial reporting quality, especially for firms with a strong corporate governance structure. Therefore, the presence of an accounting expert on the board and the audit committee enhances board monitoring performance.

### *2.3 The Influence of Corporate Governance on Management Earnings Forecast Behaviour*

The management earnings forecast literature suggests that managers' decision to provide earnings forecasts can involve significant benefits as well as costs (Hirst et al., 2008). According to Trueman (1986), management earnings forecasts give investors a more favourable assessment of the managers' ability to anticipate economic changes and provide reliable production plans, thus translating into a higher firm market value. Management earnings forecasts could reduce the level of information asymmetry in the capital markets (Coller and Yohn, 1997). Frankel et al. (1995) suggest that firms' ability to assess the capital markets more frequently is enhanced by the issuance of management earnings forecasts. Management earnings forecasts could also assist firms to reduce litigation and reputation costs (Skinner, 1994, 1997; Field et al., 2005). In addition, management earnings forecasts could facilitate better clarity and investor understanding (Graham et al., 2005).

Other researchers have identified the costs associated with management earnings forecasts. The disclosure of earnings forecasts could increase proprietary, litigation and reputation costs (Francis et al., 1994; Bamber and Cheon, 1998; Baginski et al., 2004). Specifically, firms with high litigation risk were less likely to provide earnings forecasts (Francis et al., 1994). According to Wang (2007), firms with higher proprietary information costs reduced their public disclosures following the introduction of the Regulation Fair Disclosure 2000 (Reg FD).

Given the benefits and costs associated with management earnings forecasts, managers will balance these benefits and costs when determining the optimal level of earnings forecast disclosure for their firms. Corporate governance factors will act as external shocks to this disclosure equilibrium. The impact of these types of shock will vary depending on the degree of effectiveness of the corporate governance factors and other environmental factors, including the current effectiveness of the existing private litigation environment.

La-Porta et al. (2006) propose that the strength of private litigation could be considered as an integral aspect of the investor protection environment. A jurisdiction which features a strong culture or private litigation could provide a natural monitoring mechanism for shareholders to prevent management's opportunistic behaviour. The threat of private enforcement might act as a substitute to the corporate governance

mechanisms as an effective tool to manage and supervise management activities. Therefore, the impact of corporate governance mechanisms on management earnings forecast behaviour could be dependent on the effectiveness of the alternative private enforcement mechanism.

Tinaikar (2008) investigates the association of one aspect of board structure – one internal corporate governance mechanism – the proportion of outside directors and management earnings forecast behaviour across two legal regimes with unequal private litigation costs – the U.S. and Canada. His findings reveal that outside directors and private enforcement act as substitutes when determining management earnings forecast behaviour. Specifically, although the frequency of management earnings forecasts is positively associated with the percentage of outside directors in both the U.S. and Canada, the association is stronger in Canada than in the U.S. the proportion of outside directors is positively related only to the precision of earnings forecasts issued by Canadian firms, not the U.S. firms. In addition, while forecast bias is negatively related with the percentage of outside directors in both the U.S. and Canada, the negative association is stronger in Canada.

Based on La-Porta et al.'s (2006) proposition and given the findings of Tinaikar (2008), it is possible to argue that the incremental benefits of corporate governance mechanisms could be stronger and/or be more easily identifiable in an environment when low private litigation prevails.

### *2.4 Statement of Hypotheses*

As argued in section 2.1, effective corporate governance mechanisms are expected to lead to improvements in corporate disclosure behaviour in general and management earnings forecast behaviour in particular. Based on La-Porta et al.'s (2006) theoretical argument and Tinaikar's (2008) empirical evidence provided in section 2.3, the positive impact of effective corporate governance mechanisms on management earnings forecast behaviour is posited to be strong in a low private litigation environment of New Zealand. Therefore, the hypotheses regarding to forecast likelihood and frequency are stated as follows:

Forecast Likelihood

*H1a: Firms that are monitored by more effective corporate governance mechanisms are more likely to issue management earnings forecasts.*

*H1b: Firms that are monitored by more effective corporate governance mechanisms are more likely to issue non-routine management earnings forecasts.*

Forecast Frequency

*H2a: The frequency of management earnings forecasts is higher for firms that are monitored by more effective corporate governance mechanisms.*

*H2b: The frequency of non-routine management earnings forecasts is higher for firms that are monitored by more effective corporate governance mechanisms.*

Following the decision to release the earnings forecasts to the market, firms must then decide the qualitative characteristics of the earnings forecasts they are reporting (King et al., 1990). Three key qualitative characteristics of management earnings forecasts are forecast horizon, forecast precision and forecast accuracy which capture the timeliness, specificity and accuracy of the earnings forecasts, respectively (Hirst et al., 2008).

Prior research on management earnings forecasts documents significant variation in earnings forecasts' characteristics across different jurisdictions which could be explained by differences in private litigation risk. Specifically, there is consistent evidence that firms from lower private litigation risk jurisdictions were more likely to provide timelier and more precise earnings forecasts (Baginski et al., 2002; Frost, 2004). While U.S. firms tended to provide more pessimistic earnings forecasts to pre-empt litigation risk (Skinner, 1994), Japanese firms consistently issued over-optimistic earnings forecasts as they faced no obvious legal sanctions (Kato et al., 2009).

An informative and credible management earnings forecast is expected to be timely, precise and accurate (i.e. smaller forecast error and less optimistically biased) (King et al., 1990; Tinaikar, 2008). In the low private litigation environment of New Zealand, it

is argued that corporate governance as an alternative monitoring mechanism for monitoring managerial self-interest as manifested in the firms' earnings forecast policies could enhance the timeliness, precision and accuracy of management earnings forecasts. Therefore, the following hypotheses regarding forecast horizon, precision and accuracy are tested:

Forecast Horizon

*H3: The horizon of management earnings forecasts is longer for firms that are monitored by more effective corporate governance mechanisms.*

Forecast Precision

*H4a: Firms that are monitored by more effective corporate governance mechanisms are more likely to issue quantitative (open-ended, range and point) management earnings forecasts.*

*H4b: The frequency of quantitative (open-ended, range and point) management earnings forecasts is higher for firms that are monitored by more effective corporate governance mechanisms.*

*H4c: The precision of management earnings forecasts is higher for firms that are monitored by more effective corporate governance mechanisms.*

Forecast Accuracy

*H5a: The error of management earnings forecasts is smaller for firms that are monitored by more effective corporate governance mechanisms.*

*H5b: The management earnings forecasts are less optimistically biased for firms that are monitored by more effective corporate governance mechanisms.*

## 3 Research Design

### *3.1 Study Period and Sample*

The selected study period for this study is an eleven-year period encompassing all market announcements made by firms regarding the financial years ending between 31 January 1998 and 31 December 2007. The starting financial year ending on 31 January 1998 is chosen as it is the earliest financial year where the disclosure data are made available on the NZX database. The ending financial year ending on 31 December 2007 is selected to avoid any contamination that may arise from the further amendments to the continuous disclosure provisions under the Securities Markets Amendment Act 2002 which came into force on 29 February 2008. These amendments give the Securities Commission the power to seek pecuniary penalties and compensation from individual directors and officers involved in any continuous disclosure breaches.[1]

The sample selection process commences with the 317 firms listed in the Events section of the NZX database as at 17 September 2008. After a deduction of 113 firms for which data are not available on the NZX database, 31 firms which are listed on the New Zealand Alternative Market (NZAX) and 48 firms not issuing at least 5 annual reports since being listed on the New Zealand Stock Market (NZSX) or firms with missing market announcements, the final sample comprises 125 firms in total. Previous research studies often delete firms with non-June financial reporting dates and with non-December financial reporting dates in the Australia and the U.S., respectively (Gallery et al., 2002; Hirst et al., 2008). Given the significantly mixed financial reporting dates among NZX-listed firms, the sample selection process does not follow this similar step. Therefore, the final sample consists of firms with 31 January, 28 February, 31 March, 31 May, 30 June, 31 July, 1 August, 31 August, 30 September or 31 December financial reporting dates. These 125 firms cover a total of 897 firm-years during which they issued a total of 32,690 market announcements. All 32,690 announcements were carefully read to identify announcements containing management earnings forecasts. Among these 32,690 market announcements, there are 1,082 announcements including management earnings forecasts. These 1,082 management earnings forecasts include both forecasts of half-yearly and annual earnings. Among these 897 firm-years, there are 265 firm-years where firms fully disclosed the level of independence, size, number

[1] This decision to avoid the confounding impact of the further amendments to the Securities Markets Act 1988 is supported by the Securities Commission's recent launching of a case against Nuplex Industries Limited and its current and former directors for the breaches of continuous disclosure requirements.

of meetings and level of accounting expertise of boards of directors and audit committees. Among these 265 firm-years, the total of management earnings forecasts issued is 350. This sub-sample of 265 firm-years and 350 management earnings forecasts provides a basis for additional tests regarding the influence of various board structure indicators including the level of independence, size, number of meetings and level of accounting expertise of the boards of directors and audit committees on management earnings forecast behaviour.

Details about this sample selection process are provided in Table 1.

[INSERT TABLE 1 HERE]

### *3.2 Data Sources*

The NZX listing status was extracted from the Events section of the NZX database as at 17 September 2008. The cross-listing status was taken directly from the NZX helpline services. The analyst following information was taken from the Forecasts section of the NZX database. All market announcements were extracted from the Announcements section of the NZX database. Data related to ownership concentration and board structure were carefully extracted from the annual reports which are provided in the Annual Reports section of the NZX database. Accounting and market-related data were obtained from either the NZX database or the Datastream database.

### *3.3 Classifications of Management Earnings Forecasts*

#### *3.3.1 Forecast Event*

Following Dunstan et al. (2010), the identified management earnings forecasts are classified according to their underlying event (routine or non-routine) associated with the announcements. Routine event announcements are defined as periodic announcements common to all firms as required under the NZX listing rules or in common practice. They include all mandatory periodic financial reports (e.g. quarterly, half-yearly, preliminary and annual reports) and other periodic releases associated with repetitive events (e.g. chairman's addresses at the Annual General Meeting and letters to shareholders). All other announcements are considered non-routine events.

### *3.3.2 Forecast News Content*

Consistent with Ajinkya et al. (2005) and Dunstan et al. (2010), management earnings forecasts are classified as good (bad) news if the forecast news content reveals favourable (unfavourable) earnings prospects relative to the previous earnings announcements or the most recent management earnings forecasts if management earnings forecasts have been provided since the previous earnings announcements. Management earnings forecasts are classified as neutral if the earnings forecasts indicate no expected change in earnings.

### *3.3.3 Forecast Horizon*

Forecast horizon captures the timeliness of the management earnings forecasts. Forecast horizon refers to the difference in time between a management earnings forecast and its corresponding financial reporting date. Assuming that the management earnings forecast is accurate, a longer forecast horizon provides investors with information on a timelier basis. We follow Baginski et al. (2002) by defining forecast horizon as the number of calendar days until financial year-end, regardless of whether the management earnings forecasts are related to a half-yearly or annual period.

### *3.3.4 Forecast Precision*

Forecast precision is defined as the level of specificity in the management earnings forecasts. Following Ajinkya et al. (2005), we employ an ordinal coding scheme where precision is coded as 0, 1, 2 and 3 for qualitative, open-ended, range and point estimates, respectively. Qualitative earnings forecasts are those where firms provide a general impression (non-numeric) expectation about their earnings performance. An example of a qualitative earnings forecast is that "we expected improved earnings performance this year". Open-ended earnings forecasts are earnings forecasts where firms specify a lower or an upper bound for the expected earnings performance. An example of an open-ended earnings forecast is that "we expect the net profit for this year will be greater than $1 million" or "we are certain that the net income for this year will be lower than $2 million". Range earnings forecasts contain a numerical range of expected firms' earnings performance. An example of a range earnings forecast is that

"the net profit for this year will be between $1 million and $2 million". Point earnings forecasts are the most specific, indicating a single numerical figure about the firms' expected earnings performance. An example of a point earnings forecast is that "we are confident that the net income for this year will be $1.5 million".

#### *3.3.5 Forecast Accuracy*

Forecast error and forecast bias are employed to measure the accuracy level of range and point management earnings forecasts. Consistent with Ajinkya et al. (2005), we define forecast error as the absolute value of the difference between forecasted and actual earnings per share deflated by the share price at the beginning of the financial year and forecast bias as the difference between forecasted and actual earnings per share deflated by the share price at the beginning of the financial year.

### *3.4 Measures of Four Corporate Governance Mechanisms*

#### *3.4.1 Continuous Disclosure Regulatory Reform*

The statutory-backed continuous disclosure reform came into effect from 1 December 2002 under the Securities Markets Amendment Act 2002. Therefore, 1 December 2002 is chosen as the cut-off between the pre-reform and post-reform periods. All firm-years with financial reporting dates ending before 1 December 2002 are classified to be in the pre-reform period. Accordingly, all firm-years with financial reporting dates ending after 1 December 2002 are classified to be in the post-reform period. Among 897 firm-years studied in this study, there are 374 firm-years (41.69%) related to the pre-reform period and 523 firm-years (58.31%) related to the post-reform period (see Table 5, Panel A).

#### *3.4.2 Analyst Following*

Most prior research studies use the number of analysts following the firm as a proxy for the level of analyst following (Ajinkya et al., 2005; Karamanou and Vafeas, 2005; Chan et al., 2008; Tinaikar, 2008). The use of the number of analysts following the firm could be justified by the fact that most of these studies are based on large publicly listed firms in the U.S., Canada or Australia where large publicly listed firms are usually followed

by analysts. In New Zealand, not all NZX-listed firms are followed by analysts (Dunstan et al., 2009). Also, the study focuses on all NZX-listed firms, irrespective of firm size. Therefore, whether or not a firm is followed by analysts is used as a proxy for the analyst following of this firm. Among 897 firm-years studied in this study, there are 487 firm-years (54.29%) during which the firms were not followed by analysts and 410 firm-years (45.71%) during which the firms were followed by analysts (see Table 5, Panel A).

