DIRECTOR EFFECTIVENESS AND FIRM PERFORMANCE BEFORE AND AFTER THE ADOPTION OF THE NZX CORPORATE GOVERANANCE BEST PRACTICE CODE[#]

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Abstract

Changes in the listing requirements imposed by the New Zealand Stock Exchange (NZX) in August 2003 has fundamentally altered corporate governance within New Zealand and impacted the outside/independent board–firm performance relationship. Using a three stage least squares regression, we estimate the endogenous relationship between firm performance measure and outside/independent board representation over a sample of New Zealand listed companies during the period 1997-2008. Consistent with agency theory, we find that firms with a higher proportion of outside directors have a greater Tobin's Q. Simultaneously Tobin's Q is inversely related to the proportion of outside directors. We find that the code improved Tobin's Q. Firm response to the code saw an increase in the proportion of outside directors. However, the reduced sensitivity of outside directors to firm performance casts doubt on the effectiveness of outside board representation. Our results indicate that board composition is an important mechanism in the mitigation of agency within the firm and has implications for firm performance. In particular, firms adopting a high proportion of outside/independent directors may compromise the effectiveness of the board and be suboptimal during different time frames.

1. Introduction

This paper analyses the endogenous relationship between outside/independent board representation and the performance of New Zealand listed companies over the period 1997–2008. The period of our study is important for two reasons; first it includes the implementation of the Corporate Governance Best Practice Code by the New Zealand Stock Exchange (NZX) in 2003. The code amended listing rule requirements that included both mandatory and recommended standards. Second, the change in the compliance regulations provides a unique opportunity to review the relationship between board composition and firm performance as well as re-examine the effect of changes in listing requirements. In particular, our study examines the distinction made in the legislation between an outside non-executive director and a truly independent director. We also look at the exclusion of chief executive officer duality and the requirement that listed firms have a minimum of two independent directors or one-third (whichever is the larger) of total directors who are independent.

Board of director composition has become an important mechanism in the mitigation of agency costs through better alignment of manager-shareholder interests. The board can be seen as a market solution to the monitoring and contracting problems prevalent in most organisations (Hermalin and Weisbach, 2003). An appropriately compensated and independent board can be an effective proxy for overall good governance (Bhagat and Bolton, 2008), which in turn is expected to improve financial performance through an increase in expected cash flows as well as a reduction in the cost of capital (Reddy et al., 2010). A board that efficiently monitors managerial actions can improve the accountability and transparency of the firm, check on the level of risk exposure to the shareholder, and ratify long-term strategies that maximize the value of the firm. Outside directors are expected to develop expertise in monitoring corporate behaviour (Fama and Jensen, 1983), while inside directors are expected to have superior firm-specific knowledge enabling better strategic decision-making (Kiel and Nicholson, 2003). Thus, the inside-outside mix in theory has implications for firm performance. In practice, the effectiveness of board composition in enhancing firm performance is not clear. This becomes apparent through an examination of the empirical evidence from studies investigating board composition (Hermalin and Weisbach, 2003; Denis and McConnell, 2003). Conflicting results can be attributed to econometric issues associated with studies in corporate governance, such as endogeneity and model specification, as well as conflicting theoretical arguments.

Our research is unique in four ways. First, the econometric model controls for a wide variety of explanatory variables to isolate the effect of board composition on firm performance. We control for endogeneity and reverse causality by using a system of equations approach, and we control for unobservable firm heterogeneity and year effects using a two-way fixed effects specification. Thus, the coefficient estimates are econometrically sound and robust to various model specifications. Second, this study supports extant New Zealand evidence on the effect of the NZX code on firm performance (see Reddy, Locke and Scimegeour (2010) and Teh (2009)) and is the first to analyse the effect on board composition. Third, this study has the advantage of being able to differentiate between an outside non-executive director and independent director over the sub-sample period 2004–2008. Fourth, this is the first New Zealand–based study to analyse the sensitivity of outside/independent directors to firm performance through three factors: director remuneration, firm-level risk, and changes in the NZX code. These variables are likely to impact the board composition–firm performance relationship; and have important implications for firms, policymakers, and shareholders.

Changes in the economic environment, increased risk to board members, and additional changes to NZX listing requirements related to directors, combined with firm failure attributed to ineffective boards, make this is an opportune time to re-examine the board composition–firm performance argument. We extend the work done by Prevost et al. (2002) and re-examine the joint relationship between firm performance and board composition determinants within New Zealand during the period 1997 to 2008. We adopt a similar methodology to Prevost et al. (2002), employing a three stage least squares (3sls) estimation to control for endogeneity of board composition and firm performance. However, we improve their methodology by including fixed effects into the model specification to account for unobservable firm heterogeneity present within the panel data set.

Current evidence within the New Zealand context is not clear. Prior to our study a comprehensive analysis of board composition using New Zealand data was done by Prevost, Rao, and Hossain (2002). The study covers the period 1991 to 1997 and includes a significant legislation change, the 1993 Companies Act. This new law introduced three key changes for directors. [1] Prevost et al. (2002) report a positive joint association between firm performance and board composition after controlling for endogeneity using the method of

[1] It explicitly defined directors' duties, imposed penalties for failing to execute their fiduciary role, and expanded disclosure of directors' activities and business interests in the annual report.

three-stage least squares (3sls). In contrast, the study by Reddy et al. (2010) during the period 1999 to 2007 documents evidence that suggests this relationship has changed. However, Reddy et al. (2010) report that outside director representation is not significantly correlated to firm performance. Koerniadi and Tourani-Rad (2012) use a sample of 182 firm-year observations over the period 2004 to 2006 to examine the impact of independent directors on firm performance. They report that independent directors in New Zealand negatively affect firm value and consistent with stewardship theory these directors only add value when they are in the minority.

International evidence for the board composition firm performance argument is mixed at best. The majority of research conducted in the United States (US) indicates that board composition has no clear effect on US firm performance (Hermalin and Weisbach, 2003; Bhagat and Black, 2001). However, isolated studies in other jurisdictions find evidence towards a positive association (Prevost et al., 2002; Choi, Park, and Yoo, 2007; Dayla and McConnell, 2005; Kaplan and Minton, 1994), while others find a negative association (Agrawal and Knoeber, 1996; Kiel and Nicholson, 2003,). Conflicting results partly reflect the econometric problems associated with governance-related research, such as the endogeneity of variables of interest and model specification. Conflicting results also reflect competing theoretical arguments, in particular agency theory and stewardship theory. Agency theory is based on the premise that there is an inherent conflict of interest between owners of capital and those entrusted to manage the day-to-day activities and strategic vision of the firm on their behalf (Fama and Jensen, 1983). Managers may not pursue optimal policies when the financial consequences are disproportionally borne by the shareholders, and without effective monitoring may consume excess perks and shirk and empire-build at the expense of shareholders (Jensen and Meckling, 1976). Agency theorists would recommend a majority of outside directors on the board to independently monitor managers' actions, ensuring the firm's capital is employed to maximise the value of the firm. In contrast, stewardship theory argues that managers are trustworthy individuals who work hard in the interests of shareholders (Donaldson and Davies, 1991). Proponents of this theory argue that firms should have a majority of insider directors because relative to outsiders, insiders have superior firm-specific knowledge enabling better strategic and investment decision-making (Klein, 1998; Kiel and Nicholson, 2003). For a significant relationship to exist, the inherent assumption is that a certain board structure is optimal for all firms, and that firms which stray away from optimal structure will have lower performance. A final view is that the costs and benefits of

board structure vary across firms. Each firm optimally structures the board to suit their specific requirements. As such, in equilibrium there should be no empirical relation between board structure and firm performance (Hermalin and Weisbach, 2003; Mak and Li, 2001).

The remainder of this paper is set out as follows. Section 2 summarizes the prior research related to board composition and firm performance measures. The main hypotheses are developed in Section 3. The data and the empirical methodology are defined in Section 4. The results and robustness tests are reported in Section 5. Section 6 contains the conclusion.

2. Literature Review

International governance principles have highlighted the importance of outside/independent directors as a significant mechanism in the monitoring and accountability of executives.[2] In theory, the effect of this requirement on firm performance could be negative, positive, or insignificant. The current mixed empirical evidence may be attributed to the complex nature of determining firm value (see Hermalin and Weisbach, 2003, and Adams, Hermalin, and Weisbach, 2010, for good overviews). In addition, studies that have attempted to address the question of board independence and performance have also been hindered by econometric issues; in particular, the problem of low power in statistical tests and issues related to endogeneity (Hermalin and Weisbach, 2003). If board composition and firm performance are endogenous, ordinary least squares (OLS) estimates are biased and inconsistent, as the explanatory variable that is determined simultaneously with the dependent variable is correlated with the error term (Woolridge, 2002, p. 530).

A large amount of empirical and theoretical research has analysed the relation between board composition, accounting, and market measures of firm performance. Board composition includes the size of the board (see Yermack, 1996; Coles, Daniel, and Naveen, 2008), the proportion of outside or independent directors on a board (see, for example, Agrawal and Knoeber, 1996; Hermalin and Weisbach, 2003; Duchin, Matsusaka, and Ozbas, 2010) CEO duality (Brickley, Coles, and Jarrell, 1997; Kiel and Nicholson, 2003), and more recently, the gender and racial mix on the board (Carter, D'Souza, Simkins, and Simpson, 2010). Accounting or operating performance is defined by net income relative to the book value of assets or equity. Market measures of performance are defined as stock returns based on adjusted share prices and Tobin's Q.

[2] For example, the Sarbanes Oxley Act in the United States, the Cadbury report in the United Kingdom, and the OECD Principles of Corporate Governance.

Agency theory predicts that an independent board is more able to effectively align management action with shareholder interest through intensive monitoring and efficient contracting. This should result in a positive association between the proportion of board members and firm performance. A number of international studies have found this (Hossain, Prevost, and Rao, 2001; Prevost et al. 2002; Choi, Park, and Yoo, 2007; Dahya and McConnell, 2005; Duchin, Matsusaka, and Ozbas, 2010). In contrast, stewardship theory assumes managers are essentially trustworthy individuals who make decisions that maximise the value of the firm (Donaldson and Davis, 1991; Davis, Schoorman, and Donaldson, 1997). This model supports the view that superior corporate performance will be linked to a majority of insiders on the board, since these individuals maximise the value of the company for shareholders (Nicholson and Kiel, 2003). Insiders on the board might be more capable of making superior investment decisions due to their firm-specific expertise. If this is the case, an inverse relation between the proportion of outside directors and firm performance is expected. Indeed, studies by Nicholson and Kiel (2003), Agrawal and Knoeber (1996), and Klein (1998) have documented this relationship.

There is also a large amount of research using US data which argues the relationship is ambiguous, and as such no significant cross-sectional result can be found (Hermalin and Weisbach (1991); Bhagat and Black, 2001).These findings are consistent with optimization theory—that is, managers trade off the benefits and costs associated with the insider-outsider mix in order to find the optimal structure that maximizes firm value (Mak and Li, 2001).
A relatively new area of study focuses on financial remuneration to outside directors and the mitigation of agency costs (Bryan and Klein, 2004; Fich and Shivdasni, 2005). This area of study has largely been confined to the studies within the US.

An extensive survey of the US empirical literature by Hermalin and Weisbach (2003) and the updated version (Adams et al., 2010) has revealed that there is an insignificant cross-sectional relationship between accounting measures of firm performance and the proportion of outside board members.[3] Similarly, there have been a range of studies using market value measures of firm performance, such as Tobin's Q or market to book. The rationale for using these measures is that an efficient market should price intangible factors, such as governance, into firm performance which accounting measures cannot capture.