*3.4.3 Ownership Concentration*

Prior research studies on voluntary disclosures in general and management earnings forecasts in particular used the Herfindahl index as a proxy for ownership concentration (Makhija and Patton, 2004; Ajinkya et al., 2005). According to Woerheide and Persson (1993), this Herfindahl index is considered as the best of the five measures of portfolio diversification and its explanatory power is regarded to be adequate for general use. We adopt the Herfindahl index to measure the level of ownership concentration. The Herfindahl index is calculated as follows.

$$\text{Herfindahl } (OWNCON) = \sum_{i=1}^{n} \left(\frac{\text{The total number of shares held by shareholder i}}{\text{The total number of shares outstanding}}\right)^2$$

In this Herfindahl index, n is the top five largest shareholders. The average ownership concentration for 897 firm-years is 0.185 (see Table 5, Panel A). According to the concentration benchmark provided by Brown and Warren-Boulton (1988), a Herfindahl index greater than 0.18, between 0.1 to 0.18 and smaller than 0.1 indicates a high, medium and low level of concentration, respectively. Therefore, the average of 0.185 is considered to be high according to this concentration benchmark.

Research studies on the relationship between ownership structure and management earnings forecasts encounter the common problem of endogeneity between these two measures (Ajinkya et al., 2005). While different ownership structures could be associated with different disclosure strategies, superior corporate disclosure could attract shareholders to invest into firms (Healy et al., 1999; Bushee and Noe, 2000). Although ownership concentration could be influenced by management earnings

forecast strategies, it is also reasonable to argue that management earnings forecast strategies are influenced by the level of ownership concentration.

In order to address the concern about the endogenous relationship between ownership concentration and management earnings forecast behaviour and to detect a one-way causal effect of ownership concentration on management earnings forecast behaviour, a two-stage least squares method is employed. Shareholder intensity as measured by the ratio of the total number of shareholders to the total number of shares outstanding is chosen as an instrumental variable. This shareholder intensity variable could be theoretically argued to determine the level of ownership concentration while not being related to management earnings forecast behaviour.

In the first stage, the ownership concentration measure – the Herfindahl index of concentration of top five largest shareholders is regressed on this instrumental variable and the fitted values of the Herfindahl index are obtained. The fitted values of the Herfindahl index represent the portion of ownership concentration which might not be explained by management earnings forecast behaviour. In the second stage, the fitted values of the Herfindahl index of concentration of top five largest shareholders replace the original Herfindahl index in the models used to test the impact of ownership concentration on the likelihood, frequency, horizon, precision and accuracy of management earnings forecasts.

*3.4.4 Board Structure*

As explained in section 2, the effectiveness of board structure is related to many aspects of board structure including the degree of independence, size, meeting frequency and accounting expertise on the board of directors and its sub-committees. In the context of this study, the degree of independence, size, meeting frequency and the level of accounting expertise on the board of directors and its audit committee are considered as indicators for board effectiveness. Therefore, the board structure indicators are initially identified and measured as follows:

| | |
|---|---|
| *CEOCHAIR* | A dichotomous variable taking the value of 1 for separate CEO and Chairman and 0 otherwise. |

| | |
|---|---|
| *BRDINDP* | The percentage of non-executive directors on the board. |
| *BRDSIZE* | The number of directors on the board. |
| *BRDMEET* | The number of board meetings held during the year. |
| *BRDACCEXP* | The percentage of directors with accounting expertise on the board. |
| *AC* | A dichotomous variable taking the value of 1 if the firm formally establishes an audit committee. |
| *ACINDP* | The percentage of non-executive directors on the audit committee. |
| *ACSIZE* | The number of directors on the audit committee. |
| *ACMEET* | The number of audit committee meetings held during the year. |
| *ACACCEXP* | The percentage of directors with accounting expertise on the audit committee. |

Prior research studies examining the impact of board structure on management earnings forecast behaviour use only single indicators to measure the effectiveness of board structure (Ajinkya et al., 2005; Karamanou and Vafeas, 2005; Chan et al., 2008; Tinaikar, 2008). We use numerous indicators for board structure as outlined above which capture the key aspects of board effectiveness previously measured in the literature. As reported in Table 2, there is significant correlation among these board structure indicators; therefore, in order to avoid a multicollinearity problem and to capture the essence of board effectiveness as represented by these indicators, we employ exploratory principal component factor analysis (PCA). The use of PCA reduces the large number of highly collinear board structure indicators into factors that retain most of the variance as in the original board structure indicators.

[INSERT TABLE 2 HERE]

The PCA identifies the underlying dimensions of board structure and determines which indicators are associated with each factor. All factors with an eigenvalue greater than unity are retained. The reduced solution is then rotated using an orthogonal rotation which allows the retained factors to be correlated in order to enhance the interpretability of the PCA solution. In order to interpret the retained factors, it is important to

determine which indicators have a substantive association with each retained factor. Each retained factor is associated with those indicators which have factor loadings greater than 0.400. Each retained factor is assigned a name based on the characteristics of the indicators determined to be associated with the factor.

Across all 897 firm-years in the final sample, firms consistently disclosed only the level of independence and size of the board of directors and whether there existed a formally established audit committee in their annual reports. Therefore, only four board structure indicators including *CEOCHAIR*, *BRDINDP*, *BRDSIZE* and *AC* are incorporated into the PCA for 897 firm-years. As shown in Table 3, Panel A, the initial PCA of these four board structure indicators indentifies two interpretable board structure factors including *BRDINDP* (board independence) and *BRDSIZEAC* (board size and audit committee).

The two *CEOCHAIR* and *BRDINDP* indicators are associated with the *BRDINDP* factor with rotated factor loadings of 0.823 and 0.794, respectively. The two *BRDSIZE* and *AC* indicators are related to the *BRDSIZEAC* factor with rotated factor loadings of 0.738 and 0.813, respectively.

Among the final sample of 897 firm-years, there are 265 firm-years where firms fully disclosed the level of independence, size, meeting frequency and level of accounting expertise on both boards of directors and audit committees in their annual reports. Therefore, nine board structure indicators including *CEOCHAIR*, *BRDINDP*, *BRDSIZE*, *BRDMEET*, *BRDACCEXP*, *ACINDP*, *ACSIZE*, *ACMEET* and *ACACCEXP* are incorporated into the PCA for the sub-sample of 265 firm-years. As apparent from Table 3, Panel B, the initial PCA of these nine board structure indicators indentifies four interpretable board structure factors including *BRDAC_INDP* (board and audit committee independence), *BRDAC_SIZE* (board and audit committee size), *BRDAC_MEET* (board and audit committee meeting) and *BRDAC_ACCEXP* (board and audit committee accounting expertise).

The three indicators *CEOCHAIR*, *BRDINDP* and *ACINDP* are related to the *BRDAC_INDP* factor with rotated factor loadings of 0.461, 0.810 and 0.801, respectively. The two *BRDSIZE* and *ACSIZE* indicators are associated with the *BRDAC_SIZE* factor with rotated factor loadings of 0.825 and 0.827, respectively. The

two *BRDMEET* and *ACMEET* indicators are related to the *BRDAC_MEET* factor with rotated factor loadings of 0.803 and 0.750, respectively. The two *BRDACCEXP* and *ACACCEXP* are associated with the *BRDAC_ACCEXP* factor with rotated factor loadings of 0.935 and 0.919, respectively.

[INSERT TABLE 3 HERE]

According to Hermalin and Weisbach (2003), there are other factors which might impact both board structure and firm attributes; therefore, a spurious correlation could be observed between board structure and firm attributes. The firm attributes mentioned in Hermalin and Weisbach (2003) would include its management earnings forecast behaviour. Denis and Sarin (1999) document that the board structure is related to firm size and growth prospects. In order to address the concern about the expected spurious relationship between board structure and management earnings forecast behaviour and detect a one-way causal effect of board structure on management earnings forecast behaviour, a two-stage least squares method is utilised. The natural logarithm of the total assets and the natural logarithm of the market value of equity divided by the book value of equity are used as proxies for firm size and growth prospects, respectively.

In the first stage, each board structure factor identified in the above PCA is regressed on the two proxies for firm size and growth prospects and the residuals of each board structure factor were obtained. These residuals represent the unexplained portion of board structure factors which are not explained by the firm characteristics identified in the prior literature. In the second stage, the residuals of these board structure factors replace the original board structure factors in the models used to test the impact of board structure on the likelihood, frequency, horizon, precision and accuracy of management earnings forecasts. Specifically, for the full sample of 897 firm-years, the residuals *BRDINDPR* and *BRDSIZEACR* replace the original *BRDINDP* and *BRDSIZEAC* factors, respectively. For the sub-sample of 265 firm-years, the residuals *BRDAC_INDPR*, *BRDAC_SIZER*, *BRDAC_MEETR* and *BRDAC_ACCEXPR* replace the original *BRDAC_INDP*, *BRDAC_SIZE*, *BRDAC_MEET* and *BRDAC_ACCEXP* factors, respectively.

### *3.5 Hypothesis Testing Procedures*

The hypotheses are first tested using univariate methods including parametric tests (two independent sample *t*-test and one-way ANOVA) and non-parametric tests (Mann Whitney *z*-test, K independent sample Kruskal Wallis chi-square test and Pearson chi-square test). Pearson, point-biserial and Phi correlations are used to test the correlation between continuous variables, between continuous and dichotomous variables and between dichotomous variables, respectively.

Due to the expected interactions across constructs, multivariate methods are employed to jointly test the hypotheses and to control for firm-specific attributes, forecast-specific characteristics and the self-selection bias associated with the endogenous decision to issue management earnings forecasts expected to impact on the likelihood, frequency, horizon, precision and accuracy of management earnings forecasts. In the multivariate procedures, the probit, multinomial probit, ordered probit, Poisson and linear regression models are estimated to make inferences about the hypothesised relationships and to control for the firm-specific attributes, forecast-specific characteristics and the self-selection bias. The model specifications for 897 firm-years and 1,082 management earnings forecasts are presented as follows:

Model 1a $FORECAST1_{i,t} = a_0 + a_1REFORM_{i,t} + a_2ANALYST_{i,t} + a_3H_{i,t} + a_4H^2_{i,t} + a_{5a}BRDINDPR_{i,t} + a_{5b}BRDSIZEACR_{i,t} + a_6ECSIGN_{i,t} + a_7ECHANGE_{i,t} + a_8SIZE_{i,t} + a_9CROSSLIST_{i,t} + a_{10}MB_{i,t} + \alpha_{i,t}$

Model 1b $FORECAST2_{i,t} = b_0 + b_1REFORM_{i,t} + b_2ANALYST_{i,t} + b_3H_{i,t} + b_4H^2_{i,t} + b_{5a}BRDINDPR_{i,t} + b_{5b}BRDSIZEACR_{i,t} + b_6ECSIGN_{i,t} + b_7ECHANGE_{i,t} + b_8SIZE_{i,t} + b_9CROSSLIST_{i,t} + b_{10}MB_{i,t} + \beta_{i,t}$

Model 2a $FREQUENCY1_{i,t} = c_0 + c_1REFORM_{i,t} + c_2ANALYST_{i,t} + c_3H_{i,t} + c_4H^2_{i,t} + c_{5a}BRDINDPR_{i,t} + c_{5b}BRDSIZEACR_{i,t} + c_6ECSIGN_{i,t} + c_7ECHANGE_{i,t} + c_8SIZE_{i,t} + c_9CROSSLIST_{i,t} + c_{10}MB_{i,t} + \gamma_{i,t}$

Model 2b $FREQUENCY2_{i,t} = d_0 + d_1REFORM_{i,t} + d_2ANALYST_{i,t} + d_3H_{i,t} + d_4H^2_{i,t} + d_{5a}BRDINDPR_{i,t} + d_{5b}BRDSIZEACR_{i,t} + d_6ECSIGN_{i,t} + d_7ECHANGE_{i,t} + d_8SIZE_{i,t} + d_9CROSSLIST_{i,t} + d_{10}MB_{i,t} + \delta_{i,t}$

Model 3 $HORIZON_{i,t} = e_0 + e_1REFORM_{i,t} + e_2ANALYST_{i,t} + e_3H_{i,t} + e_4H^2_{i,t} + e_{5a}BRDINDPR_{i,t} + e_{5b}BRDSIZEACR_{i,t} + e_6BAD_{i,t} + e_7GOOD_{i,t} + e_8ECHANGE_{i,t} + e_9SIZE_{i,t} + e_{10}CROSSLIST_{i,t} + e_{11}MB_{i,t} +$

$e_{12}MEFORDER_{i,t} + e_{13}IMR_{i,t} + \varepsilon_{i,t}$

Model 4a $FORECAST3_{i,t} = f_0 + f_1REFORM_{i,t} + f_2ANALYST_{i,t} + f_3H_{i,t} + f_4H^2_{i,t} + f_{5a}BRDINDPR_{i,t} + f_{5b}BRDSIZEACR_{i,t} + f_6ECSIGN_{i,t} + f_7ECHANGE_{i,t} + f_8SIZE_{i,t} + f_9CROSSLIST_{i,t} + f_{10}MB_{i,t} + \zeta_{i,t}$

Model 4b $FREQUENCY3_{i,t} = g_0 + g_1REFORM_{i,t} + g_2ANALYST_{i,t} + g_3H_{i,t} + g_4H^2_{i,t} + g_{5a}BRDINDPR_{i,t} + g_{5b}BRDSIZEACR_{i,t} + g_6ECSIGN_{i,t} + g_7ECHANGE_{i,t} + g_8SIZE_{i,t} + g_9CROSSLIST_{i,t} + g_{10}MB_{i,t} + \eta_{i,t}$