These considerations are also affected by the presence of an active market for corporate control in some countries acts as a strong monitoring mechanism and may even act as a

[3] Studies that have examined this issue include MacAvoy, Cantor, Dana and Peck (1983); Hermalin and Weisbach (1991); Mehran (1995); Klein (1998); and Bhagat and Black (2001).

substitute for independent directors. In equilibrium, and in the absence of regulation which mandates a certain mix of outside directors, market forces should force each firm to optimally allocate the proportion of outsiders to insiders of the board to minimise agency costs (Agrawal and Knoeber, 1996). It is likely that optimal governance structure differs across firms, purely because each firm faces unique management issues. Hence a systematic study which analyses the cross-sectional relationship across all firms is unlikely to find a significant result.Overall, studies using US data suggest that the degree of outsiders on a board has no clear effect on firm value. The reason why governance activists are so vocal is due to legislation such as the Sarbanes Oxley Act. Legal action has made a majority of independent board members a requirement. However, the lack of empirical evidence to support this decision is somewhat perplexing.

Ideally, boards of directors are designed to mitigate manager-shareholder conflict. However, directors themselves face the same incentives managers do in terms of maximising their own interest. Director-shareholder conflict may arise when incentives are not fully aligned (Ertugrul and Hegde, 2008). Fama and Jensen (1983) argue that director concern for his or her reputation acts as a strong incentive for convergence of interests. Reputational concern may be even stronger in a small market such as New Zealand, where directorial actions are more likely to be transparent. However, reputation alone may not be sufficient to eliminate agency conflict between outside directors and shareholders, and in fact can create its own agency problems (Holmstrom, 1999).[4] As such, in addition to reputation, convergence of interest between directors and shareholders may be obtained through appropriate financial incentives. Compensation to directors in broad terms comes in the form of cash, stock and option grants, and performance bonuses. The use of stock-based compensation to outside directors has grown significantly in the US.[5]

There is also evidence that compensation policy to outside directors can actually be a source of agency conflict rather than a mitigating factor. One possible reason could be due to managerial and board entrenchment since the board determines compensation for both the CEO and itself. Brick, Palmon, and Wald (2006) find a positive correlation between excess CEO compensation and excess director compensation. They suggest this could be due to

[4] For example, an outside director overly concerned with reputation may be exceedingly risk-averse and may prevent management from investing in positive net present value projects that are deemed to be too risky.
[5] Fich and Shivasani (2005) report that in 1992 just over 200 firms in the Fortune 1000 list offered stock-based compensation to outside directors. By 1997, this had grown to 500 firms. Bryan and Klein (2004) report that firms with greater agency problems use more option compensation for outside directors.

collusion of the CEO and board members to inappropriately increase their compensation at the expense of shareholders. Stock options may compromise board member independence.[6] In New Zealand, compensation to outside directors and the effect on firm performance has not been analysed. Equity-based compensation is not that common in New Zealand, and the current evidence supports the view that the proportion is less than optimal (Reddy et al., 2010).The main form of compensation paid to outside/independent directors is cash which carries a very different incentive mechanism than stock options.

A survey of international evidence related to board composition and firm performance by Dennis and McConnell (2003) indicates that the outside directors do not affect firm performance on average across countries. In contrast a number of studies suggest otherwise.[7] The results differ from studies in the US and suggest that the economic conditions of the country may contribute on the outcome. In particular, US firms operate in a market that is characterised by strong governance, economic stability and well-developed external governance mechanisms with high market liquidity. UK evidence suggests that the recommendation of three independent directors by the Cadbury Report had a significant positive impact on performance for those firms that complied. The NZX actioned a corporate governance best practice code after the Cadbury report (Teh, 2009). Evidence of board structure in Singapore show that corporate governance mechanisms do not affect firm value (Mak and Li, 2001). Given Singapore's weak market for corporate control, concentrated stock ownership and significant government ownership of firms suggests that the interrelationship between board structure and other governance variables indicate that market forces push firms to adopt optimal internal mechanisms.

The work by Prevost et al. (2001, 2002) indicates that board composition affects firm performance and vice versa. The study investigates the effect of the 1994 Companies Act on board composition and performance. The introduction of the act resulted in a significant increase in outside board representation. However, this increase reduced the sensitivity of firm performance to outside representation on the board, which casts doubt on the efficacy of regulation imposed by the NZ Government. Prevost et al. (2002) suggest that this result could be due to the increased threat of litigation driving away qualified outside directors or at least making them overly cautious. The incorporation of the 2003 NZX corporate governance best

[6] See Bebchuk, Grinstein and Peyers (2010); Cullinan, Du and Wright (2008).
[7] Work by Kaplan and Minton (1994) find evidence that outside director appointments improve operating performance, sales growth and stock returns in Japan. Similarly for Korea, based on a study by Choi, Park and Yoo (2007) following the Asian Financial Crisis.

practice code is a timely opportunity to relook at governance and firm performance in New Zealand.

Reddy et al. (2010) update the work conducted by Prevost et al. (2001, 2002) covering the period 1999 to 2007 to take into account the governance change introduced by the New Zealand securities commission in 2004. However the study does not take into account the potential endogeneity between performance and board composition. It also does not distinguish between outside and independent directors. Earlier Gunasekarage and Reed (2008) used an event study to measure market reaction to the governance change. The results suggest that shareholders expect additional outside directors will add value to the firm when agency problems are present.

Bradbury and Mak (2000) partition non-executive directors into affiliated and non-affiliated (independent) directors. They find that independent directors are associated with NZ firms that choose to adopt a less restrictive takeover amendment. This is consistent with the notion that independent board members are less likely to be entrenched and fight to prevent takeovers by using more restrictive takeover amendments.

Our study expands the work undertaken by Prevost et al. (2002). We analyse how director remuneration, firm-level risk and regulatory change influence outside director decision-making behaviour and impact firm performance. Outside directors serve as agents on behalf of shareholders, thus the potential for misaligned interests exists. Therefore, incentive mechanisms such as director remuneration can be used to motivate appropriate director action. Firm-level risk is also expected to impact outside director behaviour. In particular, outside directors of high-risk firms may monitor management actions more vigorously than low-risk firms due to the higher probability of financial default and subsequent loss of directorial reputation. Alternatively, if outside directors are risk averse, highly risky firms may not be able to attract and employ the most qualified outside directors, which in turn could compromise the effectiveness of the board. Finally, the implementation of the NZX code is likely to affect directorial behaviour through increased public and firm awareness of corporate-governance-related issues.

New Zealand's internal and external governance mechanisms differ substantially from the US and make board composition interesting for a number of reasons that are unique to this economy. Internal mechanisms relate to board structure, insider ownership, debt and dividend policy and management compensation, whilst external mechanisms relate to the

monitoring role provided by institutional shareholding, the market for corporate control, and the market for managerial labour (Agrawal and Knoeber, 1996; Easterbrook, 1984; Ang, Cole, and Lin 2000; Fama, 1980). These mechanisms can mitigate agency issues within the corporation, or alternatively serve to entrench management. The relative importance of outside directors in mitigating agency issues depends on whether alternative mechanisms act as substitutes or complements. Arguably, the most important internal mechanism is the board of directors (Prevost et al., 2002). This is because the board has the power to make, or at least ratify, all decisions relating to capital structure, management compensation, and executive share ownership. Therefore, the relative importance of board composition depends on the strength of external mechanisms in monitoring and, if necessary, disciplining management.

There are substantial differences between the external environment in New Zealand relative to our US and UK counterparts. First, the majority of shares held by New Zealand firms are highly concentrated, whilst shareholdings of UK and US firms are widely dispersed (Bhabra, 2007; Hossain et al., 2001; Prevost et al., 2001; Reddy, 2010). Hossain et al. (2001) Prevost et al. (2001) report the mean proportion of stock held by the largest 20 shareholders is 73% from 1991 to 1997 in New Zealand. Similarly, Gunasekarage and Reed (2008) report that the mean shareholding of the top 10 blockholders from 1999 through to 2004 was 64%. The comparative figure in the US is only 37.66% (Demsetz and Lehn, 1985). In contrast, Holderness (2009) documents that 96% of US publicly held firms have blockholders who own 39% of the common stock on average. Hence, it could be argued that there is greater potential for shareholder activism in NZ compared with other countries, which could have positive implications for firm performance. This could effectively diminish the monitoring role of outside directors if ownership concentration acts as strong substitute (Prevost et al., 2002). This is often not the case; New Zealand institutions are often criticized for their apathy towards monitoring (Bhabra, 2007). Furthermore, institutional shareholdings are dominated by foreign as opposed to New Zealand institutions (Bhabra, 2007). The geographical dispersement could hamper the monitoring ability of such institutions, leaving an important role for outside directors. Second, the corporate takeover market in New Zealand is weak at best (Reddy, 2010). The lack of an external discipline force enables entrenchment of poorly performing management, which could contribute to poor firm performance. Third, the small scale of New Zealand firms and relatively little remuneration hardly promotes competition within the managerial labour market. In general, external mechanisms seem less than optimal

within New Zealand, and as such the onus for effective governance falls predominantly on the board.

On 6 May 2003 the NZX announced its Corporate Governance Best Practice Code, which came into effect 29 October 2003. The NZX's aim was to create a regime that gave the New Zealand markets international credibility, enhanced investor confidence, and brought New Zealand markets into line with other recognised markets (Gilbertson and Gibson, 2003). New Zealand adopted a flexible principle-based approach similar to codes adopted by the UK, Canada, and Australia (Teh, 2009). This approach establishes guidelines for effective governance and relies on firms to adopt the recommendations, or else explain otherwise. The advantage of such an approach is that it accounts for firm heterogeneity and minimises compliance costs. This regulation also makes a clear distinction between an independent director and an outside director in New Zealand.[8]

3. Hypothesis Development

The first hypothesis examines the primary relationship of interest between the proportion of outside/independent board members and firm performance. Agency theory predicts a positive association while stewardship theory predicts a negative relation. The first hypothesis is then:

> *H1a: The proportion of outside board members is positively related to firm performance measures over the sample period 1997–2008.*

The preceding discussion also indicates that some outside directors may have affiliations with the firm that compromises their independence, and could bias results. From 2004 onwards, a definition of independent directors can be obtained. The second hypothesis is then:

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[8] The New Zealand Securities Commission (2004, p. 11) clarifies the definition of independence:

"*A non-executive director is formally classified as independent only where he/she does not represent a substantial shareholder and where the board is satisfied that he/she has no other direct or indirect interest or relationship that could reasonably influence their judgement and decision making as a director."*

H1b: The proportion of independent board members is positively related to firm performance measures over the sample period 2004–2008.

An independent director is expected to monitor and discipline management with more vigilance than an outside director. The increased reduction in agency conflict should be reflected in a higher coefficient for the independent director representation estimator than the outside director representation estimator.

H1c: The proportion of independent directors will have a larger, and positive, economic impact on firm performance relative to the proportion of outside directors.

Evidence in the US suggests that board composition may be endogenous, so that firm performance and the structure of the board are determined simultaneously (Bhagat and Black, 2001, Hermalin and Weisbach, 2003). The most comprehensive analysis in New Zealand suggests the relationship is jointly positive (Prevost et al., 2002). This leads to the second hypothesis:

H2a: Firm performance and outside board representation are jointly positive for the period 1997–2008.

H2b: Firm performance and independent board representation are jointly positive for the period 2004–2008.