Model 4c $PRECISION_{i,t} = h_0 + h_1REFORM_{i,t} + h_2ANALYST_{i,t} + h_3H_{i,t} + h_4H^2_{i,t} + h_{5a}BRDINDPR_{i,t} + h_{5b}BRDSIZEACR_{i,t} + h_6BAD_{i,t} + h_7GOOD_{i,t} + h_8ECHANGE_{i,t} + h_9SIZE_{i,t} + h_{10}CROSSLIST_{i,t} + h_{11}MB_{i,t} + h_{12}NREVENT_{i,t} + h_{13}HORIZON_{i,t} + h_{14}IRM_{i,t} + \theta_{i,t}$

Model 5a $ERROR_{i,t} = i_0 + i_1REFORM_{i,t} + i_2ANALYST_{i,t} + i_3H_{i,t} + i_4H^2_{i,t} + i_{5a}BRDINDPR_{i,t} + i_{5b}BRDSIZEACR_{i,t} + i_6BAD_{i,t} + i_7GOOD_{i,t} + i_8ECHANGE_{i,t} + i_9SIZE_{i,t} + i_{10}CROSSLIST_{i,t} + i_{11}MB_{i,t} + i_{12}POINT_{i,t} + i_{13}HORIZON_{i,t} + i_{14}IRM_{i,t} + \iota_{i,t}$

Model 5b $BIAS_{i,t} = j_0 + j_1REFORM_{i,t} + j_2ANALYST_{i,t} + j_3H_{i,t} + j_4H^2_{i,t} + j_{5a}BRDINDPR_{i,t} + j_{5b}BRDSIZEACR_{i,t} + j_6BAD_{i,t} + j_7GOOD_{i,t} + j_8ECHANGE_{i,t} + j_9SIZE_{i,t} + j_{10}CROSSLIST_{i,t} + j_{11}MB_{i,t} + j_{12}POINT_{i,t} + j_{13}HORIZON_{i,t} + j_{14}IRM_{i,t} + \kappa_{i,t}$

The model specifications for 265 firm-years and 350 management earnings forecasts would be similar to those for 897 firm-years and 1,082 management earnings forecasts, except for the residuals of the two board structure factors – *BRDINDPR* and *BRDSIZEACR* being replaced with the residuals of four board structure factors – *BRDAC_INDPR*, *BRDAC_SIZER*, *BRDAC_MEETR* and *BRDAC_ACCEXPR*.

Models 1a-b, 2a-b, 3, 4a-c and 5a-b are used to test the impact of three external corporate governance mechanisms – continuous disclosure regulatory reform, analyst following and ownership concentration and one internal corporate governance mechanism – board structure on the likelihood (H1a-b), frequency (H2a-b), horizon (H3), precision (H4a-c) and accuracy (H5a-b) of management earnings forecasts.

The definitions of the dependent variables and independent variables including corporate governance variables and control variables are described as follows:

**Dependent Variables**

| | |
|---|---|
| *FORECAST1* | A dichotomous variable taking the value of 1 if the current financial year's earnings announcement is pre-empted by at least one management earnings forecast and 0 otherwise. |
| *FORECAST2* | An ordinal variable taking the value of 2, 1 and 0 if the current financial year's earnings announcement is pre-empted by at least one non-routine management earnings forecast, solely routine management earnings forecasts and no management earnings forecasts, respectively. |
| *FREQUENCY1* | The number of management earnings forecasts released between the actual release dates of the mandatory earnings announcements for the prior and the current years. |
| *FREQUENCY2* | The number of non-routine management earnings forecasts released between the actual release dates of the mandatory earnings announcements for the prior and the current years. |
| *HORIZON* | The number of calendar days between the release date of the management earnings forecast and the corresponding financial reporting date. |
| *FORECAST3* | An ordinal variable taking the value of 2, 1 and 0 if the current financial year's earnings announcement is pre-empted by at least one quantitative (open-ended, range and point) management earnings forecast, solely qualitative management earnings forecasts and no management earnings forecasts, respectively. |
| *FREQUENCY3* | The number of quantitative (open-ended, range and point) management earnings forecasts released between the actual release dates of the mandatory earnings announcements for the prior and the current years. |
| *PRECISION* | An ordinal variable taking the value of 0, 1, 2 and 3 for |

| | |
|---|---|
| | qualitative, open-ended, range and point management earnings forecasts, respectively. *POINT* (in model 5a-b) is a dichotomous variable taking the value of 0 and 1 for range and point management earnings forecasts, respectively. |
| *ERROR* | The natural logarithm of the absolute value of the difference between forecasted and actual earnings per share deflated by the share price at the beginning of the financial year. |
| *BIAS* | The natural logarithm of the transformed difference between the forecasted and actual earnings per share deflated by the share price at the beginning of the financial year.[2] |

**Independent Variables – Corporate Governance Variables**

| | |
|---|---|
| *REFORM* | A dichotomous variable taking the value of 1 if the current financial year ends in the post-reform period and 0 otherwise. |
| *ANALYST* | A dichotomous variable taking the value of 1 if the firm is followed by analysts and 0 otherwise. |
| *H* | The fitted value of the Herfindahl index of concentration of top five largest shareholders (*OWNCON*). |
| $H^2$ | *H* square. |
| *BRDINDPR* | The residual value of the *BRDINDP* factor. |
| *BRDSIZEACR* | The residual value of the *BRDSIZEAC* factor. |
| *BRDAC_INDPR* | The residual value of the *BRDAC_INPD* factor. |
| *BRDAC_SIZER* | The residual value of the *BRDAC_SIZE* factor. |
| *BRDAC_MEETR* | The residual of the *BRDAC_MEET* factor. |
| *BRDAC_ACCEXPR* | The residual value of the *BRDAC_ACCEXP* factor. |

**Independent Variables – Control Variables**

| | |
|---|---|
| *ECSIGN* | A dichotomous variable taking the value of 1 for a positive current financial year earnings per share change and 0 |

[2] Untabulated results show that the minimum of forecast bias, which is measured by the differences between the forecasted and actual earnings per share deflated by share price at the beginning of the financial year, is -1.287. Therefore, forecast bias is added by 1.5 before taking the natural logarithm.

| | |
|---|---|
| | otherwise. |
| *BAD* | A dichotomous variable taking the value of 1 if the management earnings forecast indicates an expected negative change in the current year earnings and 0 otherwise. |
| *GOOD* | A dichotomous variable taking the value of 1 if the management earnings forecast indicates an expected positive change in the current year earnings and 0 otherwise. |
| *ECHANGE* | The natural logarithm of the absolute value of the percentage change in earnings per share deflated by share price at the beginning of the financial year. |
| *SIZE* | The natural logarithm of the total assets at the end of the current financial year. |
| *CROSSLIST* | A dichotomous variable taking the value of 1 if the firm is cross-listed on a foreign exchange and 0 otherwise. |
| *MB* | The natural logarithm of the market value of equity divided by the book value of equity at the end of the current financial year. |
| *MEFORDER* | The order of the management earnings forecasts. |
| *NREVENT* | A dichotomous variable taking the value of 1 if the management earnings forecast is released through a non-routine announcement and 0 otherwise. |
| *IMR* | The Inverse Mills Ratio based on Model 1a – *FORECAST1*, which is included to account for the self-selection bias inherent in analysing data that is conditional on a management earnings forecast being issued. |

Firm performance, firm size, cross-listing status and growth prospects are widely found to influence management earnings forecast behaviour (Hirst et al., 2008). Therefore, *ECSIGN*, *BAD*, *GOOD*, *ECHANGE*, *SIZE*, *CROSSLIST* and *MB* are included as control variables in the testing models.

Prior research findings document a potential trade-off between forecast horizon and forecast precision and accuracy (Hirst et al., 2008). As more of the financial reporting

period elapses and less time remains before the release of mandatory earnings announcements, firms possess more information and are more certain about the eventual earnings outcome. Therefore, *HORIZON* is included in model 4c and *POINT* and *HORIZON* are included models 5a-b as control variables.

As there are a number of NZX-listed firms issuing multiple earnings forecasts during the financial year, Dunstan et al. (2010), which is the only New Zealand study on management earnings forecast behaviour to date, focus only on the first management earnings forecasts issued prior to the release of the mandatory earnings announcements for their forecast horizon testing. While the sole focus on the first management earnings forecasts in the forecast horizon testing could reveal how early the firms first update the capital markets with their expectations of earnings, this approach might have ignored a valuable sample of updated earnings forecasts with a higher level of precision and accuracy which could be more informative and relevant to the capital markets. Therefore, we include all management earnings forecasts in the forecast horizon testing, irrespective of whether the management earnings forecast is the first or an updated one. As an updated management earnings forecast always has a shorter horizon than the prior ones, *MEFORDER* is included in model 3 as a control variable.

It is also shown in Dunstan et al. (2010) that management earnings forecasts released through non-routine announcements tended to be more precise. Therefore, *NREVENT* is included in model 4c as a control variable.

In addition, forecast horizon, precision and accuracy can be observed only among the group of firms providing earnings forecasts. As proposed by Heckman (1979), there might be a self-selection bias inherent in testing the horizon, precision and accuracy of management earnings forecasts. Therefore, the Inverse Mills Ratio (*IMR*) is included in models 3, 4c and 5a-b as a control variable. Following Heckman's (1979), the *IMR* is estimated based on model 1a – the probit model estimating the likelihood of firms issuing management earnings forecasts. The *IMR* estimate is calculated as follows.

$$\mathrm{IMR}_{i,t} = \frac{\phi(\mathrm{E}(\mathrm{FORECAST1}_{i,t})}{\Phi(\mathrm{E}(\mathrm{FORECAST1}_{i,t})}$$

In this calculation of *IMR*, $\phi(.)$ denotes the standard normal probability density function and $\Phi(.)$ denotes the cumulative distribution function for a standard normal random variable.

Prior to estimating the models, the skewness and kurtosis statistics for all the continuous variables are checked and extreme values are winsorised to preserve the characteristics of the original data while minimising the possible distortion of results by these extreme values. The maximum number of observations winsorised is low at the level of 1 percent of the sample observations.

## 4 Results

### *4.1 Descriptive Statistics*

Table 4 describes the nature and extent of the sample firm-years and management earnings forecasts for both the full sample (897 firm-years and 1,082 management earnings forecasts) and the sub-sample (265 firm-years and 350 management earnings forecasts).

[INSERT TABLE 4 HERE]

Table 4, Panel A indicates that among the final sample of 897 firm-years, there are 511 firm-years (56.97%) of which earnings announcements were pre-empted by at least one management earnings forecast. Among these 511 pre-empted firm-years, there are 320 (35.67%) and 191 (21.29%) firm-years of which earnings announcements were pre-empted by only routine management earnings forecasts and by at least one non-routine management earnings forecast, respectively. Also, 212 (23.63%) earnings announcements were pre-empted by exclusively qualitative management earnings forecasts and 299 (33.33%) earnings announcements were pre-empted by at least one quantitative (open-ended, range and point) management earnings forecast.

It is also apparent from Table 4, Panel A that NZX-listed firms provided up to a total of 8 overall, 6 non-routine and 7 quantitative (open-ended, range and point) earnings forecasts during the study period. Specifically, there are 190 (21.18%), 157 (17.50%), 104 (11.59%), 42 (4.68%), 13 (1.45%), 3 (0.33%), 1 (0.11%), and 1 (0.11%) firm-years

where firms pre-empted their earnings announcements with 1, 2, 3, 4, 5, 6, 7 and 8 management earnings forecasts, respectively. There are 138 (15.38%), 39 (4.35%), 12 (1.34%), 1 (0.11%) and 1 (0.11%) earnings announcements being pre-empted with 1, 2, 3, 5 and 6 non-routine management earnings forecasts, respectively. There are 136 (15.16%), 85 (9.48%), 48 (5.35%), 22 (2.45%), 5 (0.56%), 2 (0.22%) and 1 (0.11%) firm-years where firms pre-empted their earnings announcements with 1, 2, 3, 4, 5, 6 and 7 quantitative (open-ended, range and point) earnings forecasts.

Table 4, Panel B describes the horizon, precision and accuracy (error and bias) of 1,082 management earnings forecasts in the final sample. The mean and median of forecast horizon are 184 and 168 days, respectively which is far longer than those with an average forecast horizon of 71 days issued by U.S. firms and a little shorter than those with an average forecast horizon of 188 days issued by Canadian firms provided by Baginski et al. (2002).

While the proportion of the qualitative management earnings forecasts stays at a high level of 46.21%, open-ended, range and point management earnings forecasts are only 12.29%, 13.77% and 27.73% of the total number of management earnings forecasts, respectively. The percentage of qualitative management earnings forecasts is far higher than those reported in the U.S. (11.2%) and Canada (11%) by Baginski et al. (2002).

The mean and median of forecast error are 0.051 and 0.004, respectively and the mean and median for forecast bias are 0.034 and 0. The mean of forecast error and bias is much larger than the mean of U.S. forecast error (0.022) and forecast bias (0.018) documented by Ajinkya et al. (2005).

In addition, the descriptive statistics for the sub-sample of 265 firm-years and 350 management earnings forecasts show that the nature and extent are mostly similar to those reported for the full sample, except for a lower proportion of qualitative management earnings forecasts (33.14%), a higher percentage of range management earnings forecasts (25.71%) and a lower mean of forecast error (0.017) and forecast bias (0.004).

### *4.2 Multivariate Results*

The predicted signs for the coefficients on corporate governance and control variables are reported in Table 6.

[INSERT TABLE 6 HERE]

The results from estimating the multiple regression models used to jointly test the hypothesised relationships are presented in Tables 7 and 8.