The impact of the NZX Code on New Zealand firm performance can be directly tested using a dummy variable for the time period after 2003. Mandating independent directors onto New Zealand boards could reduce agency costs through improved monitoring and contracting, and have a positive impact on firm performance.

Current New Zealand evidence indicates the code had a positive impact on firm performance (Teh, 2009; Reddy et al., 2010). Thus:

H3: The NZX code had a positive impact on firm performance measures.

The intention of the NZX code was to improve governance in New Zealand in line with governance norms internationally (Gilbertson and Gibson, 2003). It is hypothesised that outside directors will better monitor management and improve firm performance following the code compared with the pre-code era. An interaction term calculated by the product of the

proportion of outside directors and a dummy variable equal to one for the years after 2003 will test the following hypothesis:

H4: The sensitivity of firm-performance to outside director representation is larger post-code than pre-code.

The NZX code mandated that the CEO could not concurrently hold position as the chairman of the board. It is expected that firms with no CEO duality prior to 2003 outperformed firms that do.

H5: CEO duality is negatively related to firm performance measures.

Outside directors may be motivated to act in the best interest of shareholders through appropriate financial incentives. Outside directors that are highly compensated could have a greater incentive to monitor, contract, and discipline management, and could reduce agency conflict. Furthermore, firms in New Zealand have to vigorously compete to attract and retain the best outside directors. It is assumed that firms that pay the highest average fees are able to attract and retain the most qualified outside director. The following hypothesis tests this idea:

H6a: The efficacy of outside representation on the board to firm performance is positively associated with average outside director fees.

H6b: The efficacy of independent representation on the board to firm performance is positively associated with average outside director fees.

An outside director concerned with reputation may not supply his or her labour to firms that are considered too risky. If a highly risky firm has a lower available pool of directors to employ, then the firm could be forced to adopt outside directors that do not have the required skills and expertise. This leads to the following hypothesis:

H7a: The efficacy of outside representation on the board to firm performance is negatively associated with firm-level risk.

H7b: The efficacy of independent representation on the board to firm performance is negatively associated with firm-level risk.

4. Methodology and Data

Stage 1: Full sample period 1997–2008

We examine the relationship between board composition and firm performance using three multivariate econometric models over the sample period 1997 through to 2008. We also investigate the role of independent directors following the introduction of the Best Practice Code in 2003 using the sub-sample from 2004 – 2008. First, we estimate the model proposed by Hossain et al. (2001) with the addition of fixed effects. Second, we replicate the model proposed by Prevost et al. (2002) using 3sls with fixed effects. This model treats firm performance and board composition as endogenous variables. Third, we estimate a new model that uses additional explanatory variables, controlling for endogeneity using 3SLS.

4.1 Model 1: OLS Regression

Model 1 follows Hossain et al. (2001), including fixed effects:

$$FP_{i,t} = \beta_0 + \beta_1 OD_{i,t} + \beta_2 OD * CODE_{i,t} + \beta_3 BOARD_{i,t} + \beta_4 CCH_{i,t} + \beta_5 INSOWN_{i,t} + \beta_6 BLOCK_{i,t} + \beta_7 TA_{i,t} + \beta_8 DEBT_{i,t} + \beta_9 SEGMENT_{i,t} + \beta_{10} CAPEX_{i,t} + \gamma \times TIME\ DUMMY_t + \alpha_i + \varepsilon_{i,t} \quad (1)$$

Where $FP_{i,t}$ represents firm performance for firm *i* in year *t*, and is measured by the two dependent variables Tobin's Q and return on assets (ROA), respectively. OD is the proportion of outside directors on the board. CODE is a dummy variable taking the value of 1 for the time period 2004–2008 and zero elsewhere, thereby capturing the time interval after the NZX code came into effect. The interaction term OD * CODE captures the efficacy of outside directors to firm performance after new regulation has been in place. BOARD is the number of directors on the board. CCH is a dummy variable that takes the value of one if the CEO is also the chairman of the board. INSOWN is the sum of the director shareholdings held beneficially divided by total shares outstanding. BLOCK is the cumulative percentage ownership of the largest five shareholders, excluding nominee and custodial services and director shareholdings. To proxy for firm size, the natural logarithm of total assets (TA) is used. DEBT is the value of total liabilities scaled by total assets. SEGMENT is the number of business segments and CAPEX is the total commitment to capital expenditure. Year dummy variables are used for 1997 through to 2007 (2008 acts as the base year). The fixed effects α_i account for unobserved, firm-specific heterogeneity that is invariant over time. $\varepsilon_{i,t}$ is the

usual error term capturing unobservable effects not explained by the model, assumed to be identically and independently distributed with zero mean and constant variance. A more thorough explanation of each variable follows:

$$\text{Tobin's Q} = (\text{MVE} + \text{PS} + \text{LTD} + \text{STD} - \text{CA})/\text{BTA}$$

where MVE is the market value of equity for firm *i* in year *t* calculated as the product of the firm's share price at balance date and the number of ordinary shares outstanding. PS is the value of the firm's preferred stock, LTD is the book value of the firm's non-current liabilities, STD is the firm's book value of current liabilities, CA is the book values of the firm's current assets, and BTA is the book value of the firm's total assets. All variables are measured at each firm's balance date.[9]

ROA is used as a secondary measure of firm performance. ROA is not affected by the psychology of investors. Including ROA as an additional dependent variable will add robustness to empirical results. ROA is simply measured as net income divided by book value of assets.

Explanatory variables in the model are used to control for factors that could affect firm performance. The board structure variables are the proportion of outside directors, board size and CEO duality. Director ownership measured as the proportion of beneficial shares held by the directors. The effect of institutional shareholders measured as the proportion of shares held by the five largest shareholders (BLOCK), excluding custodial institutions. Firm size is measured using the natural logarithm of total assets. The capital structure of the firm calculated as the book value of total liabilities to the book value of total assets. The number of business segments which proxy for the scope and complexity of the firm's operations, and controls for the effect of diversification on firm value. Growth opportunities measured by commitment to capital expenditures scaled by total assets (Hossain et al., 2001). Year dummy variables control for factors that affect firm performance over time, such as the stage of the business cycle. Fixed effects modelled with firm dummy intercept variables, α_i account for unobserved, firm-specific heterogeneity that is invariant over time. This factor captures the uniqueness of firm management ability and effort, the value of the firm's brand.

[9] Chung and Pruitt (1994) find that at least 96.6% of the total variability in the theoretical Tobin's Q is explained by the approximate Tobin's Q.

In order for the coefficient estimates to be unbiased and efficient, Model 1 assumes all explanatory variables are exogenous. If this is true, then OLS estimators are more efficient than approaches used to correct for endogeneity, such as an instrumental variable approach. OLS is also less prone to mis-specification error (Hossain et al., 2001; Bhagat and Black, 2001). The remaining two models use a systems approach to estimate the joint interaction between firm performance measures and board composition.

4.2 Model 2: 3SLS

This model examines the relationship between board composition and firm performance assuming they are endogenous. The coefficients are estimated in a simultaneous system using 3sls.[10] Model 2 is equivalent to Prevost et al. (2002), with the exception that it controls for time and unobservable firm-specific effects. Our models are given as:

$$FP_{i,t} = \beta_0 + \beta_1 OD_{i,t} + \beta_2 OD * CODE_{i,t} + \beta_3 INSOWN_{i,t} + \beta_4 BLOCK_{i,t} + \beta_5 DEBT_{i,t} + \beta_6 TA_{i,t} + \beta_7 CAPEX_{i,t} + \gamma \times TIME\ DUMMY_t + \alpha_i + \varepsilon_{1i,t} \quad 2(a)$$

Where $\varepsilon_{1i,t}$ represents the residuals from the firm performance structural equation, and $\varepsilon_{2i,t}$ represents the residuals from the OD structural equation.

$$OD_{i,t} = \beta_0 + \beta_1 FP_{i,t} + \beta_2 INSOWN_{i,t} + \beta_3 BLOCK_{i,t_{i,t}} + \beta_4 DEBT_{i,t} + \beta_5 BOARD_{i,t} + \beta_6 CAPEX_{i,t} + \beta_7 CCH_{i,t} + \beta_8 CODE_{i,t} + \beta_9 SEGMENT_{i,t} + \gamma \times TIME\ DUMMY + \varepsilon_{2i,t} \quad 2(b)$$

Equation 2a is equivalent to equation 1 except that the explanatory variables BOARD, CCH, and SEGMENT have been excluded in order for the system of equations to be identified.

The first three exogenous variables, INSOWN, BLOCK, and DEBT, are alternate governance mechanisms which are assumed to act as substitutes to OD (Prevost et al., 2002; Agrawal and Knoeber, 1996). BOARD measures board size and is expected to be positively related to OD (Prevost et al., 2002). Commitment to capital expenditure is used as a proxy for growth opportunities. CCH is a dummy variable that takes the value one when the CEO is also the Chairman of the board. CODE is a dummy variable that takes on the value of one for the

[10] We use 3sls over 2sls estimate because 3sls accounts for cross-equation correlation that is likely to exist in our data, resulting in more efficient estimators.

years 2004 to 2008. The number of businesses segments, as disclosed in the annual report, is used as a proxy for the complexity of the firm

4.3 Model 3

The third model is similar to model 2, but includes additional explanatory variables in the firm performance equations. Additional interaction variables are added to this model to test hypotheses 6a and 7a. The system of equations is specified as follows:

$$FP_{i,t} = \beta_0 + \beta_1 OD_{i,t} + \beta_2 CODE_{i,t} + \beta_3 OD * CODE_{i,t} + \beta_4 OD * RISK + \beta_5 OD * FEE_{i,t} + \beta_6 INSOWN_{i,t} + \beta_7 INSOWN^2_{i,t} + \beta_8 INSOWN^3_{i,t} + \beta_9 BLOCK_{i,t} + \beta_{10} DEBT_{i,t} + \beta_{11} TA_{i,t} + \beta_{12} CAPEX_{i,t} + \beta_{13} RISK_{i,t} + \beta_{14} CCH_{i,t} + \gamma \times time\ dummy + \alpha_i + \varepsilon_{1i,t} \quad 3(a)$$

$$OD_{i,t} = \beta_0 + \beta_1 FP_{i,t} + \beta_2 INSOWN_{i,t} + \beta_3 BLOCK_{i,t} + \beta_4 DEBT_{i,t} + \beta_5 BOARD_{i,t} + \beta_6 CAPEX_{i,t} + \beta_7 CCH_{i,t} + \beta_8 CODE_{i,t} + \beta_9 SEGMENT_{i,t} + \gamma \times time\ dummy + \varepsilon_{2i,t} \quad 3(b)$$

These are extensions of Model 2. Additional variables include CODE to capture the impact of legislative reform, squared and cubed values of inside ownership (Bhabra, 2007), firm level risk measured as the five-year standard deviation of share returns, CCH, CEO duality dummy variable and the interaction between the proportion of outside directions and average outside direction remuneration. Finally, the interaction between outside directors and firm risk is also included as an explanatory variable.

Stage 2: Sub-sample period 2004 - 2008

The second stage of empirical tests utilises the New Zealand Securities Commission (2004) definition of independent directors over the sample period 2004–2008. This explicit distinction between a director that is a non-executive (outside) versus an independent director will be used to test hypothesis 1b, 1c, 2b, 6b, and 7b.