[INSERT TABLES 7 & 8 HERE]

*4.2.1 The Likelihood of Firms Issuing Management Earnings Forecasts*

Tables 7 and 8 report the results for the *FORECAST1* probit model. *FORECAST1* captures firms' decisions to pre-empt earnings announcements with earnings forecasts.

The coefficients for *REFORM*, *ANALYST*, *H* and *BRDINDPR* are significantly positive and the coefficient for $H^2$ is significantly negative; therefore, H1a is supported. It is apparent from Table 8 that the coefficients for *BRDAC_SIZER* and *BRDAC_MEETR* are significantly positive, thus further supporting H1a.

These results indicate that firms were more likely to pre-empt their earnings announcements in the post-reform period and when they were followed by analysts. An increase in ownership concentration at a low level of ownership concentration tended to increase the forecast likelihood, while an increase in ownership concentration at a high level of ownership concentration is more associated with a strategy of no earnings forecast disclosure. Also, firms where the role of CEO and Chairman is separated, there are more directors in general and more non-executive directors in particular on the board and audit committee, and where the board and audit committee met more frequently were more inclined to issue earnings forecasts.

Further evidence from the *FORECAST1* model reveals significant coefficients for the firm-specific attribute control variables. Larger earnings changes are associated with an increased likelihood of management earnings forecasts. Larger firms tended to pre-empt their earnings announcements with earnings forecasts. Cross-listed firms were less likely to provide earnings forecasts.

*4.2.2 The Likelihood of Firms Issuing Non-routine Management Earnings Forecasts*

Tables 7 and 8 present the regression results from estimating the multinomial probit model *FORECAST2*. The dependent variable *FORECAST2* takes the value of 2, 1 and 0 if the current financial year's earnings announcement is pre-empted by at least one non-routine management earnings forecast, exclusively routine management earnings forecasts and no management earnings forecasts, respectively.

The coefficients for *REFORM*, *ANALYST*, *H*, *BRDINDPR* and *BRDSIZEACR* are significantly positive and the coefficient for $H^2$ is significantly negative for the 2/0 comparison (see Table 7). Therefore, H1b is supported. As shown in Table 8, the significant positive coefficient for *BRDAC_MEETR* further supports H1b.

These findings document that firms were more likely to provide non-routine earnings forecasts in the post-reform period and when they were followed by analysts. While an increase in ownership concentration at a low level of ownership concentration is associated with higher non-routine forecast likelihood, an increase in ownership concentration at a high level of ownership concentration is related to lower non-routine forecast likelihood. In addition, firms with a larger board and audit committee, a higher percentage of non-executive directors on the board and audit committee, a separate role for CEO and Chairman and a higher board and audit committee meeting frequency were more inclined to release earnings forecasts through non-routine announcements.

However, the sign for *H* and $H^2$ is opposite to the predicted sign for the sub-sample of 265 firm-years. Among the sub-sample of 265 firm-years, an increase in ownership concentration at a low (high) level of ownership concentration is associated with a decrease (an increase) in the non-routine forecast likelihood (see Table 8).

It is also shown in Tables 7 and 8 that larger firms, firms experiencing a greater change in earnings and firms with greater growth prospects were more likely to provide non-routine earnings forecasts. Cross-listed firms were less likely to issue earnings forecasts via non-routine market announcements.

*4.2.3 The Frequency of Management Earnings Forecasts Issued by Firms*

Tables 7 and report the results for the Poisson model *FREQUENCY1* where *FREQUENCY1* is the number of management earnings forecasts released between the actual release dates of the mandatory earnings announcements for the prior and the current years. Untabulated results show that the distribution for *FREQUENCY1* is highly positively skewed and does not appear to follow a normal distribution. The Shapiro-Wilk test also confirms the non-normal distribution of *FREQUENCY1*. Therefore, we employ the Poisson model which is more appropriate for testing this type of variable.

The coefficients for *REFORM*, *ANALYST*, *H* and *BRDINDPR* are significantly positive and the coefficient for $H^2$ is significantly negative, thus supporting H2a (see Table 7). The significant positive coefficients for *BRDAC_SIZER*, *BRDAC_MEETR* and *BRDAC_ACCEXPR* in Table 8 provide further support for H2a.

These results show that the firms tended to provide earnings forecasts more frequently in the post-reform period and when they were followed by analysts. An increase in ownership concentration at a low (high) level of ownership concentration is related to a higher (lower) frequency of management earnings forecasts. Firms with a higher percentage of non-executive directors and directors with accounting expertise on the board and audit committee and a separate role for CEO and Chairman were more inclined to provide earnings forecasts more frequently. A larger board and audit committee is associated with a higher earnings forecast frequency. Also, the frequency of earnings forecasts increased when the board and audit committee met more frequently.

However, the sign for *H* and $H^2$ is opposite to the predicted sign for the sub-sample of 265 firm-years. Among the sub-sample of 265 firm-years, an increase in ownership concentration at a low (high) level of ownership concentration is associated to a lower (higher) frequency of management earnings forecasts (see Table 8).

The results presented in Table 7 further indicate that larger firms and firms experiencing larger earnings change were more likely to provide earnings forecasts more frequently. The earnings forecast frequency for cross-listed firms is lower than that of non-cross-

listed firms. In addition, firms with greater growth prospects are associated with higher forecast frequency (see Table 8).

*4.2.4 The Frequency of Non-routine Management Earnings Forecasts Issued by Firms*

The results for the Poisson model *FREQUENCY2* are shown in Tables 7 and 8. *FREQUENCY2* is the number of non-routine management earnings forecasts released between the actual release dates of the mandatory earnings announcements for the prior and the current years.[3]

The coefficients for *REFORM*, *ANALYST* and *BRRSIZEACR* are significantly positive, thus supporting H2b (see Table 7). The significant positive coefficients for *BRDAC_SIZER*, *BRDAC_MEETR* and *BRDAC_ACCEXPR* in Table 8 show further support for H2b.

It is apparent from these findings that firms tended to provide earnings forecasts via non-routine announcements more frequently in the post-reform period and when they were followed by analysts. A larger board and the existence of a formally established audit committee are associated with a higher non-routine earnings forecast frequency. Firms with a larger board and audit committee, more board and audit committee meetings and more directors with accounting expertise on the board and audit committee were more inclined to provide earnings forecasts via non-routine announcements more frequently.

However, the sign for $H$ and $H^2$ is opposite to the predicted sign for the sub-sample of 265 firm-years. Among the sub-sample of 265 firm-years, an increase in ownership concentration at a low (high) level of ownership concentration is associated with a lower (higher) frequency of non-routine management earnings forecasts (see Table 8).

Further evidence in Tables 7 and 8 indicates that firms experiencing a decline in earnings and those with a large earnings change tended to provide non-routine earnings forecasts more frequently.

[3] The untabulated results show that the distribution for *FREQUENCY2* is highly positively skewed and does not appear to follow a normal distribution. The Shapiro-Wilk test also rejects the normal distribution of *FREQUENCY2*. Therefore, similar to the argument provided for *FREQUENCY1*, it is more appropriate to use the Poisson model to test *FREQUENCY2*.

*4.2.5 The Horizon of Management Earnings Forecasts Issued by Firms*

Tables 7 and 8 provide the results from estimating the *HORIZON* linear regression model. *HORIZON* captures the timeliness of the management earnings forecasts prior to the release of the corresponding earnings announcements.

Except for the significant positive coefficient for *BRDAC_ACCEXPR*, none of the remaining corporate governance variables have significant coefficients. Therefore, H3 is supported only in respect to the level of accounting expertise of the board and audit committee. In other words, firms with a higher percentage of directors with accounting expertise on the board and audit committee were more inclined to provide earnings forecasts on a timelier basis.

Further evidence in Tables 7 and 8 indicates that bad news management earnings forecasts are significantly associated with shorter forecast horizon.

*4.2.6 The Likelihood of Firms Issuing Quantitative (Open-ended, Range and Point) Management Earnings Forecasts*

Tables 7 and 8 present the results from estimating the *FORECAST3* ordered probit model. *FORECAST3* is an ordinal variable taking the value of 2, 1 and 0 if the current financial year's earnings announcement is pre-empted by at least one quantitative (open-ended, range and point) management earnings forecast, solely qualitative management earnings forecasts and no management earnings forecasts, respectively.

The coefficients for *REFORM*, *ANALYST*, *H* and *BRDINDPR* are significantly positive and the coefficient for $H^2$ is significantly negative; therefore H4a is supported (see Table 7). In addition, Table 8 shows significant positive coefficients for *BRDAC_SIZER* and *BRDAC_MEETR* which further supports H4a.

Thus, firms were more likely to pre-empt their earnings announcements with quantitative (open-ended, range and point) earnings forecasts in the post-reform period and when they were followed by analysts. An increase in ownership concentration at a low (high) level of ownership concentration is associated with an increase (a decrease) in quantitative forecast likelihood. Firms where the role of CEO was separated from the

Chairman and where more non-executive directors sat on the board were more likely to provide quantitative earnings forecasts. Firms with a larger board and audit committee and a higher board and audit meeting frequency were more inclined to issue quantitative earnings forecasts.

However, the coefficient for *H* among the sub-sample of 265 firm-years is negative and marginally significant and the coefficient for $H^2$ is not significant. This means that an increase in ownership concentration is associated with a decrease in quantitative earnings forecast likelihood.

In addition, further evidence provided in Table 7 shows that larger firms, firms experiencing larger changes in earnings and firms with higher growth prospects tended to pre-empt their earnings announcements with quantitative earnings forecasts. Cross-listed firms were less likely to release quantitative earnings forecasts.

*4.2.7 The Frequency of Quantitative (Open-ended, Range and Point) Management Earnings Forecasts Issued by Firms*

Tables 7 and 8 reports the results for the Poisson model *FREQUENCY3* where *FREQUENCY3* is the number of quantitative (open-ended, range and point) management earnings forecasts released between the actual release dates of the mandatory earnings announcements for the prior and the current years.[4]

As shown in Table 7, the coefficients for *REFORM*, *ANALYST*, *H* and *BRDINDPR* are significantly positive and the coefficient for $H^2$ is significantly negative, thus supporting H4b. Table 8 reports significant positive coefficients for *BRDAC_SIZER* and *BRDAC_MEETR* which further supports H4b.

These findings indicate that firms were more inclined to provide quantitative earnings forecasts more frequently in the post-reform period and when they were followed by analysts. An increase in ownership concentration at a low (high) level of ownership concentration is associated with an increase (a decrease) in quantitative earnings

[4] Untabulated results show that the distribution for *FREQUENCY3* is highly positively skewed and does not appear to follow a normal distribution. The Shapiro-Wilk test also confirms the non-normal distribution of *FREQUENCY3*. Thus, similar to the argument provided for *FREQUENCY1* and *FREQUENCY2*, the Poisson model could be more appropriate for testing *FREQUENCY3*.

forecast frequency. Firms where the role of CEO was separated from the Chairman and with more non-executive directors on the board were more likely to issue more quantitative earnings forecasts. A larger board and audit committee, and a higher board and audit committee meeting frequency are related to a higher quantitative forecast frequency.

However, the sign for $H$ and $H^2$ is opposite to the predicted sign for the sub-sample of 265 firm-years. Among the sub-sample of 265 firm-years, an increase in ownership concentration at a low (high) level of ownership concentration is associated with a lower (higher) frequency of quantitative earnings forecasts (see Table 8).

Tables 7 and 8 further indicate that larger firms, firms experiencing a decrease in earnings and firms with higher growth prospects were more likely to provide more quantitative earnings forecasts. In addition, cross-listed firms tended to issue quantitative earnings forecasts more frequently (see Table 8).

*4.2.8 The Precision of Management Earnings Forecasts Issued by Firms*

Tables 7 and 8 present the results obtained from estimating the forecast precision *PRECISION* ordered probit model. *PRECISION* is an ordinal variable taking the value of 0, 1, 2 and 3 for qualitative, open-ended, range and point management earnings forecasts, respectively.

It is apparent from Table 7 that the coefficients for *REFORM*, *ANALYST*, $H$ and *BRDINDPR* are significantly positive and the coefficient for $H^2$ is significantly negative; therefore, H4c is supported.

These results suggest that management earnings forecasts issued in the post-reform period and by firms followed by analysts were more likely to be more precise. An increase in ownership concentration at a low (high) level of ownership concentration is associated with the issuance of more (less) precise management earnings forecasts. More precise management earnings forecasts tended to be issued by firms with a separate CEO and Chairman and a higher percentage of non-executive directors on the board.

Further evidence from Tables 7 and 8 reveals that more precise management earnings forecasts are associated with neutral news content, non-routine announcements and shorter horizon. Earnings forecasts issued by firms with higher growth prospects tended to be more precise.

*4.2.9 The Error of Management Earnings Forecasts Issued by Firms*

Results for the test of the association of corporate governance with the error of range and point management earnings forecasts are presented in Tables 7 and 8 where the dependent variable *ERROR* captures the magnitude of forecast deviation from actual earnings reported *ex post*.

The significant positive coefficients for *REFORM*, *ANALYST*, *H* and *BRDINDPR* and the significant negative coefficient for $H^2$ indicate the rejection of H5a (see Table 7). The significant positive coefficients for *BRDAC_INDPR* and *BRDAC_ACCEXPR* thus further reject H5a (see Table 8). The negative coefficient for *BRDSIZEACR* is marginally significant, providing a weak support for H5a.

Management earnings forecasts issued in the post-reform period and by firms followed by analysts tend to have larger forecast error. An increase in ownership concentration at a low (high) level of ownership concentration is associated with larger (smaller) forecast error. Firms with a separate CEO and Chairman, a higher percentage of non-executive directors, a higher percentage of directors with accounting expertise on the board and audit committee tended to issue earnings forecasts of larger error. Earnings forecasts with smaller error were more likely to be issued by firms with a larger board and a formally established audit committee.

It is also apparent from Tables 7 and 8 that larger firms, non-cross-listed firms, firms with higher growth prospects and firms experiencing large changes in earnings tended to provide earnings forecasts of larger forecast error. Cross-listed firms were more inclined to issue earnings forecasts of smaller forecast error. Management earnings forecasts of larger forecast error were more likely to be associated with neutral news content, longer horizon and lower level of precision. The level of forecast error is

significantly influenced by the self-selection bias inherent in firms' decisions to issue earnings forecasts.

*4.2.10 The Bias of Management Earnings Forecasts Issued by Firms*

Tables 7 and 8 show the results for the test of the association of corporate governance with the bias of range and point management earnings forecasts where the dependent variable *BIAS* captures the forecast deviation from actual earnings reported *ex post*.

It is apparent from Table 7 that the significant positive coefficients for *REFORM*, *ANALYST* and *H* and the significant negative coefficient for $H^2$ reject H5b. However, the significant negative coefficient for *BRDSIZEACR* provides the support for H5b. Firms were more inclined to issue optimistic earnings forecasts in the post-reform period and when they were followed by analysts. An increase in ownership concentration at a low (high) level of ownership concentration is related to the issuance of optimistic (pessimistic or unbiased) management earnings forecasts. Firms with a larger board and firms where an audit committee was formally established were less likely to provide optimistic earnings forecasts.

As shown in Table 8, except for the coefficients for *H* and $H^2$, the results from the testing of the sub-sample of 190 earnings forecasts provide strong support for H5b with significant negative coefficients for *REFORM*, *ANALYST*, *BRDAC_INDPR*, *BRDAC_SIZER*, *BRDAC_MEETR* and *BRDAC_ACCEXPR*. These results indicate that the continuous disclosure reform, analyst following and the level of independence, size, meeting frequency and the level of accounting expertise of board and audit committee are associated with the issuance of less optimistically biased earnings forecasts.

Further evidence from Tables 7 and 8 shows that larger firms, non-cross-listed firms and firms experiencing larger changes in earnings were more likely to provide optimistic earnings forecasts. However, among the sub-sample of 190 earnings forecasts, the issuance of optimistic earnings forecasts is associated with smaller firms and cross-listed firms. Also, firms with higher growth prospects were more inclined to provide less optimistically biased earnings forecasts. In addition, the level of forecast

bias is significantly influenced by the self-selection bias inherent in firms' decisions to issue earnings forecasts.

### *4.3 Sensitivity Analysis*

A number of sensitivity tests are undertaken to ensure the robustness of the results to various conditions. Prior research documents that earnings volatility may influence the disclosure behaviour (Hirst et al., 2008). Therefore, *ECHANGE_VOL* which is measured by the natural logarithm of the changes in earnings per share volatility over the prior five financial years is included in separate estimations of all models. The *ECHANGE_VOL* coefficient is not significant in any model and other results are not significantly different from the main findings except for the coefficient for *ECHANGE* losing its significance. Correlation tests show that *ECHANGE_VOL* is highly positively correlated with *ECHANGE* which may explain the reduced significance. These results are also consistent with the assumption made by Baginski et al. (2002) that the magnitude of earnings change also acts as a proxy for earnings volatility.

Capital raising is normally found to have a positive impact on the level of disclosure (Frankel et al., 1995). Capital raising may also affect forecast precision as firms may be more likely to provide quantitative earnings forecasts when they are required to issue prospectuses. Therefore, models 1a-b, 2a-b and 4a-c are retested while including *CAPITAL_RAISING* which is a dichotomous variable taking the value of 1 if the firm raises capital during the financial year and 0 otherwise. The coefficient for *CAPITAL_RAISING* is insignificant and other results are not significantly different from the main findings.

All models are retested inclusive of each of the industry dichotomous variables for the six major industry categories: (1) materials, mining or energy, (2) technology, telecommunication or biotechnology, (3) financial services, (4) utilities, airports, airlines, ports or shipping, (5) manufacturing or healthcare and (6) consumer staples. The results are mixed. Firms in the materials, mining or energy industry and financial services industry were less likely to provide earnings forecasts (overall, non-routine and quantitative). Firms in the technology, telecommunication or biotechnology industry tended to provide earnings forecasts of longer horizons but their earnings forecasts were

more optimistically biased. Firms in the utilities, airports, airlines, ports or shipping industry were more inclined to provide routine earnings forecasts. Firms in the manufacturing or healthcare industry and consumer staples industry were more likely to provide earnings forecasts (overall, non-routine and quantitative) and these earnings forecasts were issued more frequently. Other results are not significantly different from the main findings.

As the continuous disclosure regulatory reform came into effect on 1 December 2002, some firms may have either responded earlier or postponed their responses depending on the closeness of this date to their financial reporting dates. To test whether the results are influenced by such behaviour, all the models are retested after dropping all firm-years that fall within six months of the effective date of the continuous disclosure reform (i.e. approximately 12 months around 1 December 2002). The results are quantitatively similar to those previously reported in the main findings.

The White's heteroscedasticity standard errors are used to allow the refitting of all models which may contain heteroscedastic residuals. The results obtained from retesting all the models are quantitatively similar to the main findings.

Overall, the sensitivity analysis shows that the results reported in the main findings are robust to various alternative conditions and specifications.

## *4.4 Discussion of Key Findings*

### *4.4.1 Continuous Disclosure Regulatory Reform and Management Earnings Forecast Behaviour*

The enforcement of the continuous disclosure regulatory reform has significantly improved the likelihood of firms pre-empting their earnings announcements with earnings forecasts (overall and non-routine) and the frequency and precision of these earnings forecasts. These findings are consistent with those reported by Dunstan et al. (2010). To some extent, these results are also consistent with an Australian study by Chan et al. (2007) who report that there is a significant increase in the level of non-routine bad news earnings forecasts issued by ASX-listed firms in the post-2000 period, due to an increase in continuous disclosure enforcement in Australia.

While Dunstan et al. (2010) report a marginal decline in the forecast horizon and a significant improvement in forecast error in the post-reform period, this study shows no noticeable change in forecast horizon and an increase in forecast error in the period following the continuous disclosure regulatory reform after controlling for the self-selection bias inherent in firms' decisions to issue earnings forecasts. We also extend Dunstan et al. (2010) by examining the impact of the reform on forecast bias, and documents that management earnings forecasts were more optimistically biased in the post-reform period. However, management earnings forecasts were less optimistically biased in the post-reform period among the sub-sample of 190 earnings forecasts.

*4.4.2 Analyst Following and Management Earnings Forecast Behaviour*

To some extent, analysts play an important role in driving firms to pre-empt their earnings announcements with earnings forecasts (overall and non-routine) and to provide these earnings forecasts more frequently. Firms followed by analysts were more inclined to provide more precise earnings forecasts. However, these firms tended to provide earnings forecasts of larger forecast error and these earnings forecasts were more likely to be optimistically biased. Among the sub-sample of 190 earnings forecasts, firms followed by analysts were more inclined to provide less optimistically biased earnings forecasts.

These findings are consistent with those reported by Chan et al. (2007) (the likelihood and frequency of overall and non-routine earnings forecasts), by Tinaikar (2008) (forecast precision) and by Karamanou and Vafeas (2005) (forecast error and bias). These findings are not consistent with those found by Dunstan et al. (2010). It should be noted that Dunstan et al. (2010) use the number of analysts following a firm as a proxy for analyst following and that this study employs the existence of analyst following as a proxy based on the justification that not all NZX-listed are followed by analysts.

*4.4.3 Ownership Concentration and Management Earnings Forecast Behaviour*

The reported impact of ownership concentration on the likelihood of firms issuing earnings forecasts (overall, non-routine and quantitative) supports the efficient-monitoring (opportunistic) hypothesis at a low (high) level of ownership concentration.

To some extent, this evidence is consistent with other research studies on the impact of ownership concentration on voluntary disclosure (Makhija and Patton, 2004) and on firm value (Navissi and Naiker, 2006).

However, it is interesting to find that the efficient-monitoring (opportunistic) hypothesis is supported at a high (low) level of ownership concentration regarding the non-routine forecast likelihood, forecast frequency (overall, non-routine and quantitative) for the sub-sample of 265 firm-years, forecast error and forecast bias. In addition, the opportunistic hypothesis is supported regarding the quantitative forecast likelihood among the sub-sample of 265 firm-years, irrespective of level of ownership concentration. These findings are significantly different from prior theoretical arguments and empirical evidence regarding the role of ownership concentration.

*4.4.4 Board Structure and Management Earnings Forecast Behaviour*

Three aspects of board structure including independence, size and meeting frequency are found to improve the likelihood that firms issue earnings forecasts (overall and non-routine), the frequency of these earnings forecasts (overall and non-routine), forecast precision and forecast accuracy (smaller error and less optimistic bias). The level of accounting expertise on the board and the audit committee is positively related to the frequency that firms issued earnings forecasts (overall and non-routine), forecast horizon and forecast accuracy (lack of optimistic bias). However, there is also evidence that firms with a higher level of accounting expertise on the board and the audit committee were more inclined to issue earnings forecasts of larger error.

These findings are mostly different from evidence reported in prior research. Specifically, in the U.S., Ajinkya et al. (2005) document no association between forecast precision and the proportion of outside directors. Karamanou and Vafeas (2005) show that in the U.S., more precise earnings forecasts were provided by firms with a lower percentage of outside directors on the board and a smaller audit committee. In Australia, the positive relation between audit committee independence and the likelihood and frequency of firms issuing earnings forecasts is mainly driven by routine earnings forecasts over which management has a greater discretion (Chan et al., 2008).

Overall, it is apparent from the reported findings that firms monitored by effective corporate governance mechanisms were more inclined to pre-empt their earnings announcements with earnings forecasts (overall, non-routine and quantitative) and provide these earnings forecasts more frequently. The earnings forecasts issued by these firms were less optimistically biased. In addition, firms having more directors with accounting expertise on their boards and audit committees were more likely to provide timelier earnings forecasts. However, except for board size and the existence of a formally established audit committee, other aspects of board structure and operations are shown to have no positive impact on forecast error.

Despite the evidence on forecast error, our study provides strong evidence of significant influence of three important external corporate governance mechanisms – continuous disclosure regulatory reform, analyst following and ownership concentration and one important internal corporate governance mechanism – board structure on the management earnings forecast behaviour in New Zealand where a low private litigation environment prevails. Both external and internal corporate governance mechanisms perform an important role in monitoring management earnings forecast behaviour in the low private litigation environment of New Zealand. More importantly, while our findings show some consistency with prior research on the association between corporate governance and management earnings forecast behaviour, most of the findings are different from those documented in prior literature.

## 5 Conclusion

The objective of our study is to examine the influence of three important external corporate governance mechanisms – continuous disclosure regulatory reform, analyst following and ownership concentration and one important internal corporate governance mechanism – board structure on the likelihood, frequency, horizon, precision and accuracy of management earnings forecasts in the low private litigation environment of New Zealand.

Based on a sample of 1,082 management earnings forecasts issued by 125 firms listed on the NZX during the 31 January 1998 to 31 December 2007 financial reporting periods, we provide strong evidence that four corporate governance mechanisms have a

significant influence on management earnings forecast behaviour. Our findings prevail after effectively controlling for endogeneity, multicollinearity and self-selection bias problems. Firms monitored by effective corporate governance mechanisms were more inclined to pre-empt their earnings announcements with earnings forecasts (overall, non-routine and quantitative) and provide these earnings forecasts more frequently. These earnings forecasts issued by these firms were less optimistically biased. In addition, firms having more directors with accounting expertise on their boards and audit committees were more likely to provide earnings forecasts with longer horizon and smaller forecast error. Board size and the existence of a formally established audit committee are shown to have a positive impact on forecast error.

It is important to note that while the findings from this study show some consistency with prior research on the association between corporate governance and management earnings forecast behaviour, most of the findings provided are different from those documented in the prior literature. For example, regarding the non-routine forecast likelihood, forecast frequency (overall, non-routine and quantitative) for the sub-sample of 265 firm-years and forecast error and bias, the efficient-monitoring (opportunistic) hypothesis is supported at a high (low) level of ownership concentration rather than at a low (high) level of ownership concentration as previously shown in prior research. In addition, the opportunistic hypothesis is supported regarding the quantitative forecast likelihood at all levels of ownership concentration among the sub-sample of 265 firm-years which is also different from those documented in prior research studies into the value of ownership concentration. However, it should be noted that the different results obtained might in part derive from the choice of statistical analysis techniques.

The findings provided in this study lend support for the positive impact of the four identified important corporate governance mechanisms on corporate behaviour. Given the low private litigation environment of New Zealand, it is reasonable to conclude that improvements in the likelihood, frequency, horizon, precision and accuracy of management earnings forecasts can be largely explained by the effective monitoring role performed by these four corporate governance mechanisms. A possible interpretation is that effective corporate governance mechanisms are able to be more beneficial in circumstances where private enforcement is a less viable alternative. This

interpretation means that in New Zealand a combination of external and internal corporate governance mechanisms has been able to effectively substitute for a private litigation alternative. If this is the case, the findings from this study have important implications for other low private litigation jurisdictions and contribute to the debate regarding the value of corporate governance internationally. These findings may also have important implications for other high private litigation environments such as the U.S. given the high economic and social costs that have been identified as being related to private litigation. This study should be beneficial to academic researchers, corporate regulators, investors as well as corporate insiders.

The major limitation of this study is that it focuses on a small sample within a small but largely unique jurisdiction; therefore, the generalisability of the findings reported in this study is limited. Even though this study provides strong evidence to support the monitoring role of both external and internal corporate governance on corporate behaviour in a litigation environment where private enforcement is a less viable alternative, it does not provide direct evidence regarding the incremental benefits of these corporate governance mechanisms compared to the private enforcement alternative. In addition, while this study indicates some support regarding the different impact of each corporate governance mechanism on management earnings forecast behaviour, it has not examined the potential substitution effect among these corporate governance mechanisms. Future research could directly compare the impact of a combined set of external and internal corporate governance mechanisms on management earnings forecast behaviour between two jurisdictions with unequal private litigation costs and also investigate the potential substitution effect among these examined corporate governance mechanisms.