4.4 Model 4

First, for comparative purposes, we estimate the simultaneous model using OD and firm performance measures as the endogenous variables over the sub-sample period 2004–2008. Model 4 is specified as:

$$FP_{i,t} = \beta_0 + \beta_1 OD_{i,t} + \beta_2 OD * RISK_{i,t} + \beta_3 OD * ODFEE_{i,t} + \beta_4 INSOWN_{i,t} + \beta_5 INSOWN^2{}_{i,t} + \beta_6 INSOWN^3{}_{i,t} + \beta_7 BLOCK_{i,t} + \beta_8 DEBT_{i,t} + \beta_9 TA_{i,t} + \beta_{10} CAPEX_{i,t} + \beta_{11} RISK_{i,t} + \gamma \times time\ dummy + \delta \times industry\ dummy + \varepsilon_{1i,t} \quad 4(a)$$

$$OD_{i,t} = \beta_0 + \beta_1 FP_{i,t} + \beta_2 INSOWN_{i,t} + \beta_3 BLOCK_{i,t} + \beta_4 DEBT_{i,t} + \beta_5 BOARD_{i,t} + \beta_6 CAPEX_{i,t} + \beta_7 SEGMENT_{i,t} + \gamma \times time\ dummy + \delta \times industry\ dummy + \varepsilon_{2i,t} \quad 4(b)$$

Model 4 is equivilent to model 3; however, CCH has been dropped because NZX listing rules prohibit CEO duality, and industry dummies replace firm dummies. Unlike prior models, we are unable to control for unobservable firm heterogenity because the sample size drops to 355 firm-year observations, reducing the power of statistical tests. The degress of freedom are too low to be able to effectivly estimate over 100 parameters when firm dummies are included in the model. We do, however, control for any industry effect using industry dummies.This system of equations is estimated using a 3sls approach.

4.5 Model 5

Finally, to test hypothesis 1b, 6b, and 7b, we estimate model 5 using the definition of independent directors:

$$FP_{i,t} = \beta_0 + \beta_1 INDD_{i,t} + \beta_2 INDD * RISK_{i,t} + \beta_3 INDD * INDDFEE_{i,t} + \beta_4 INSOWN_{i,t} + \beta_5 INSOWN^2_{i,t} + \beta_6 INSOWN^3_{i,t} + \beta_7 BLOCK_{i,t} + \beta_8 DEBT_{i,t} + \beta_9 TA_{i,t} + \beta_{10} CAPEX_{i,t} + \beta_{11} RISK_{i,t} + \gamma \times time\ dummy + \delta \times industry\ dummy + \varepsilon_{1i,t} \quad 5(a)$$

$$INDD_{i,t} = \beta_0 + \beta_1 FP_{i,t} + \beta_2 INSOWN_{i,t} + \beta_3 BLOCK_{i,t} + \beta_4 DEBT_{i,t} + \beta_5 BOARD_{i,t} + \beta_6 CAPEX_{i,t} + \beta_7 SEGMENT_{i,t} + \gamma \times time\ dummy + \delta \times industry\ dummy + \varepsilon_{2i,t} \quad 5(b)$$

INDD represents the proportion of indepenednt directors and INDDFEE represents the average fee paid to independent directors.

4.5 Data

The data required for models 1 through 5 are obtained from the NZX Company Research Database (formerly N ZX Deep Archive). The sample includes both listed and delisted firms over the period 1997 to 2008 in order to reduce the possibility of survivorship bias impacting results. Firms were excluded from the sample in any given year if they did not have all the required information. In total, 153 firms are analysed over the 12-year horizon, but because firms merge, delist, or have insufficient information, a total of 909 firm-year observations are obtained. This sample is substantially higher than the sample selection of New Zealand studies conducted by Prevost et al. (2002) and Reddy et al. (2010), which had 607 firm years and 410 firm years, respectively. The larger degrees of freedom within our sample will allow more powerful empirical tests to be carried out. The second stage of analysis uses data over the period 2004 to 2008. The number of firm-year observations drops to 355, thus reducing the power of statistical tests.

The sample includes firms from all sectors of the economy as classified by the NZX, including primary, energy, goods, property service, and investments[11]. Each model controls for influential outliers in the firm performance measures using the Cook's distance

[11] Available at https://www.nzx.com/markets/NZSX/sectors/G04

approach[12]. Following an approach suggested by Bollen and Jackman (1990) an observation is treated as an outlier if Cook's distance is greater than 4/n, where n is the number of observations. The outliers are removed from subsequent analysis so that parameter estimates are truly representative of the general behaviour of all observations in the sample.

5 Results

[Insert Table 2 here]

Table 2 displays sample descriptive statistics for the pooled data over the period 1997 to 2008. The mean (median) Tobin's Q is 1.495 (1.013), slightly greater than Prevost et al.'s (2002) sample mean of 1.124 and less than Reddy et al.'s (2010) sample mean of 3.26. The median is slightly above 1, indicating that the sample of New Zealand listed companies' added value above the replacement cost of assets to shareholders. The mean (median) ROA is -0.08 (0.046), once again skewed by a few firms with enormous losses. The sample median is similar to Reddy et al. (2010). The median board size has not changed since Prevost et al. (2002) published their results, consisting of six directors. The invariant nature of board size could indicate that on average New Zealand firms believe that six directors are optimal. The proportion of outside directors is remarkably high, with a mean (median) of 0.82 (0.83), comparable with Reddy et al.'s (2010) sample mean (median) of 0.76 (0.8). This could indicate that New Zealand firms rely heavily on outside directors to mitigate agency issues

[12] Cook's Distance is one regression diagnostic technique used to determine whether an extreme observation is exerting excessive influence on parameter estimates by causing a statistically significant change in the regression line (Wilson 1997).

Cook's Distance is measured as follows (Wilson 1997):

$$D_i = \frac{(\hat{Y}_i - \hat{Y}_{(i)})' (\hat{Y}_i - \hat{Y}_{(i)})}{p\hat{\sigma}^2}$$

Where

D_i = the ordinary Euclidean distance between Y and Y_i

$\hat{Y}_i$ = the vector of estimates from the regression line including the *i*th observation

$\hat{Y}_{(i)}$ = the vector of estimates from the regression line excluding the *i*th observation

p = the number of parameters

$\hat{\sigma}^2$ = the standard error of the estimate.

within the firm, perhaps due to weak external mechanisms. It may also be that the proportion of outside directors could be too high, impeding firm performance. The proportion of outside directors in our sample is substantially higher than Prevost et al. (2002), who has a mean proportion of outside directors (median) of 0.55 (0.6), but this could be due to difference in the definition of outside directors. Prevost et al. (2002) are able to partition directors as insiders, affiliated or independent outsiders. Interestingly, as illustrated in table 4, the mean (median) of independent directors within our sample from 2004 to 2008 is 0.59 (0.57), very similar to Prevost et al. (2002). The mean (median) total fee paid to outside directors is $38,000 ($32,000). The minimum is $0, according to the annual reports Southern Capital did not pay their outside directors any form of remuneration in 2000, 2001, and 2002, but began remunerating outside directors after acquiring Hirequip Limited and renaming the company Hirequip New Zealand Limited. The mean (median) percentage of inside ownership is 8.9% (1.1%) comparable with Prevost et al.'s (2002) of 6.4% (0.6%) and Reddy et al. (2010). The mean (median) percentage of shares held by blockholders is 43% (41%), substantially lower than Prevost et al.'s (2002) sample mean (median) 60% (61%) and Reddy et al.'s (2010) sample mean (median) 62% (65%). This is due to the different definition of institutional blockholding. We exclude nominee firms that do not have a beneficial interest in shares. This result indicates that the ownership structure of New Zealand firms is not as highly concentrated as many prior studies believe. However, block ownership at 43% is still larger than in other markets such as the United States, where the comparable figure is around 25% (Demsetz and Lehn, 1985). CEO duality has a sample mean (median) of 6% (0), substantially lower than the mean 21.3% reported by Prevost et al. (2002). The drop is due to the change in listing requirements in 2003, which mandated that the CEO could not concurrently be the chairman of the board. The mean (median) ratio of commitment to capital expenditures scaled by total assets is 0.024 (0.003), comparable with Prevost et al. (2002), who report a mean (median) of 0.029 (0.005). The mean (median) number of business segments is 1.64 (1), once again comparable with Prevost et al. (2002), who report a mean (median) of 1.95 (1). The mean (median) debt ratio is 44% (43%), comparable with Hossain et al. (2001) and Reddy et al. (2010), who respectively report a mean (median) debt ratio of 41% (42%) and 47% (44%). The mean (median) size of New Zealand firms measured by the natural logarithm of total assets is 18.5 (18.6), or equivalently $118 ($120) million dollars, substantially smaller than Prevost et al.'s (2002) sample mean of $690 million. The mean (median) firm risk is 0.4 (0.31), with a smaller mean than Reddy's (2010) sample 0.68, but comparable with the median sample 0.35.

[Insert Tables 3 and 4 here]

Tables 3 and 4 display sample descriptive statistics for the pooled data over the sub-sample periods 1997 to 2003 (pre-code) and 2004 to 2008 (post-code). Most variables are comparable with the descriptive statistics presented in Table 2.

[Insert Table 5 here]

Table 5, panel A, reports a simple t- test for the difference between two means for the firm performance variables and proportion of outside directors over the two sub-sample periods. The mean Tobin's Q for New Zealand firms increased from 1.21 to 1.93, and with a t- value of 4.78 is significant at the 1% level. This indicates that the implementation of the NZX code had the desired effect of improving governance and hence firm performance. The mean ROA increases from -0.11 to -0.02, but this increase is insignificant due to the high standard deviation of ROA . The proportion of outside directors increased slightly from 0.808 to 0.824, and with a t-statistic of 1.537 is significant at the 10% level, consistent with the hypothesis that New Zealand firms responded to the change in listing requirements by changing board structure. Also of interest is the difference between the proportion of outside and independent directors over the post-code period 2004–2008. Panel B of table 5 shows that the mean proportion of outside directors is 0.82, while the proportion of independent directors is only 0.59. A simple t-test of the difference of two means confirms that this difference is significant at the 1% level (t-statistic 16.98). This confirms that the distinction between an outside director and independent director is important and could have an effect on subsequent results. Panel B of table 5 also reports that independent directors are paid on average $46,000 in total fees, while outside directors are paid $45,600; however, the difference between the two means is insignificant.

[Insert Table 6 here]

Table 6 displays a pairwise correlation matrix for the firm performance dependent variables and the independent variables. The star beside the coefficient indicates the correlation is significantly different from 0 at the 5% level of significance. Both Tobin's Q and ROA are insignificantly correlated with OD, consistent with current evidence in New Zealand (Reddy et al., 2010) and within the US (Bhagat and Black, 2001) indicating that board structure has no discernable effect on firm performance. This finding supports the

optimization theory: New Zealand firms trade off the benefits and costs associated with the insider-outsider mix in order to find the optimal structure that maximises firm value.

Tobin's Q is significantly correlated to most independent variables, and generally displays the expected sign. For example, Tobin's Q is significantly negatively correlated to BOARD, SEGMENT, and TA, consistent with theory and extant empirical evidence (Yermack, 1996; Berger and Ofek, 1995; Fama and French, 1992). Tobin's Q is positively associated with RISK and with CODE, indicating the passage of the NZX code had a positive effect on firm performance, a result consistent with Reddy et al. (2010) and Teh (2009). The negative correlation between Tobin's Q and BLOCK is possible if high block ownership insulates firms from efficacy-improving takeovers (Prevost et al., 2002).

This negative correlation suggests that a company that reports below-average ROA is associated with a higher market valuation (Yermack, 1996). This odd result is likely to be driven by outliers present in the sample for both ROA and Tobin's Q which affects the mean and hence the correlation measure. 714 out of 909 (78%) firm-year observations report a positive ROA, yet the sample mean is -0.08, driven by a few very large negative returns. At the same time, a few large positive values skew the mean value of Tobin's Q (1.5) substantially higher than the median (1.012). For the ROA measure, 87% of observations are greater than the mean, while for the Tobin's Q measure 70% of observations are below the mean, which drives the significant negative correlation.