Given that the sample firms must have survived a minimum of five years since being listed to be included in the final sample, the findings from this study might not be representative of newly-listed firms. Also, while this study uses the percentage of non-executive directors as a proxy for board and audit committee independence, similar to much of prior research studies, this proxy might not have captured the essence of board and audit committee independence. Therefore, this study leaves open for future research the examination of the impact of alternative corporate governance mechanisms on

management earnings forecast behaviour of newly-listed firms and the refining of the proxy for board and audit committee independence.

## References


Abbott, L. J., S. Parker, and G. F. Peters 2004, Audit committee characteristics and restatements, *Auditing: A Journal of Practice and Theory*, Vol. 23, No. 1, March, pp. 69-87.

Ajinkya, B., S. Bhojraj, and P. Sengupta 2005, The association between outside directors, institutional Investors and the properties of management earnings forecasts, *Journal of Accounting Research*, Vol. 43, No. 3, June, pp. 343-376.

Baginski, S. P., J. M. Hassell, and M. D. Kimbrough 2002, The effect of legal environment on voluntary disclosure: Evidence from management earnings forecasts issued in U.S. and Canadian markets, *The Accounting Review*, Vol. 77, No. 1, January, pp. 25-50.

Baginski, S. P., J. M. Hassell, and M. D. Kimbrough 2004, Why do managers explain their earnings forecasts *Journal of Accounting Research*, Vol. 42, No. 1, March, pp. 1-29.

Bamber, L. S., and Y. S. Cheon 1998, Discretionary management earnings forecast disclosures: Antecedents and outcomes associated with forecast venue and forecast specificity choices, *Journal of Accounting Research*, Vol. 36, No. 2, Autumn, pp. 167-190.

Berle, A. A., and G. C. Means, 1932, *The modern corporation and private property*, MacMillan, New York.

Bethel, J. E., J. P. Liebeskind, and T. Opler 1998, Block share purchases and corporate performance, *The Journal of Finance*, Vol. 53, No. 2, April, pp. 605-634.

Bradbury, M. E., Y. T. Mak, and S. M. Tan 2006, Board characteristics, audit committee characteristics and abnormal accruals, *Pacific Accounting Review*, Vol. 18, No. 2, pp. 47-68.

Brown, D. M., and F. R. Warren-Boulton 1988, Testing the structure-competition relationship on cross-sectional firm data, *Discussion paper*, Economic Analysis Group, U.S. Department of Justice.

Bushee, B. J., and C. F. Noe 2000, Corporate disclosure practices, institutional investors, and stock return volatility, *Journal of Accounting Research*, Vol. 38, Supplement: Studies on accounting information and the economics of the firm, pp. 171-202.

Bushman, R. M., and A. J. Smith 2003, Transparency, financial accounting information, and corporate governance, *FRBNY Economic Policy Review*, April, pp. 65-87.

Carcello, J. V., D. R. Hermanson, T. L. Neal, and R. A. Riley 2002, Board characteristics and audit fees, *Contemporary Accounting Research*, Vol. 19, No. 3, Fall, pp. 365-384.

Chan, H., R. Faff, Y. K. Ho, and A. Ramsay 2007, Management earnings forecasts in a continuous disclosure environment, *Pacific Accounting Review*, Vol. 19, No. 1, pp. 5-30.

Chan, H., R. Faff, P. Mather, and A. Ramsay 2008, The association between directors' independence, reputation and management earnings forecasts, *Working paper*, Department of Accounting and Finance, Monash University.

Chen, C. J. P., and B. Jaggi 2000, Association between independent non-executive directors, family control and financial disclosures in Hong Kong, *Journal of Accounting and Public Policy*, Vol. 19, pp. 285-310.

Cheng, E. C. M., and S. M. Courtenay 2006, Board composition, regulatory regime and voluntary disclosure, *The International Journal of Accounting*, Vol. 41, pp. 262-289.

Chung, K. H., and H. Jo 1996, The impact of security analysts' monitoring and marketing functions on the market value of firms, *Journal of Financial and Quantitative Analysis*, Vol. 31, No. 4, pp. 493-512.

Coles, J. L., N. D. Daniel, and L. Naveen 2008, Boards: Does one size fit all, *Journal of Financial Economics*, Vol. 87, pp. 329-356.

Coller, M., and T. L. Yohn 1997, Management forecasts and information asymmetry: An examination of bid-ask spreads, *Journal of Accounting Research*, Vol. 35, No. 2, Autumn, pp. 181-181.

Defond, M. L., R. N. Hann, and X. Hu 2005, Does the market value financial expertise on audit committees of board of directors, *Journal of Accounting Research*, Vol. 43, No. 2, pp. 153-193.

Denis, D. J., and A. Sarin 1999, Ownership and board structures in publicly traded corporations, *Journal of Financial Economics*, Vol. 52, pp. 187-223.

Dunstan, K., G. Gallery, and T. P. Truong 2009, The impact of disclosure reform and alternative sources of earnings-related information on the market reaction to firm-based earnings-related disclosures, *Working paper*, School of Accounting and Commercial Law, Victoria University of Wellington.

Dunstan, K., G. Gallery, and T. P. Truong 2010, Public regulatory reform and management earnings forecasts in a low private litigation environment, *Accounting and Finance*, forthcoming.

Fama, E. F., and M. C. Jensen 1983, Separation of ownership and control, *Journal of Law and Economics*, Vol. 26, No. 2, Corporations and private property: A conference sponsored by the Hoover Institution, pp. 301-325.

Felo, A. J., S. Krishnamurthy, and S. A. Solieri 2003, Audit committee characteristics and the perceived quality of financial reporting: An empirical analysis, *Working paper*, School of Management, Binghamton University.

Field, L., M. Lowry, and S. Shu 2005, Does disclosure deter or trigger litigation, *Journal of Accounting and Economics*, Vol. 39, pp. 487-507.

Francis, J., D. Philbrick, and K. Schipper 1994, Shareholder litigation and corporate disclosures, *Journal of Accounting Research*, Vol. 32, No. 2, Autumn, pp. 137-164.

Frankel, R., M. McNichols, and G. P. Wilson 1995, Discretionary disclosure and external financing, *The Accounting Review*, Vol. 70, No. 1, January, pp. 135-150.

Frijns, B., A. Gilbert, and A. Tourani-Rad 2008, Insider trading, regulation, and the components of the bid-ask spread, *The Journal of Financial Research*, No. 31, No. 3, pp. 225-246.

Frost, C. A. 2004, Characteristics and information value of corporate disclosures of forward looking information in global equity markets, *Working paper*, State University of New York at Buffalo.

Gallery, G., N. Gallery, and C. Gilchrist 2002, Are Australian corporate disclosures of earnings changes 'continuous' or 'opportunistic', *Working paper*, School of Accountancy, Queensland University of Technology.

Gillan, S. L. 2006, Recent development in corporate governance: An overview, *Journal of Corporate Finance*, Vol. 12, pp. 381-402.

Graham, J. R., C. R. Harvey, and S. Rajgopal 2005, The economic implications of corporate financial reporting, *Journal of Accounting and Economics*, Vol. 40, pp. 3-73.

Gul, F. A., and S. Leung 2004, Board leadership, outside directors' expertise and voluntary corporate disclosures, *Journal of Accounting and Public Policy*, Vol. 23, pp. 351-379.

Hart, O. 1995, Corporate governance: Some theory and implications, *The Economic Journal*, Vol. 105, No. 430, May, pp. 378-389.

Healy, P. M., A. P. Hutton, and K. G. Palepu 1999, Stock performance and intermediation changes surrounding sustained increases in disclosure, *Contemporary Accounting Research*, Vol. 16, No. 3, Fall, pp. 485-520.

Healy, P. M., and K. G. Palepu 2001, Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature, *Journal of Accounting and Economics*, Vol. 31, pp. 405-440.

Heckman, J. J. 1979, Sample selection bias as a specification error, *Econometrica*, Vol. 47, No. 1, January, pp. 153-161.

Hermalin, B. E., and M. S. Weisbach 2003, Boards of directors as an endogenously determined institution: A survey of the economic literature, *FRBNY Economic Policy Review*, April, pp. 7-26.

Hirst, E., L. Koonce, and S. Venkataraman 2008, Management earnings forecasts: A review and framework, *Accounting Horizons*, Vol. 22, No. 3, pp. 315-338.

Ho, S. S. M., and K. S. Wong 2001, A study of the relationship between corporate governance structures and the extent of voluntary disclosure, *Journal of International Accounting, Auditing & Taxation*, Vol. 10, pp. 139-156.

Holmstrom, B., and J. Tirole 1993, Market liquidity and performance monitoring, *The Journal of Political Economy*, Vol. 101, No. 4, August, pp. 678-709.

Huang, M., A. Marsden, and R. Poskitt 2009, The impact of disclosure reform on the NZX's financial information environment, *Pacific-Basin Finance Journal*, Vol. 17, pp. 460-478.

Huddart, S. 1993, The effect of a large shareholder on corporate value, *Management Science*, Vol. 39, No. 11, November, pp. 1407-1421.

Jensen, M. C., and W. H. Meckling 1976, Theory of the firm: Managerial behaviour, agency costs and ownership structure, *Journal of Financial Economics*, Vol. 3, pp. 305-360.

John, K., and L. W. Senbet 1998, Corporate governance and board effectiveness, *Journal of Banking and Finance*, Vol. 22, pp. 371-403.

Kang, J.-K., and A. Shivdasani 1995, Firm performance, corporate governance, and top executive turnover in Japan, *Journal of Financial Economics*, Vol. 38, pp. 29-58.

Karamanou, I., and N. Vafeas 2005, The association between corporate boards, audit committees, and management earnings forecasts: An empirical analysis, *Journal of Accounting Research*, Vol. 43, No. 3, June, pp. 453-486.

Kato, K., D. J. Skinner, and M. Kunimura 2009, Management forecasts in Japan: An empirical study of forecasts that are effectively mandated, *The Accounting Review*, Vol. 84, No. 5, September, pp. 1575-1606.

King, R., G. Pownall, and G. Waymire 1990, Expectations adjustments via timely management forecasts: Review, synthesis, and suggestions for future research, *Journal of Accounting Literature*, Vol. 9, pp. 113-144.

Klein, A. 2002, Audit committee, board of director characteristics, and earnings management, *Journal of Accounting and Economics*, Vol. 33, pp. 375-400.

La-Porta, R., F. Lopez-de-Silanes, and A. Shleifer 2006, What works in securities laws, *The Journal of Finance*, Vol. 61, No. 1, pp. 1-32.

Lakhal, F. 2005, Voluntary earnings disclosures and corporate governance: Evidence from France, *Review of Accounting and Finance*, Vol. 4, No. 3, pp. 64-85.

Luo, S., S. M. Courtenay, and M. Hossain 2006, The effect of voluntary disclosure, ownership structure and proprietary cost on the return - future earnings relation, *Pacific-Basin Finance Journal*, Vol. 14, pp. 501-521.

Macfarlane, H. 2008, *Investor losses: A fruitful ground for class actions*, [Online], available: http://www.heskethhenry.co.nz/News/archive/5.html, accessed 05 August 2008.

Makhija, A. K., and J. M. Patton 2004, The impact of firm ownership structure on voluntary disclosure: empirical evidence from Czech annual reports, *Journal of Business*, Vol. 77, No. 3, pp. 457-491.

Moyer, R. C., R. E. Chatfield, and P. M. Sisneros 1989, Security analyst monitoring activity: Agency costs and information demands, *The Journal of Financial and Quantitative Analysis*, Vol. 24, No. 4, December, pp. 503-512.

Navissi, F., and V. Naiker 2006, Institutional ownership and corporate value, *Managerial Finance*, Vol. 32, No. 3, pp. 247-256.

Pound, J. 1988, Proxy contests and the efficiency of shareholder oversight, *Journal of Financial Economics*, Vol. 20, pp. 237-265.

Shleifer, A., and R. W. Vishny 1986, Large shareholders and corporate control, *The Journal of Political Economy*, Vol. 94, No. 3, Part 1, June, pp. 461-488.

Shleifer, A., and R. W. Vishny 1997, A survey of corporate governance, *The Journal of Finance*, Vol. 52, No. 2, June, pp. 737-783.

Skinner, D. J. 1994, Why firms voluntarily disclose bad news, *Journal of Accounting Research*, Vol. 32, No. 1, Spring, pp. 38-60.

Skinner, D. J. 1997, Earnings disclosures and stockholder lawsuits, *Journal of Accounting and Economics*, Vol. 23, pp. 249-282.

Song, J., and B. Windram 2004, Benchmarking audit committee effectiveness in financial reporting, *Internatinal Journal of Auditing*, Vol. 8, pp. 195-205.

Tinaikar, S. 2008, Outside directors, litigation environment and management earnings forecasts, *Working paper*, Fisher School of Accounting, University of Florida.

Todd, S. 2005, Accident compensation and the common law, in *The Law of Torts in New Zealand*, edited by S. Todd, Thomson Brookers, Wellington.

Trueman, B. 1986, Why do managers voluntarily release earnings forecasts, *Journal of Accounting and Economics*, Vol. 8, pp. 53-71.

Vafeas, N. 1999, Board meeting frequency and firm performance, *Journal of Financial Economics*, Vol. 53, pp. 113-142.

Wang, I. Y. 2007, Private earnings guidance and its implications for disclosure regulation, *The Accounting Review*, Vol. 82, No. 5, October, pp. 1299-1332.