There is some evidence of interdependence among the explanatory variables. For example, OD is significantly correlated to INSOWN, BLOCK, BOARD, CCH TA, and RISK, consistent with the view that governance mechanisms are interrelated. The largest correlation between independent variables is BOARD and TA at 0.58, consistent with well-known evidence that board size is positively related to firm size (Hossain et al., 2001). Other pairwise correlations between independent variables are generally less (in absolute value) than 0.2, thus it is unlikely that multicollinearity will be an issue in multivariate regressions.

[Insert Table 7 here]

Model 1: OLS Regression

Table 7 reports regression results for the OLS model specified by Hossain et al. (2001), including fixed effects. T-values are calculated using normal standard errors because once firm fixed effects are included in regression models, OLS standard errors are unbiased

(Petersen, 2009, p. 464). Using the Cook's distance approach to remove influential outliers, the sample size drops from 909 firm-year observations to 881 (899) when Tobin's Q (ROA) is used as the measure of firm performance. For both performance measures, the ANOVA F value is significant at the 1% level, indicating the overall model is a good fit. The Hausman confirms the use of a fixed effects model for both measures of performance.

As the primary variable of interest, OD is insignificantly associated with Tobin's Q, consistent with recent evidence provided by Reddy et al. (2010). Thus, Hossain et al. (2001) Prevost et al.'s (2001) findings of a positive and significant relationship between OD and Tobin's Q seem to have disappeared over the period 1997 to 2008. However, a significant positive relationship exists between OD and ROA, providing at least some evidence to support hypothesis 1a. The interaction term between OD and CODE is negative for both performance measures, and only significant for ROA. Thus, we find no support for hypothesis 4. Outside directors did not improve their monitoring efficacy after the implementation of the code, rather there is some evidence that the sensitivity of firm performance to outside director representation declined after the code. The coefficient for CCH is negative when both Tobin's Q and ROA are used as the dependent variable, and significant at the 10% and 5%, respectively. This supports hypothesis 5: CEO duality gives too much power to CEOs, which enhances agency conflict and reduces firm performance. SEGMENT is negative and significant for both performance measures. This supports extant US evidence of the link between diversification and value destruction (Wernerfelt and Montgomery, 1988; Lang and Stulz, 1994; Servaes, 1996). BOARD is positively associated with Tobin's Q, but has no effect on ROA. BLOCK is positively related to ROA and significant at the 1% level; however, it is insignificant when Tobin's Q is used as a measure of firm performance. As expected, the size of the firm (TA) is inversely related to Tobin's Q, and DEBT is positively associated to Tobin's Q. However, TA is positively related to ROA, and DEBT is negatively related to ROA. The conflicting evidence makes it difficult to draw conclusions. Other explanatory variables are insignificant.

[Insert Table 8 here]

Model 2: 3SLS estimates of firm performance and outside board representation

Model 1 assumes outside board representation is exogenous. However, prior studies indicate outside board representation is likely to be endogenously determined by the firm (Hermalin

and Weisbach, 2003). Thus, to obtain unbiased estimates we use the model specified by Prevost et al. (2002) and use a 3sls approach. Unlike Prevost et al. (2002), we include time dummies to account for variations in firm performance over time, and firm dummy variables to control for unobservable firm heterogeneity. Using the Cook's distance approach to remove influential outliers, the sample size drops from 909 firm-year observations to 882 (901) when Tobin's Q (ROA) is used as the measure of firm performance. The regression estimates are reported in table 8 and used to test hypotheses 2 and 4.

Model 2a: Endogenous variables Tobin's Q and OD

Model 2a in table 8 reports the coefficient estimates when Tobin's Q as the measure of firm performance and OD are determined in a simultaneous system of equations. Both models fit the data well, with the chi-square statistic significant at the 1% level. Most time and firm dummies are significant at the 5% level (unreported), indicating the inclusion of fixed effects is necessary. Under hypothesis 2, OD and Tobin's Q are expected to demonstrate a positive relation with each other. Interestingly, we find that Tobin's Q has a significant, negative association with OD, while OD has a significant, positive association with Tobin's Q. This result is consistent with agency explanations. Similar to Hermalin and Weisbach (1988) and Bhagat and Black (2001), the negative coefficient of Tobin's Q in the OD equation indicates that firms with worse performance, which is an indication of poor management and the need for greater monitoring, are compelled to increase the proportion of outside directors. Dissimilar to Bhagat and Black (2001), the significant positive association between OD and Tobin's Q implies this strategy tends to work.

The effectiveness of outsider board representation is pleasing from an agency perspective; however, the significant negative coefficient for the interactive variable ODCODE indicates the efficiency of outside directors to firm performance has decreased after implementation of the code, contrary to expectations. The marginal effect of adding an additional director is negative. Under hypothesis 4, outside board members are expected to monitor management more after implementation of the code due to heightened awareness of corporate governance issues. This does not seem to be the case. The period 2004 to 2008 was a volatile period for New Zealand firms; many were adversely affected by the global financial crisis of 2007–2009. It seems that outsiders failed to deliver the monitoring expertise expected of them when it was needed the most. The extremely large proportion of outside directors could indicate that New Zealand firms and shareholders have become overly reliant on outside directors.

The increase in outsider board representation from 2004 to 2008 (as evidenced by the statistically significant positive coefficient of CODE in the OD equation) could have compromised the effectiveness of New Zealand boards. Just as boards of failed finance companies in New Zealand tended to "lack the experience and skills required to oversee the scale, complexity and characteristics of financing operations", (Ministry of Economic Development, 2009, p.8) New Zealand listed companies over-represented by outsiders on the board could lack the firm-specific knowledge to make sound strategic and risk-management decisions.

Debt is positively associated with Tobin's Q and is significant at the 10% level. This result is consistent with other recent New Zealand studies, such as Reddy et al. (2010) and Boone et al. (2011), indicating the cash flow benefits of debt financing has positive implications for shareholder wealth. Firm size (TA) has a negative impact on shareholder wealth, significant at the 1% level. Other control variables are insignificant.

The OD equation shows that INSOWN, BLOCK, BOARD, CCH, and CODE are all significant at the 1% level. The negative coefficient of CCH supports the notion that CEOs who also chair the board have influential power over the board selection process, and prefer to stack the board with insiders (Hermalin and Weisbach, 1998). The negative coefficient of INSOWN indicates that INSOWN and OD act as substitutes to mitigate agency, as expected. The positive coefficient of BLOCK is somewhat unexpected, suggesting that OD and BLOCK act as complements. This suggests that firms with large blockholders prefer a board with a high proportion of outsiders. Large blockholders have the financial incentive and the voting power to influence the board selection process. In contrast, a firm with dispersed ownership concentration that suffers from free-rider problems is more likely to leave the determination of board composition to the CEO, who in turn prefers to stack the board with insiders. BOARD is positively correlated with the proportion of outsiders consistent with Prevost et al. (2002). The positive coefficient for CODE indicates that firms responded to the NZX governance rules by increasing the proportion of outside directors. As previously mentioned, this increase in outside board representation had the unfortunate effect of reducing the sensitivity of outsiders to firm performance. Other control variables had an insignificant effect on board composition. Model 2b in Table 8 reports the coefficient estimates when ROA is used as the measure of firm performance, determined endogenously with OD. Both models fit the data well, with the chi-square statistic significant at the 1% level.

For the OD equation, the sign and significance of coefficient estimates are consistent with model 2a. Most importantly, the inverse relation between ROA and OD reinforces the notion that shareholders of firms that perform poorly compel management to increase the proportion of outsiders. Also, the significance of CODE at the 1% level confirms that firms increased the proportion of outside directors following the NZX code.

The ROA equation reports that the proportion of outside directors, although positive, has an insignificant effect on firms' ROA. This result is consistent with US studies (Hermalin and Weisbach, 2003) and with current evidence in New Zealand (Reddy et al., 2010). Thus, while outside directors on average are positively associated with shareholder wealth (using Tobin's Q as the measure of financial performance), outside directors do not have a material impact on the accounting returns to shareholders. However, the significant negative coefficient of the multiplicative variable ODCODE indicates the sensitivity of outside directors to firms' ROA declined after implementation of the NZX code, casting doubt on the effectiveness of outside board representation over the 2004–2008 period. As expected, BLOCK is positive and significant at the 1% level, consistent with New Zealand evidence (Boone et al., 2011). INSOWN, DEBT, and TA all become significant and display the opposite sign to that expected. Larger firms are associated with a higher return on assets, while firms with a higher proportion of debt in their capital structure and inside ownership are inversely related to ROA.

Model 3: 3SLS estimates of firm performance and outside board representation

[Insert Table 9 here]

Next, we update the model specified by Prevost et al. (2002) by including additional explanatory variables into the firm performance equations. The coefficient estimates from model 3 are reported in table 9. To test whether the NZX code had on average a positive impact on firm performance (hypothesis 3); the variable CODE is included in the model. The variable CCH is also included to test whether CEO duality had a negative impact on firm performance (hypothesis 5). OD*FEE is included to test the financial incentive facing outside directors (hypothesis 6a). The interaction term, OD*RISK tests for the impact of firm risk on the sensitivity of outside board representation to firm performance (hypothesis 7a). Firm risk is included as an additional explanatory variable together with squared and cubed measures for inside ownership to account for non-linearity with this measure. Once again, the system of

two equations is estimated using 3sls, and year and firm dummies are included in the model specification. Using the Cook's distance approach to remove influential outliers, the sample size drops from 909 firm-year observations to 880 (900) when Tobin's Q (ROA) is used as the measure of firm performance. Results are reported in table 9.

Table 9, model 3a reports the coefficient estimates when Tobin's Q is used as the measure of firm performance, determined in a simultaneous system with OD. Both models fit the data well, with the chi-square statistic significant at the 1% level. Most time and firm dummies are significant at the 5% level (unreported).

The main results are quantitatively similar to model 2a. OD is positive and significant at the 1% level, and ODCODE is negative and significant at the 1% level. The dummy variable CODE is positive and significant at the 1% level, indicating that New Zealand firms performed better after the NZX incorporated the new governance code and provides support for hypothesis 3. This indicates that the flexible code had the desired effect of improving corporate governance in New Zealand while minimising compliance costs due to the flexible nature of the code. There is the possibility that other coincident changes over the time frame 2004–2008 caused the improvement in firm performance, rather than the NZX code. However, the empirical model does control for a range of factors likely to affect Tobin's Q, and results are consistent with recent New Zealand evidence on the positive impact of the governance code on firm performance measures (Teh, 2009; Reddy et al., 2010).

Contrary to both agency theory expectation and stewardship theory, we fail to find any significant relationship between CCH and Tobin's Q (hypothesis 5). The mandatory requirement of the NZX code that disallows a director to hold the position of CEO and chairman simultaneously has not had the positive impact expected by agency theory (Levy, 1981; Dayton, 1984) or the negative impact expected by those favouring stewardship theory (Donaldson and Davis, 1991; Keil and Nicholson, 2003). The insignificant correlation is consistent with Brickley et al. (1997), who argue that there is no optimal leadership structure because both CEO duality and separation have costs and benefits. Some firms will benefit from the dual leadership structure, while others will not.