Woerheide, W., and D. Persson 1993, An index of porfolio diversification, *Financial Services Review*, Vol. 2, No. 2, pp. 73-85.

Yermack, D. 1996, Higher market valuation of companies with a small board of directors, *Journal of Financial Economics*, Vol. 40, pp. 185-211.

**Table 1**
**Sample Selection Procedure**

| Selecting Criteria | Number of Observations |
|---|---|
| Sample Firms | |
| Total firms listed in the Events section of the NZX database as at 17 September 2008 | 317 |
| Less firms listed on the Events section of the NZX database not covered by the NZX database | (113) |
| Less firms listed on the NZAX | (31) |
| Less firms not issuing at least 5 annual reports since being listed on the NZSX or firms with missing market announcements | (48) |
| Total firms in the final sample | 125 |
| Sample Firm-years | |
| Total firm-years in the final sample | 897[1] |
| Total firm-years in the sub-sample | 265[2] |
| Sample Management Earnings Forecasts | |
| Total market announcements in the final sample | 32,690 |
| Less market announcements not containing management earnings forecasts | (31,608) |
| Total management earnings forecasts in the final sample | 1,082 |
| Total range and point management earnings forecasts in the final sample | 449 |
| Total management earnings forecasts in the sub-sample. | 350 |
| Total range and point management earnings forecasts in the sub-sample | 190 |

[1] The total number of firm-years includes all firm-years with financial reporting dates ending between 31 January 1998 and 31 December 2007.
[2] Among these 897 firm-years, there are 265 firm-years where firms fully disclosed the level of independence, size, number of meetings and level of accounting expertise on boards of directors and audit committees in their annual reports.

**Table 2**
**Correlation Matrix for Board Structure Indicators**

**Panel A: Full Sample**

| | *CEOCHAIR* | *BRDINDP* | *BRDSIZE* |
|---|---|---|---|
| *BRDINDP* | 0.325<br>0.000** | | |
| *BRDSIZE* | 0.143<br>0.000** | 0.134<br>0.000** | |
| *AC* | 0.070<br>0.036* | 0.120<br>0.000** | 0.220<br>0.000** |

**Panel B: Sub-sample**

| | *CEOCHAIR* | *BRDINDP* | *BRDSIZE* | *BRDMEET* | *BRDACCEXP* | *ACINDP* | *ACSIZE* | *ACMEET* |
|---|---|---|---|---|---|---|---|---|
| *BRDINDP* | 0.254<br>0.000** | | | | | | | |
| *BRDSIZE* | 0.205<br>0.001** | 0.108<br>0.079^ | | | | | | |
| *BRDMEET* | 0.115<br>0.062^ | 0.021<br>0.730 | -0.016<br>0.790 | | | | | |
| *BRDACCEXP* | 0.151<br>0.014* | 0.051<br>0.411 | -0.019<br>0.758 | 0.051<br>0.409 | | | | |
| *ACINDP* | 0.216<br>0.000** | 0.397<br>0.000** | 0.123<br>0.046* | 0.059<br>0.338 | 0.141<br>0.021* | | | |
| *ACSIZE* | 0.095<br>0.122 | 0.098<br>0.110 | 0.437<br>0.000** | -0.021<br>0.735 | 0.111<br>0.071^ | -0.002<br>0.977 | | |
| *ACMEET* | 0.200<br>0.001** | 0.056<br>0.363 | 0.317<br>0.000** | 0.288<br>0.000** | -0.148<br>0.016* | -0.003<br>0.961 | 0.089<br>0.147 | |
| *ACACCEXP* | 0.199<br>0.001** | 0.158<br>0.010* | 0.076<br>0.219 | 0.082<br>0.186 | 0.758<br>0.000** | 0.126<br>0.040* | -0.050<br>0.420 | -0.104<br>0.090^ |

^, * and ** denote significance at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed). Pearson, point-biserial and Phi correlation coefficients are followed by p-value. See section 3 for definitions of board structure indicators.

**Table 3**
**Board Structure Factors Identified in Exploratory Principal Component Factor**

| Factor | Factor Name | Board Structure Indicators | Factor Loadings |
|---|---|---|---|
| **Panel A: Full Sample** | | | |
| 1 | *BRDINDP* (Board independence) | *CEOCHAIR* (Separate CEO and Chairman) | 0.823 |
| | | *BRDINDP* (Non-executive directors on the board) | 0.794 |
| 2 | *BRDSIZEAC* (Board size and audit committee) | *BRDSIZE* (Board size) | 0.738 |
| | | *AC* (Audit committee) | 0.813 |
| **Panel B: Sub-sample** | | | |
| 1 | *BRDAC_INDP* (Board and audit committee independence) | *CEOCHAIR* (Separate CEO and Chairman) | 0.461 |
| | | *BRDINDP* (Non-executive directors on the board) | 0.810 |
| | | *ACINDP* (Non-executive directors on the audit committee) | 0.801 |
| 2 | *BRDAC_SIZE* (Board and audit committee size) | *BRDSIZE* (Board size) | 0.825 |
| | | *ACSIZE* (Audit committee size) | 0.827 |
| 3 | *BRDAC_MEET* (Board and audit committee meeting) | *BRDMEET* (Board meeting) | 0.803 |
| | | *ACMEET* (Audit committee meeting) | 0.750 |
| 4 | *BRDAC_ACCEXP* (Board and audit committee accounting expertise) | *BRDACCEXP* (Board accounting expertise) | 0.935 |
| | | *ACACCEXP* (Audit committee accounting expertise) | 0.919 |

**Table 4**
**Descriptive Statistics – Firm Years and Management Earnings Forecasts**

| | Full Sample | | Sub-sample | |
|---|---|---|---|---|
| | Frequency<br>*Mean* | Percentage<br>*Median* | Frequency<br>*Mean* | Percentage<br>*Median* |
| **Panel A: Firm-years** | | | | |
| Non pre-empted and pre-empted firm-years | | | | |
| Non pre-empted firm-years | 386 | 43.03% | 114 | 43.02% |
| Pre-empted firm-years | 511 | 56.97% | 151 | 56.98% |
| Routine pre-empted and non-routine pre-empted firm-years | | | | |
| Routine pre-empted firm-years | 320 | 35.67% | 83 | 31.32% |
| Non-routine pre-empted firm-years | 191 | 21.29% | 68 | 25.66% |
| Qualitative pre-empted and quantitative (open-ended, range and point) pre-empted firm-years | | | | |
| Qualitative pre-empted firm-years | 212 | 23.63% | 43 | 16.23% |
| Quantitative pre-empted firm-years | 299 | 33.33% | 108 | 40.75% |
| Number of management earnings forecasts per firm-years | | | | |
| 0 | 386 | 43.03% | 114 | 43.02% |
| 1 | 190 | 21.18% | 51 | 19.25% |
| 2 | 157 | 17.50% | 43 | 16.23% |
| 3 | 104 | 11.59% | 34 | 12.83% |
| 4 | 42 | 4.68% | 10 | 3.77% |
| 5 | 13 | 1.45% | 10 | 3.77% |
| 6 | 3 | 0.33% | 1 | 0.38% |
| 7 | 1 | 0.11% | 1 | 0.38% |
| 8 | 1 | 0.11% | 1 | 0.38% |
| Number of non-routine management earnings forecasts per firm-years | | | | |
| 0 | 706 | 78.71% | 197 | 74.34% |
| 1 | 138 | 15.38% | 46 | 17.36% |
| 2 | 39 | 4.35% | 14 | 5.28% |
| 3 | 12 | 1.34% | 6 | 2.26% |
| 4 | 0 | 0.00% | 0 | 0.00% |
| 5 | 1 | 0.11% | 1 | 0.38% |
| 6 | 1 | 0.11% | 1 | 0.38% |
| Number of quantitative management earnings forecasts per firm-years | | | | |
| 0 | 598 | 66.67% | 157 | 59.25% |
| 1 | 136 | 15.16% | 41 | 15.47% |
| 2 | 85 | 9.48% | 32 | 12.08% |
| 3 | 48 | 5.35% | 21 | 7.92% |
| 4 | 22 | 2.45% | 7 | 2.64% |
| 5 | 5 | 0.56% | 5 | 1.89% |
| 6 | 2 | 0.22% | 1 | 0.38% |
| 7 | 1 | 0.11% | 1 | 0.38% |
| **Panel B: Management Earnings Forecasts** | | | | |
| Forecast horizon | *184* | *168* | *180* | *155* |
| Forecast precision | | | | |
| Qualitative | 500 | 46.21% | 116 | 33.14% |
| Open-ended | 133 | 12.29% | 44 | 12.57% |
| Range | 149 | 13.77% | 90 | 25.71% |
| Point | 300 | 27.73% | 100 | 28.57% |
| Forecast error | *0.051* | *0.004* | *0.017* | *0.003* |
| Forecast bias | *0.034* | *0* | *0.004* | *0* |

**Table 5**
**Descriptive Statistics – Corporate Governance Characteristics**

| | Frequency/*Mean* | Percentage/*Median* |
|---|---|---|
| **Panel A: Full sample** | | |
| *REFORM (post-reform)* | 523 | 58.31% |
| *ANALYST (followed by analysts)* | 410 | 45.71% |
| *OWNCON* | *0.185* | *0.122* |
| *CEOCHAIR (separate CEO and Chairman)* | 806 | 89.86% |
| *BRDINDP* | *0.820* | *0.833* |
| *BRDSIZE* | *6.065* | *6* |
| *AC (audit committee)* | 790 | 88.07% |
| **Panel B: Sub-sample** | | |
| *REFORM (post-reform)* | 189 | 71.32% |
| *ANALYST (followed by analysts)* | 176 | 66.42% |
| *OWNCON* | *0.206* | *0.148* |
| *CEOCHAIR (separate CEO and Chairman)* | 234 | 88.30% |
| *BRDINDP* | *0.857* | *0.857* |
| *BRDSIZE* | *6.913* | *6* |
| *BRDMEET* | *10.472* | *10* |
| *BRDACCEXP* | *0.265* | *0.250* |
| *ACINDP* | *0.970* | *1* |
| *ACSIZE* | *3.472* | *3* |
| *ACMEET* | *3.743* | *3* |
| *ACACCEXP* | *0.400* | *0.333* |

**Table 6**
**Predicted Signs for the Coefficients on Corporate Governance and Control Variables**

| | *Model 1a FORECAST1* | *Model 1b FORECAST2* | *Model 2a FREQUENCY1* | *Model 2b FREQUENCY2* | *Model 3 HORIZON* | *Model 4a FORECAST3* | *Model 4b FREQUENCY3* | *Model 4c PRECISION* | *Model 5a ERROR* | *Model 5b BIAS* |
|---|---|---|---|---|---|---|---|---|---|---|
| *REFORM* | + | + | + | + | + | + | + | + | - | - |
| *ANALYST* | + | + | + | + | + | + | + | + | - | - |
| *H* | + | + | + | + | + | + | + | + | - | - |
| $H^2$ | - | - | - | - | - | - | - | - | + | + |
| *BRDINDPR (full sample)* | + | + | + | + | + | + | + | + | - | - |
| *BRDSIZEACR (full sample)* | + | + | + | + | + | + | + | + | - | - |
| *BRDAC_INDPR (sub-sample)* | + | + | + | + | + | + | + | + | - | - |
| *BRDAC_SIZER (sub-sample)* | + | + | + | + | + | + | + | + | - | - |
| *BRDAC_MEETR (sub-sample)* | + | + | + | + | + | + | + | + | - | - |
| *BRDAC_ACCEXPR (sub-sample)* | + | + | + | + | + | + | + | + | - | - |
| *ECSIGN* | ? | ? | ? | ? | | ? | ? | | | |
| *BAD* | | | | | ? | | | ? | ? | ? |
| *GOOD* | | | | | ? | | | ? | ? | ? |
| *ECHANGE* | + | + | + | + | + | + | + | + | + | ? |
| *SIZE* | + | + | + | + | + | + | + | + | - | - |
| *CROSSLIST* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *MB* | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| *MEFORDER* | | | | | - | | | | | |
| *NREVENT* | | | | | | | | + | | |
| *HORIZON* | | | | | | | | - | + | ? |
| *POINT* | | | | | | | | | + | ? |
| *IMR* | | | | | ? | | | ? | ? | ? |

See section 3 for definitions of corporate governance and control variables.