The interaction variable ODFEE is insignificant; as such, there is insufficient evidence in support of hypothesis 6a. Director fees do not affect the sensitivity of outside director to firm performance in New Zealand. There are two possible reasons for this insignificance. First, as Fama and Jensen (1983) argue, director concern for his or her reputation acts as strong

incentive for convergence of interest between directors and shareholders. Reputational concern may be particularly strong in a small market such as New Zealand, where director actions are likely to be more transparent. Thus, outside directors could act in the best interest of shareholders in performing their monitoring role regardless of the level of fees they receive. Second, director fees are not tied to performance. As long as an outside director turns up to board meetings, he or she will get paid regardless of firm performance. This compensation mechanism does not provide the same financial incentive to motivate outside directors compared to equity-based compensation. The interaction term ODRISK also has an insignificant effect on TOBIN'S Q. Contrary to hypothesis 7a, firm-level risk does not affect the sensitivity of outside directors to firm performance. This implies outside directors supply their labour to firms irrespective of firm-level risk.

The coefficient $INSOWN^2$ is significant at the 10% level and the coefficient $INSOWN^3$ is significant at the 1% level. This supports Bhabra's (2007) finding of a non-linear relationship between inside ownership and firm performance. However, the functional form is completely opposite to what is expected. The negative (but insignificant) coefficient of INSOWN, the positive coefficient of $INSOWN^2$, and the negative coefficient of $INSOWN^3$ imply that inside ownership and Tobin's Q are inversely related at low levels of ownership, become positively related at medium levels, and inversely related at high levels of inside ownership. We do not have a ready explanation for this relationship, except that the entrenchment and convergence of interest effect of inside ownership is complex and the effect on firm performance is not readily apparent. Consistent with model 2a, DEBT is positively associated with TOBIN'S Q and TA is inversely related to TOBIN'S Q. Other control mechanisms are insignificant.

The results for the OD equation show that all estimates are consistent with results for model 2a reported in table 8. This is not surprising, given the specification of OD has not changed. The result for most importance is the inverse relation between TOBINS'Q and OD, significant at the 1% level.

The regression results for the ROA equation are reported in table 9. The proportion of outside directors has an insignificant effect on firms' ROA. The effect of the NZX governance code also has had a benign effect on firms' ROA, and now the sensitivity of outside board representation to firms ROA after the code has become insignificant. These results are consistent with studies in the US that reveal an insignificant cross-sectional relationship between accounting measures of firm performance and the proportion of outside

board members (Adams et al., 2010). The significance of INSOWN, $INSOWN^2$, and $INSOWN^3$ are all consistent with Bhabra (2007), the positive coefficient of INSOWN, the negative coefficient as $INSOWN^2$, and the positive coefficient of $INSOWN^3$ indicate ROA increases at low levels of inside ownership, decreases at medium levels, and increases at high levels of inside ownership. CCH is negative and significant at the 1% level, consistent with agency theory. It seems that CEO duality has a negative impact on accounting returns. Thus, the mandatory requirement of the NZX code to separate the role of chairman and CEO has had a beneficial effect on New Zealand firms. Consistent with results reported in table 8, debt is inversely related to firms' ROA, while a positive relation is evident with BLOCK and TA. Other regressors are insignificant. Finally the OD equation gives results that are consistent with those reported in model 2b of Table 8.

Stage 2: Sub-sample period 2004–2008

We now focus on the period of time following implementation of the NZX code, which mandated New Zealand listed firms to adopt a minimum of two independent board members or one-third of the total board size, whatever the larger (Gilbertson and Gibson, 2003). In total, data for 355 firm years are collected over the sample period 2004–2008. Regression results are used to test hypothesis 1b, 1c, 6b, and 7b. Results for models 4 and 5 are reported in table 10 and table 11, respectively.

[Insert Table 10 here]

Model 4: 3SLS estimates of firm performance and outside board representation

TOBIN'S Q has a positive effect on OD, and is significant at the 5% level. At the same time, the proportion of outside directors has a negative impact on TOBIN'S Q. This result is more consistent with stewardship theory, which emphasises the importance of insiders on the board to enable more effective and efficient decision-making (Davies et al., 1997; Kiel and Nicholson, 2003). While the result seems inconsistent with the findings reported in tables 8 and 9 over the full sample period; we offer a potential explanation. After the implementation of the NZX Governance Code in August 2003, NZ firms responded by increasing the proportion of outside directors (see results table 8 and 9). This could be due to increased corporate and public awareness of governance issues after the global scandals of the early 2000s. Increasing outside board representation sends a credible signal to shareholders of a firm's commitment to effective corporate governance. New Zealand listed firms could also have increased outside board representation simply to take advantage of the positive

association with firm performance reported by Prevost et al. (2002). However, this increase in outsider representation reduced the marginal effect of OD on firm performance (see results in tables 8 and 9). It is likely NZ firms went too far, increasing OD above an optimum level and compromising the effectiveness of the board. Thus, when global problems started affecting all firms, those New Zealand firms with too many outside directors on average performed worse than firms with a more optimal mix.

The interaction term ODFEE becomes significant over the sub-sample period, and as expected is positive. Thus, there is some evidence that outside directors improve monitoring efficacy in response to director fees. But the magnitude of the coefficient means it is unlikely to have any real economic effect. Other coefficients are broadly consistent with results reported in tables 8 and 9.

Model 4b reports many insignificant coefficient estimates. This may partially reflect the smaller sample compared with the full sample period. There is an insignificant relationship between OD and ROA. INSOWN and TA are positively associated with ROA, while the remaining variables are insignificant. The negative coefficient of INSOWN indicates that INSOWN and OD act as substitutes to mitigate agency, while the positive coefficient of BLOCK indicates BLOCK and OD are complementary. Other explanatory variables are insignificant.

Model 5: 3SLS estimates of firm performance and independent board representation

Model 5 incorporates the definition of independent directors, and results are used to test hypotheses 1b, 1c, 2b, 6b, and 7b. Regression coefficients are reported in table 11.

[Insert Table 11 here]

Model 5a using the Tobin's Q equation shows no evidence in support of H1b. Independent directors are not positively associated with firm performance, and in fact a significant inverse relation exists. Once again, this could be interpreted as New Zealand firms replacing knowledgeable inside directors with relatively ineffective independent directors. It must also be noted that the interaction terms INDRISK and INDIFEE are significantly positive. Thus, the partial effect of INDD on Tobin's Q depends on the level of firm risk and director fees. Firm performance is enhanced by a greater representation of independent directors on the board for those firms whose returns are more variable and pay higher director

fees to attract a better quality of independent director. Hypothesis 1c posits that independent directors will have a larger and positive economic impact relative to the proportion of outside directors. Results from tables 10 and 11 show that both OD and INDD are inversely related to Tobin's Q over the sub-sample period which is contrary to the expected positive relation. However, the coefficient for INDD (-13.19) is greater than the coefficient for OD (-16.23). So, from an agency perspective, independent directors are more beneficial to the firm relative to outsiders in the sense that independent directors are associated with lesser value-destruction.

Hypothesis 2b posits that INDD and Tobin's Q are jointly positive, but the empirical results presented in table 11 do not support this hypothesis. Tobin's Q is positively associated to INDD, but INDD is negatively associated with Tobin's Q. The interaction term INDIFEE is significantly positive which supports hypothesis 6b, indicating that director fees do improve the efficacy of independent board representation to firm performance. However, the magnitude of the effect is small (0.000067), so the economic impact of director fee payment is likely to be minute.

The interaction term INDRISK is significant at the 1% level, but the coefficient is positive, which is contrary to hypothesis 7b. A possible explanation is that independent directors are aware of the firm's risk, and when firm risk is high they are compelled to monitor the actions of management more stringently or otherwise face the possibility of bankruptcy and loss of reputation. Conversely, directors for firms that have low equity volatility have less incentive to monitor management actions, which in turn exacerbates agency conflict between managers and shareholders and reduces firm performance. All control variables are significant at least at the 10% level, with the exception of CAPEX. An interesting result is the inverse relation between RISK and TOBIN'S Q; firms with higher equity volatility tend to underperform compared with less risky firms.

The determinants of the proportion of independent directors (INDD), are most explanatory variables with significance at the 5% level or less. TOBINS' Q is positively related to INDD and significant at the 1% level, indicating that better-performing firms have a higher level of independent directors. The negative coefficient of INSOWN indicates INSOWN acts as a substitute to INDD while the positive coefficient of DEBT indicates that DEBT and INDD are complementary. More diversified firms proxied by SEGMENT tend to be associated with a higher proportion of independent directors, as expected. Contrary to prior models, board

size is inversely related to INDD. CAPEX is positively associated with INDD. It seems that firms with growth opportunities prefer to bring in independent directors who might have access to valuable external resources and expertise in specific areas.

The ROA equation reports that none of the explanatory variables are related to ROA.With the exception of ROA, results for the INDD model are similar to those reported in equation 5a. ROA is inversely related to INDD and significant at the 1% level, consistent with findings reported in tables 8 and 9.

Robustness

To test the validity of the results, we include two robustness checks. First, we re-estimate model 3 and model 5 using alternate specifications of some control variables. Second, we revisit the issue of endogeneity. In this study, we have controlled for the endogenous relationship between outside board representation and firm performance measures using the 3sls systems approach. However, for the multivariate results to be unbiased and consistent, we have implicitly assumed that the control variables are exogenous. The unfortunate reality in corporate governance is that most variables of interest are not likely to be truly exogenous and determined outside the model system, but endogenous (Agrawal and Knoeber, 1996; Hermalin and Weisbach, 2003). Thus, to test the validity of these results we create pre-determined variables by taking the first lag.

Alternate specification of control variables

In this section, we re-estimate the system of equations of model 3 and model 5 using slight variations in the definitions of control variables. In particular, inside ownership is defined as the sum of shares owned by directors held beneficially and by associated persons, divided by total equity outstanding. The variable is INSOWN2. We define block ownership as the proportion of equity held by the top five shareholders excluding directors and label this BLOCK2. This measure includes custodial depository services. To control for leverage, we use the proportion of long-term liabilities over total book value of assets and label this DEBT2. Results over the full sample period treating firm performance and the proportion of outside directors as endogenous are reported in table 12. The main results do not change from this alternate specification. INSOWN2 and DEBT2 become insignificantly related to Tobin's Q, and DEBT2 becomes significant and positively related to OD.

[Insert Table 12 here]

Similarly, results over the sub-sample period treating firm performance measures and the proportion of independent directors as endogenous variables is reported in table 13. Once again, results are not materially different and do not affect conclusions.

[Insert Table 13 here]

First lag of control variables

We generate the first lag of control variables INSOWN, $INSOWN^{2,}$ $INSOWN^{3}$, BLOCK, DEBT, BOARD, CAPEX, CCH, SEGMENT, TA, and RISK to ensure these control variables are pre-determined. These are labeled LAG_INSOWN, $LAG\_INSOWN^{2,}$ LAG_INSOWN^{3}, LAG_BLOCK, LAG_DEBT, LAG_BOARD, LAG_CAPEX, LAG_CCH, LAG_SEGMENT, LAG_TA, and LAG_RISK respectively. We re-estimate model 3 to determine the joint relationship between OD and firm performance measures using these pre-determined variables and the results are reported in table 14. Taking the first lag combined with the method of Cook's D to reduce influential outliers does drop the sample size to 701 firm-year observations. We lose significance of some parameter estimates, but broadly speaking, results are consistent with model 3. OD is positively related to Tobin's Q and significant at the 10% level. However, Tobin's Q is no longer a significant determinant of OD. CODE remains positive at the 5% level to Tobin's Q, but now the interaction term OD * CODE loses significance. The joint relationship between OD and ROA becomes insignificant. Interestingly, the interaction term OD*RISK becomes significant at the 1% level, indicating the sensitivity of outside directors to firm performance is positively affected by firm-level risk.