**Table 7**
**Regression Analysis for Full Sample Firm-years and Management Earnings Forecasts**

| | Model 1a *FORECAST1* | Model 1b *FORECAST2* Comparison 1/0 | Model 1b *FORECAST2* Comparison 2/0 | Model 2a *FREQUENCY1* | Model 2b *FREQUENCY2* | Model 3 *HORIZON* | Model 4a *FORECAST3* | Model 4b *FREQUENCY3* | Model 4c *PRECISION* | Model 5a *ERROR* | Model 5b *BIAS* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*t*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*t*-statistic) | Coefficient (*t*-statistic) |
| Intercept | -3.175 | -5.503 | -4.291 | -2.372 | -2.521 | 372.962 | | -3.009 | | -39.935 | 0.091 |
| | (-4.090**) | (-3.750**) | (-3.450**) | (-4.160**) | (-2.750**) | (1.380) | | (-3.750**) | | (-3.780**) | (0.630) |
| *REFORM* | 0.382 | 0.169 | 1.126 | 0.485 | 1.227 | -16.081 | 0.443 | 0.945 | 0.795 | 2.664 | 0.044 |
| | (4.180**) | (1.260) | (6.970**) | (7.060**) | (7.360**) | (-0.700) | (5.330**) | (8.880**) | (2.320*) | (2.880**) | (3.460**) |
| *ANALYST* | 0.208 | 0.217 | 0.367 | 0.268 | 0.255 | 0.547 | 0.305 | 0.472 | 0.389 | 1.884 | 0.014 |
| | (1.950*) | (1.390^) | (2.110*) | (3.620**) | (1.690*) | (0.040) | (3.200**) | (4.560**) | (2.040*) | (3.720**) | (2.010*) |
| *H* | 21.091 | 32.095 | 26.143 | 15.181 | 9.056 | 285.871 | 20.82 | 16.242 | 39.991 | 300.200 | 1.740 |
| | (2.390**) | (1.840*) | (1.870*) | (2.410**) | (0.990) | (0.210) | (2.600**) | (1.810*) | (1.980*) | (5.540**) | (2.350*) |
| $H^2$ | -74.437 | -106.396 | -97.527 | -57.744 | -43.481 | -1097.663 | -79.746 | -63.49 | -137.899 | -1095.165 | -6.620 |
| | (-2.290*) | (-1.780*) | (-1.870*) | (-2.570**) | (-1.210) | (-0.230) | (-2.710**) | (-2.010*) | (-1.950*) | (-5.770**) | (-2.550**) |
| *BRDINDPR* | 0.117 | 0.158 | 0.131 | 0.141 | 0.041 | 2.519 | 0.114 | 0.211 | 0.290 | 1.107 | 0.004 |
| | (2.580**) | (2.370**) | (1.650^) | (3.730**) | (0.560) | (0.320) | (2.710**) | (3.710**) | (2.450**) | (3.500**) | (1.040) |
| *BRDSIZEACR* | -0.054 | -0.158 | 0.147 | -0.030 | 0.212 | -4.393 | -0.044 | 0.061 | 0.000 | -0.323 | -0.008 |
| | (-1.020) | (-2.050*) | (1.470^) | (-0.760) | (2.280*) | (-0.970) | (-0.920) | (1.030) | (0.000) | (-1.640^) | (-2.820**) |
| *ECSIGN* | 0.058 | 0.250 | -0.209 | 0.0160 | -0.358 | | 0.037 | -0.035 | | | |
| | (0.650) | (1.910^) | (-1.440) | (0.260) | (-2.890**) | | (0.470) | (-0.410) | | | |
| *BAD* | | | | | | -45.920 | | | -0.194 | -0.620 | -0.003 |
| | | | | | | (-6.200**) | | | (-1.760^) | (-2.530*) | (-1.020) |
| *GOOD* | | | | | | -8.226 | | | -0.598 | 0.096 | 0.000 |
| | | | | | | (-1.300) | | | (-6.550**) | (0.410) | (-0.130) |
| *ECHANGE* | 0.050 | 0.011 | 0.158 | 0.036 | 0.212 | -3.750 | 0.049 | 0.042 | 0.056 | 0.751 | 0.006 |
| | (1.870*) | (0.280) | (3.460**) | (1.880*) | (5.200**) | (-1.140) | (1.990*) | (1.590^) | (1.160) | (6.150**) | (3.740**) |
| *SIZE* | 0.103 | 0.157 | 0.108 | 0.076 | 0.047 | -3.442 | 0.075 | 0.046 | 0.066 | 0.368 | 0.006 |
| | (3.820**) | (3.900**) | (2.350*) | (3.890**) | (1.180) | (-0.550) | (3.030**) | (1.740*) | (0.710) | (1.540^) | (1.700*) |
| *CROSSLIST* | -0.577 | -0.914 | -0.504 | -0.246 | -0.138 | 33.526 | -0.379 | 0.126 | -0.203 | -3.714 | -0.046 |
| | (-4.270**) | (-4.460**) | (-2.290*) | (-2.560*) | (-0.740) | (0.980) | (-3.060**) | (1.030) | (-0.400) | (-2.880**) | (-2.620**) |
| *MB* | 0.065 | 0.058 | 0.153 | 0.020 | 0.099 | -3.408 | 0.089 | 0.141 | 0.156 | 0.388 | 0.001 |
| | (1.210) | (0.730) | (1.710^) | (0.490) | (1.220) | (-0.630) | (1.800^) | (2.580*) | (1.940^) | (1.910^) | (0.360) |
| *MEFORDER* | | | | | | -49.680 | | | | | |
| | | | | | | (-20.560**) | | | | | |
| *NREVENT* | | | | | | | | | 0.639 | | |
| | | | | | | | | | (6.610**) | | |
| *HORIZON* | | | | | | | | | -0.001 | 0.003 | 0.000 |
| | | | | | | | | | (-3.130**) | (3.100**) | (1.510) |
| *POINT* | | | | | | | | | | -0.608 | 0.004 |
| | | | | | | | | | | (-2.900**) | (1.500) |
| *IMR* | | | | | | -59.964 | | | 2.141 | 15.531 | 0.172 |
| | | | | | | (-0.590) | | | (1.410) | (3.890**) | (3.150**) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Estimated Cutpoint 1 | | | | | | 2.515 | | 5.308 | | |
| Estimated Cutpoint 2 | | | | | | 3.177 | | 5.691 | | |
| Estimated Cutpoint 3 | | | | | | | | 6.132 | | |
| Pseudo $R^2$ | 0.081 | | 0.062 | 0.114 | | 0.063 | 0.108 | 0.094 | | |
| Adjusted $R^2$ | | | | | 0.333 | | | | 0.254 | 0.118 |
| Model $\chi^2$ | 99.170 | 153.850 | 174.940 | 146.500 | | 120.610 | 235.880 | 253.490 | | |
| *F*-statistic | | | | | 39.580 | | | | 11.190 | 5.010 |
| p-value | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** |
| N | 897 | 897 | 897 | 897 | 897 | 897 | 897 | 1,082 | 449 | 449 |

^, * and ** denotes significance at the 0.1, 0.05 and 0.01 levels. One-tailed (two-tailed) test is used when coefficient sign is predicted (not predicted). See section 3 for model details and definitions of dependent and independent variables.

**Table 8**
**Regression Analysis for Sub-sample Firm-years and Management Earnings Forecasts**

| | Model 1a *FORECAST1* | Model 1b *FORECAST2* Comparison 1/0 | Model 1b *FORECAST2* Comparison 2/0 | Model 2a *FREQUENCY1* | Model 2b *FREQUENCY2* | Model 3 *HORIZON* | Model 4a *FORECAST3* | Model 4b *FREQUENCY3* | Model 4c *PRECISION* | Model 5a *ERROR* | Model 5b *BIAS* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*t*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*z*-statistic) | Coefficient (*t*-statistic) | Coefficient (*t*-statistic) |
| Intercept | 4.309 | 0.414 | 9.211 | 1.719 | 1.730 | 410.540 | | 0.650 | 0.616 | -9.580 | 0.394 |
| | (0.970) | (0.060) | (1.300) | (1.670^) | (0.960) | (3.870**) | | (0.470) | (1.560^) | (-3.500**) | (12.320**) |
| *REFORM* | 0.557 | 0.398 | 1.541 | 0.631 | 1.124 | 17.850 | 0.602 | 1.190 | 0.507 | -0.360 | -0.026 |
| | (2.910**) | (1.420^) | (4.050**) | (4.240**) | (3.510**) | (0.660) | (3.400**) | (5.330**) | (1.860*) | (-0.410) | (-2.520**) |
| *ANALYST* | 0.387 | 0.181 | 1.052 | 0.389 | 0.623 | 2.875 | 0.523 | 0.694 | -3.640 | 0.569 | -0.022 |
| | (2.000*) | (0.630) | (3.190**) | (2.860**) | (2.210*) | (0.150) | (2.990**) | (3.930**) | (-0.170) | (0.930) | (-3.060**) |
| *H* | -67.178 | -37.161 | -143.891 | -35.674 | -42.377 | -1112.966 | -52.019 | -37.300 | 17.358 | 140.751 | 2.208 |
| | (-1.280) | (-0.430) | (-1.720*) | (-3.190**) | (-2.340*) | (-0.740) | (-1.430^) | (-2.450**) | (0.250) | (3.040**) | (4.080**) |
| $H^2$ | 194.444 | 101.445 | 431.777 | 117.700 | 142.721 | 2906.435 | 147.037 | 136.918 | -0.068 | -538.915 | -7.356 |
| | (1.200) | (0.390) | (1.670*) | (2.830**) | (2.020*) | (0.610) | (1.280) | (2.490**) | (-0.530) | (-3.730**) | (-4.360**) |
| *BRDAC_INDPR* | 0.145 | 0.169 | 0.192 | 0.103 | 0.158 | -4.716 | 0.098 | 0.092 | 0.152 | 0.699 | -0.008 |
| | (1.730*) | (1.340^) | (1.290^) | (1.520^) | (1.110) | (-0.530) | (1.260) | (1.050) | (0.630) | (2.610**) | (-2.460**) |
| *BRDAC_SIZER* | 0.372 | 0.485 | 0.534 | 0.337 | 0.398 | 9.061 | 0.334 | 0.399 | 0.024 | 0.073 | -0.019 |
| | (3.730**) | (3.300**) | (3.150**) | (5.150**) | (2.950**) | (0.540) | (3.680**) | (4.800**) | (0.140) | (0.140) | (-3.110**) |
| *BRDAC_MEETR* | 0.258 | 0.222 | 0.528 | 0.317 | 0.508 | 13.692 | 0.217 | 0.379 | -0.093 | 0.320 | -0.013 |
| | (2.690**) | (1.510^) | (3.290**) | (5.070**) | (4.400**) | (1.120) | (2.470**) | (4.830**) | (-1.190) | (0.860) | (-3.090**) |
| *BRDAC_ACCEXPR* | 0.074 | 0.082 | 0.066 | 0.146 | 0.172 | 10.559 | 0.056 | 0.091 | 0.616 | 0.184 | -0.004 |
| | (0.820) | (0.610) | (0.460) | (2.500**) | (1.570^) | (1.930*) | (0.680) | (1.260) | (1.560^) | (1.320^) | (-2.160*) |
| *ECSIGN* | 0.123 | 0.345 | -0.209 | 0.018 | -0.470 | | 0.049 | -0.055 | | | |
| | (0.720) | (1.360) | (-0.760) | (0.160) | (-2.210*) | | (0.320) | (-0.400) | | | |
| *BAD* | | | | | | -52.732 | | | -0.409 | -0.528 | 0.004 |
| | | | | | | (-3.960**) | | | (-2.150*) | (-1.770^) | (1.040) |
| *GOOD* | | | | | | -7.569 | | | -0.724 | -0.564 | 0.000 |
| | | | | | | (-0.650) | | | (-4.470**) | (-2.020*) | (0.040) |
| *ECHANGE* | 0.030 | 0.003 | 0.108 | 0.039 | 0.228 | -2.987 | 0.020 | 0.040 | -0.024 | 0.305 | -0.001 |
| | (0.560) | (0.030) | (1.200) | (1.100) | (3.360**) | (-0.890) | (0.420) | (0.920) | (-0.500) | (3.230**) | (-0.970) |
| *SIZE* | 0.051 | 0.111 | 0.026 | 0.012 | -0.024 | -4.533 | 0.017 | -0.019 | -0.080 | -0.126 | -0.002 |
| | (0.980) | (1.390^) | (0.300) | (0.340) | (-0.360) | (-1.010) | (0.350) | (-0.440) | (-1.250) | (-1.070) | (-1.560^) |
| *CROSSLIST* | -0.396 | -0.768 | -0.180 | 0.061 | 0.057 | 12.060 | -0.200 | 0.419 | 0.288 | -0.193 | 0.022 |
| | (-1.760^) | (-2.200*) | (-0.490) | (0.400) | (0.200) | (0.550) | (-0.950) | (2.300*) | (0.930) | (-0.320) | (3.160**) |
| *MB* | 0.152 | 0.285 | 0.151 | 0.140 | -0.012 | 6.702 | 0.157 | 0.280 | 0.312 | 0.020 | -0.013 |
| | (1.410) | (1.740^) | (0.860) | (1.970*) | (-0.090) | (0.730) | (1.600) | (3.240**) | (2.340*) | (0.080) | (-4.510**) |
| *MEFORDER* | | | | | | -47.466 | | | | | |
| | | | | | | (-12.560**) | | | | | |
| *NREVENT* | | | | | | | | | 0.683 | | |
| | | | | | | | | | (4.230**) | | |
| *HORIZON* | | | | | | | | | -0.002 | 0.004 | 0.000 |
| | | | | | | | | | (-3.280**) | (3.570**) | (1.920^) |
| *POINT* | | | | | | | | | | -1.103 | 0.000 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | (-4.740**) | (0.070) |
| *IMR* | | | | | 67.395 | | | 0.426 | -0.068 | -0.107 |
| | | | | | (0.870) | | | (0.380) | (-0.030) | (-3.660**) |
| Estimated Cutpoint 1 | | | | | | -3.644 | | -1.439 | | |
| Estimated Cutpoint 2 | | | | | | -3.170 | | -0.982 | | |
| Estimated Cutpoint 3 | | | | | | | | -0.125 | | |
| Pseudo $R^2$ | 0.135 | | 0.115 | 0.187 | | 0.101 | 0.164 | 0.139 | | |
| Adjusted $R^2$ | | | | | 0.361 | | | | 0.410 | |
| Model $\chi^2$ | 48.740 | 61.940 | 10..460 | 86.810 | | 54.780 | 125.770 | 129.790 | | |
| *F*-statistic | | | | | 13.310 | | | | 8.710 | 0.152 |
| p-value | 0.000** | 0.000** | 0.000** | 0.000** | | 0.000** | 0.000** | 0.000** | 0.000** | 0.000** |
| N | 265 | 265 | 265 | 265 | 350 | 265 | 265 | 350 | 190 | 190 |

^, * and ** denotes significance at the 0.1, 0.05 and 0.01 levels. One-tailed (two-tailed) test is used when coefficient sign is predicted (not predicted). See section 3 for model details and definitions of dependent and independent variables.