[Insert Table 14 here]

We then re-estimate model 5 using the definition of independent director over the sub-sample period 2004–2008 and using the lagged control variables. In total, there are 231 firm-year observations. The results reported in table 15 are very consistent with model 5. The only noteworthy change is that the lagged debt becomes insignificant. Thus, the use of lagged pre-determined variables does not materially affect results.

[Insert Table 15 here]

7. Conclusion

This study documents empirical evidence on the joint relationship between the proportion of outside/independent board members and New Zealand firm performance over the sample period 1997-2008. This period spanned considerable change in corporate governance practices with the adoption of the 2003 NZX code. Given the recent failures of financial companies in New Zealand which has been partially attributed to poor board function, a predominate aim of this research was to determine the effectiveness of outside/independent board members and the impact of the code on firm performance in New Zealand. We use two measures of board composition; the proportion of non-executive outside directors over the full sample period, and the proportion of independent directors which was obtained over the sub-sample period 2004-2008. We also use two measures of firm performance, the market based measure Tobin's Q, and the accounting based measure ROA. We use the method of 3sls to model the determinants of board composition and firm performance measures in a simultaneous system of equations. We control for a variety of alternate governance mechanisms and economic variables likely to affect firm performance, and control for unobservable firm heterogeneity and time effects using a two-way fixed effects specification. The results are econometrically sound and robust to various model specifications.

Over the full sample period the empirical evidence consistent with agency theory. Tobin's Q is inversely related to OD, while simultaneously OD is a positive function of Tobin's Q. This result indicates that poorly performing firms tend to increase the proportion of outside directors in an effort to reduce agency conflict. This strategy tends to work, firms with a higher proportion of outside directors are associated with a greater Tobin's Q. OD has an insignificant effect on firm's ROA. Therefore, the benefit of outside directors comes in the form of a reduction in expected agency costs resulting in a higher market valuation, rather than improving the income generating capacity of the firm.

We also report that the NZX code has had a significant impact on board composition and firm performance measured by Tobin's Q. After controlling for other economic factors, a firm's Tobin's Q is higher after implementation of the code than pre-code. The mandatory requirement to separate the role of chairman and CEO also improved firms Tobin's Q. Thus, the code had the desired effect of improving governance in New Zealand. The mix of flexible and mandatory aspects of the code seems to work well in the New Zealand context, and it would be counter-productive to make large scale changes in governance legislation for listed

firms. Firms increased the proportion of outsiders on the board post-code, but this had the unfortunate effect of reducing the marginal effect of OD on firm performance.

We find no evidence that compensation in the form of fees to outside directors has any impact on the sensitivity of outside directors to firm performance. This could be because the main form of compensation is cash, rather than equity based compensation that is tied to firm performance. The use of cash compensation may not align outside director-shareholder interests and may not provide the incentive for outside directors to monitor and contract rigorously with top management. Director fees may be used by firms to attract and retain top outside directors, but given that fees do not improve the performance of such directors, an increase in director payments can and should be questioned by shareholders. Measures should be put in place to encourage further use of equity-based remuneration to New Zealand directors which is more likely to improve the effectiveness of the board. We also find no evidence that that firm-level risk has any impact on the sensitivity of outside directors to firm performance.

Over the sub-sample (2004-2008) period results are more consistent with stewardship theory. INDD and OD are both inversely related to Tobin's Q, but insignificantly related to ROA. This result casts doubt on the effectiveness of outside/independent board representation over different time frames, and indicates the firm performance- board composition relationship is dynamic. It is plausible that firms on average over-invested in outside/independent directors above an optimal level, compromising the effectiveness of the board. It is also plausible that outside/independent directors are not effective at monitoring and contracting with top management during periods of extreme uncertainty.

Sub-Sample 2004-2008

The coefficient of INDD to Tobin's Q during 2004-2008 is larger than the coefficient of OD to Tobin's Q. Thus, from an economic point of view, this provides some support in favour of agency explanation that independent directors more vigilantly monitor and discipline management than outside directors who may be under the influence of powerful CEOs. We also find that director fees increase the sensitivity of independent directors to firm performance measured by Tobin's Q. Thus, director remuneration can be used as a financial incentive mechanism to align independent board members with shareholders. However the coefficient is small and is unlikely to have any significant economic impact.

We also report that firm-level risk increases the sensitivity of independent directors to Tobin's Q. Those firms whose returns are more risky benefit more by using independent directors. An explanation is that independent directors placed in high-risk firms are motivated to monitor actions of the firm more stringently, due to the higher probability of bankruptcy and subsequent loss of directorial reputation.

Overall, results indicate that board composition is an important mechanism in the mitigation of agency within the firm and has implications for firm performance. However, firms that focus solely on agency reduction and adopt a high proportion of outside/independent directors must be wary that this could compromise the effectiveness of the board and may not be optimal over different time frames.

The principle-based NZX code has to be applauded for improving governance in New Zealand and having a positive effect on firm performance. The governance issues associated with failed finance companies do not extend to listed New Zealand firms. However, the code reduced the efficacy of outside directors to firm performance. Thus, other measures are required to increase the effectiveness of outside/independent directors which could include, but is not limited to, firm risk and directorial remuneration. Director fees do not improve the effectiveness of outside directors, so New Zealand firms could follow US counterparts and experiment with equity-based compensation to outside directors.

We identify several areas of future research related to the effectiveness of the board, firm performance and the NZX code. First, the significance of the board composition- firm performance estimators indicates an out-of- equilibrium phenomenon in New Zealand. This significant link is also evident in prior work by Prevost et al. (2002). The question that remains unanswered is why does this link persist in New Zealand? Studies based in the US generally find an insignificant relationship between board composition and firm performance. Thus, unlike our US counterparts, New Zealand listed firms do not seem to optimally structure board composition taking into account the costs and benefits of an additional outside/independent director for their particular firm. Rather, results are indicative of a herding mentality, where New Zealand firms structure their board similar to their counterparts or revert to the mean rather than determining their unique optimal proportion. Second, we assume the functional form of the board composition–firm performance relationship is linear. The dynamic relationship exposed in this thesis indicates a possible non-linear relationship exists, and this could vary according to the size of the firm or the

specific industry. Third, the NZX code recommended the establishment of a remuneration committee and nomination committee comprising of a majority of independent directors. The effectiveness of independent directors on board committees is another area of future research. Finally, creating a proxy for director 'busyness' measured by the number of board seats may shed further light on the board composition-firm performance argument.

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Table 1: Definition of variables

Variable	Definition
BOARD	Number of directors on the board including the CEO and Chairman.
BLOCK	Cumulative percentage ownership of the largest five outside shareholders, excluding nominee and custodial shareholders and members on the board.
CCH	A dummy variable for CEO duality set to 1 if the CEO and Chairman are the same person, else 0.
CAPEX	Total commitment to capital expenditure scaled by total assets.
CODE	A dummy variable to capture the period of time pre the 2003 NZX code and post the NZX Code. Set to 0 if the year is 1997 to 2003, set to 1 if the year is 2004 to 2008.
DEBT	The proportion of long term debt plus short term debt to total assets as in the balance sheet on balance date.
FEE	Total fees paid to non-executive board members divided by total number of non-executive directors on the board.
INDD	The proportion of independent directors on the board 2004-2008. A non-executive director is classified as independent only where he/she does not represent a substantial shareholder and where the board is satisfied that he/she has no other direct or indirect interest or relationship that could reasonably influence their judgement and decision making as a director.
IFEE	Total fees paid to independent board members divided by the total number of independent directors on the board.
INDDIFEE	An interaction term formed by taking the product of INDD and IFEE.
INDRISK	An interaction term formed by taking the product of INDD and RISK.
INSOWN	The sum of ordinary shares held beneficially by the board of directors divided by the total number of ordinary shares outstanding.

OD	The proportion of outside non-executive directors on the board.
ODCODE	An interaction term formed by taking the product of OD and CODE.
ODFEE	An interaction term formed by taking the product of OD and FEE.
ODRISK	An interaction term formed by taking the product of OD and RISK.
ROA	Net profit after tax divided by total assets on balance date.
RISK	Standard deviation of a firm's 5 year share return.
SEGMENT	The number of business segments of the firm.
TA	The natural logarithm of total assets that are in the balance sheet on balance date.
TOBINQ	Long term debt plus short term debt less current assets plus market value of equity at balance date divided by the book value of total assets.

Table 2: Descriptive statistics for the full sample period 1997-2008

Variable	N	Mean	Std Dev	Median	Minimum	Maximum
TOBINQ	909	1.50	2.04	1.01	-0.22	30.76
ROA	909	-0.08	1.54	0.05	-41.63	0.60
OD	909	0.81	0.15	0.83	0	1
BOARD	909	6.21	1.82	6.00	2	14
INSOWN	909	0.08	0.14	0.01	0	0.90
BLOCK	909	0.43	0.25	0.41	0	0.95
CCH	909	0.06	0.24	0	0	1
CAPEX	909	0.02	0.07	0.003	0	0.92
SEGMENT	909	1.64	0.97	1	1	11
DEBT	909	0.44	0.23	0.43	0.00	1.76
TA (ln)	909	18.59	1.83	18.61	12.84	22.92
RISK	907	0.41	0.30	0.31	0.10	3.58
ODFEE	909	38336	25662	32215	0	286537

Table 3: Descriptive statistics for the period 1997-2003

Variable	N	Mean	Std Dev	Median	Minimum	Maximum
TOBINQ	554	1.212	1.533	0.828	-0.138	20.564
ROA	554	-0.119	1.947	0.044	-41.632	0.600
OD	554	0.808	0.155	0.833	0	1
BOARD	554	6.348	1.957	6.000	2	14.000
INSOWN	554	0.076	0.139	0.010	0.000	0.729
BLOCK	554	0.449	0.249	0.471	0	0.943
CCH	554	0.081	0.273	0.000	0	1
CAPEX	554	0.024	0.072	0.003	0	0.727
SEGMENT	554	1.666	1.004	1.000	1	11.000
DEBT	554	0.439	0.222	0.442	0.001	1.760
TA (ln)	554	18.570	1.796	18.490	12.843	22.919
RISK	552	0.407	0.272	0.325	0.117	3.581
ODFEE	554	33652	24303	28938	0	286537

Table 4: Descriptive statistics for the period 2004-2008

Variable	N	Mean	Std Dev	Median	Minimum	Maximum
TOBINQ	355	1.94	2.58	1.33	-0.22	30.76
ROA	355	-0.02	0.41	0.05	-4.32	0.32
INDD	355	0.59	0.21	0.57	0.17	1
OD	355	0.82	0.15	0.83	0.50	1
BOARD	355	6.01	1.57	6.00	3.00	12.00
INSOWN	355	0.09	0.15	0.01	0.00	0.90
BLOCK	355	0.39	0.26	0.32	0.01	0.95
CCH	355	0.03	0.17	0.00	0.00	1.00
CAPEX	355	0.03	0.08	0.00	0.00	0.92
SEGMENT	355	1.60	0.90	1.00	1.00	6.00
DEBT	355	0.44	0.23	0.42	0.00	1.40
TA (ln)	355	18.62	1.88	18.82	13.24	22.74
RISK	353	0.41	0.34	0.29	0.10	3.20
INDDFEE	355	46295	26606	40625	3750	186927
ODFEE	355	45620	26050	40000	1875	181636

Table 5: T-test of the difference between sample means

Variable		Mean	Std. Dev	N	Difference	t-value
Panel A: Difference across sub-sample periods						
OD	1997-2003	0.81	0.15	554	0.016 *	1.537
	2004-2008	0.82	0.15	355		
TOBIN Q	1997-2003	1.21	1.53	554	0.725 ***	4.783
	2004-2008	1.94	2.58	355		
ROA	1997-2003	-0.12	1.95	554	0.099	1.159
	2004-2008	-0.02	0.41	355		
Panel B: Difference over the sub-sample period 2004-2008						
OD		0.82	0.15	355	0.23 ***	16.981
INDD		0.59	0.21	355		
ODFEE		45620	26606	355	-675	-0.341
INDDFEE		46295	26050	355		

** Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level*

Table 6: Pairwise correlation matrix of independent and dependent variables

This table reports pairwise correlation between the dependent variables Tobin's Q, ROA and OD, and the independent variables.

Table 6: Pairwise correlation matrix of independent and dependent variables

	ROA	TOBIN'S Q	OD	INSOWN	BLOCK	DEBT	BOARD	CAPEX	CCH	CODE	SEGMENT	TA	RISK
ROA	1												
TOBIN'S Q	-0.1978*	1											
OD	0.0383	-0.0286	1										
INSOWN	0.0142	0.0118	-0.2833*	1									
BLOCK	0.0354	-0.0878*	0.3173*	-0.2566*	1								
DEBT	-0.0437	-0.0436	-0.0213	0.0182	-0.0498	1							
BOARD	0.1164*	-0.1096*	0.1071*	-0.0687*	0.002	0.0377	1						
CAPEX	-0.006	0.0395	0.02	-0.0866*	0.0327	-0.0291	0.0333	1					
CCH	-0.1715*	-0.0349	-0.2040*	0.0294	-0.0766*	-0.0865*	-0.2277*	-0.0249	1				
CODE	0.0314	0.1738*	0.0503	0.0441	-0.1085*	0.0003	-0.0919*	0.0058	-0.1086*	1			
SEGMENT	0.0015	-0.1641*	0.0188	-0.1157*	-0.0276	0.2189*	0.1448*	-0.0584	-0.0342	-0.0348	1		
TA	0.2022*	-0.2226*	0.1925*	-0.2391*	0.0468	0.2061*	0.5824*	0.0585	-0.1598*	0.0136	0.2106*	1	
RISK	-0.0876*	0.0920*	-0.1957*	0.1055*	0.0054	-0.0006	-0.2855*	0.0427	0.0683*	-0.0036	-0.0463	-0.3509*	1

* denotes significance from zero at the 5% level.

Table 7: Model 1 – Fixed effects OLS Regression estimates of New Zealand firm performance from 1997-2008

Independent variable	TOBIN'S Q		ROA	
OD	0.05		0.18	***
	0.21		*2.62*	
ODCODE	-0.40		-0.22	***
	-1.32		*-2.68*	
BOARD	0.05	**	-0.01	
	2.20		*-1.25*	
CCH	-0.23	*	-0.07	**
	-1.81		*-2.06*	
INSOWN	0.13		-0.10	
	0.56		*-1.58*	
BLOCK	0.21		0.13	***
	1.30		*2.92*	
TA	-0.41	***	0.08	***
	-9.22		*7.21*	
DEBT	0.42	***	-0.30	***
	2.65		*-7.15*	
SEGMENT	-0.33	***	-0.04	**
	-5.24		*-2.14*	
CAPEX	0.29		-0.02	
	0.79		*-0.25*	
CONSTANT	9.40	***	-1.29	***
	10.46		*-5.61*	
Year fixed effects	Yes		Yes	
Firm fixed effects	Yes		Yes	
F -value	9.85	***	6.13	***
Overall *R^2*	0.09		0.17	
N	882		899	
Hausman test Chi^2	36.96	**	49.4	***
F-test no fixed effects	10.02	***	6.94	***

**** significant at 1%, ** significant at 5%, * significant at 10%*

Summary results of OLS fixed effects regression for a sample of New Zealand listed companies over the period 1997-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. Tobin's Q is approximated by summing the book value of long term debt, short term debt less current assets, and the market value of equity divided by the book value of total assets. ROA is approximated by dividing the net profit after tax by the total book value of assets. OD is the proportion of outside non-executive directors on the board. CODE is a dummy variable that takes the value of 1 for years 2004 to 2008, else 0 thereby capturing the period of time after the NZX implemented new listing

requirements. ODCODE is an interaction term calculated by the product of OD and CODE. BOARD is the total number of directors on the board. CCH is a dummy variable that takes the value of 1 is the CEO also holds the position of chairman of the board, else 0. INSOWN is the proportion of total shares held beneficially by directors to the total number of outstanding shares. BLOCK is the cumulative percentage ownership of the largest five outside shareholders, excluding nominee and custodial shareholders and shares held by directors. DEBT is the proportion of the book value of long term plus short term debt to the book value of total assets. TA is the natural logarithm of a firm's book value of assets. CAPEX is the total commitment to capital expenditure scaled by total book value of assets. *T*-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

Table 8: Model 2 – 3sls fixed effects estimates of New Zealand firm performance and outside board representation from 1997-2008

	Endogenous dependent variables			
Independent	Model 2a		Model 2b	
Variables	TOBIN'S Q	OD	ROA	OD
OD	3.45 ***		0.24	
	2.99		*0.76*	
TOBIN'S Q		-0.01 **		
		-2.21		
ROA				-0.07 ***
				-2.74
CODE		0.07 ***		0.04 **
		2.83		*2.01*
ODCODE	-1.36 ***		-0.24 **	
	-2.87		*-1.98*	
INSOWN	0.27	-0.24 ***	-0.12 **	-0.24 ***
	1.15	*-7.12*	*-2.01*	*-7.30*
BLOCK	0.08	0.15 ***	0.14 ***	0.16 ***
	0.47	*8.04*	*3.62*	*8.70*
DEBT	0.28 *	-0.01	-0.30 ***	-0.02
	1.66	*-0.67*	*-7.10*	*-0.99*
BOARD		0.01 ***		0.01 ***
		2.90		*3.31*
CAPEX	0.54	-0.02	-0.01	-0.01
	1.39	*-0.28*	*-0.13*	*-0.17*
CCH		-0.10 ***		-0.10 ***
		-4.94		*-4.76*
SEGMENT		-0.01		0.00
		-1.16		*-0.38*
TA	-0.36 ***		0.08 ***	
	-7.69		*7.61*	
INTERCEPT	6.33 ***	0.75 ***	-1.68 [1]***	0.73 [1]***
	3.74	*24.38*	*-4.10*	*25.41*
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	No[2]	Yes	No[2]
Chi^2 value	2072 ***	232 ***	2012 ***	234 ***
N	882	882	901	901

**** significant at 1%, ** significant at 5%, * significant at 10%*

Table 8 reports the results of model 2 - 3sls fixed effects regression for a sample of New Zealand listed companies over the period 1997-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. OD is also a dependent variable determined endogenously with firm performance measures. Variables are defined in table 1.

Z-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1] In order for the intercept term to be included in the model the dummy variable for the year 2007 was removed. This has a minimal impact on the point estimates and standard errors, and as such does not materially affect results. [2] Firm fixed effects are not included for the OD equation for two reasons. i) The number of parameters needing to be estimated greatly reduces the degrees of freedom, leading to insignificance of most parameters. ii) fixed effects are included in the first stage of the 3sls regressions in order to obtain the predicted value of OD measures, so unobserved firm heterogeneity is sufficiently controlled for.

Table 9: Model 3 – 3sls fixed effects estimates of New Zealand firm performance and outside board representation including additional control variables from 1997-2008

This table reports the results from model 3 - 3sls fixed effects regression for a sample of New Zealand listed companies over the period 1997-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. OD is also a dependent variable determined endogenously with firm performance measures. Variables are defined in table 1. *Z*-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1] In order for the intercept term to be included in the model the dummy variables for years 2003, 2005, and 2007 were removed. This has a minimal impact on the point estimates and standard errors, and as such does not materially affect results.

[2] Firm fixed effects are not included for the OD equation for two reasons. i) The number of parameters needing to be estimated greatly reduces the degrees of freedom, leading to insignificance of most parameters. ii) fixed effects are included in the first stage of the 3sls regressions in order to obtain the predicted value of OD measures, so unobserved firm heterogeneity is sufficiently controlled for.

Independent Variables	Endogenous dependent variables			
	Model 3a		Model 3b	
	TOBIN'S Q	OD	ROA	OD
OD	3.22 ***		-0.39	
	2.60		*-1.14*	
TOBIN'S Q		-0.01 **		
		-1.98		
ROA				-0.07 ***
				-2.82
CODE	1.25 ***	0.03 *	0.10	0.04 **
	3.35	*1.71*	*0.99*	*2.02*
ODCODE	-1.23 ***		-0.10	
	-2.58		*-0.77*	
ODRISK	0.00		0.00	
	0.54		*0.47*	
ODFEE	0.00		0.00	
	0.14		*0.15*	
INSOWN	-1.62	-0.23 ***	0.59 *	-0.24 ***
	-1.10	*-6.91*	*1.65*	*-7.28*
$INSOWN^2$	11.63 *		-3.08 **	
	1.95		*-2.11*	
$INSOWN^3$	-14.94 **		3.18 **	
	-2.35		*2.02*	
BLOCK	0.14	0.16 ***	0.17 ***	0.16 ***
	0.86	*8.22*	*4.25*	*8.70*
DEBT	0.28 *	-0.01	-0.28 ***	-0.02
	1.68	*-0.64*	*-6.57*	*-1.04*
BOARD		0.01 ***		0.01 ***
		2.94		*3.33*
CAPEX	0.68	-0.02	-0.08	-0.01
	1.71	*-0.22*	*-0.91*	*-0.16*
CCH	-0.13	-0.10 ***	-0.11 ***	-0.10 ***
	-0.90	*-4.85*	*-2.90*	*-4.82*
SEGMENT		-0.01		0.00
		-1.06		*-0.26*
TA	-0.36 ***		0.07 ***	
	-7.31		*6.14*	
RISK	-0.19		0.00	
	-1.43		*-0.07*	
INTERCEPT	4.85 ***	0.75 [1]***	-1.75 ***	0.73 [1]***
	2.66	*25.83*	*-3.98*	*25.37*
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	No [2]	Yes	No [2]
Chi^2 value	2130 ***	222.5 ***	1943 ***	235 ***
N	880	880	900	900

**** significant at 1%, ** significant at 5%, * significant at 10%*

Table 10: Model 4 – 3sls estimates of New Zealand firm performance and outside board representation over the sub-sample period 2004-2008

This table reports the results from model 4 - 3sls regression for a sample of New Zealand listed companies over the sub-sample period 2004-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. OD is also a dependent variable determined endogenously with firm performance measures. Variables are defined in table 1. *Z*-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1]In order for the intercepted term to be included in the model the dummy variables for years 2005 and 2007 were removed. This has a minimal impact on the point estimates and standard errors and does not materially affect results.

[2] Industry effects are included in the reduced form of the OD equation but not the structural form.

Independent Variables	Endogenous dependent variables: Model 5a TOBIN'S Q	Model 5a OD	Model 5b ROA	Model 5b OD
OD	-16.23 ***		0.62	
	-3.22		*1.17*	
TOBIN'S Q		0.04 **		
		2.31		
ROA				0.06
				0.72
ODRISK	0.00		0.00	
	0.80		*0.98*	
ODFEE	0.00 **		0.00	
	2.55		*-0.85*	
INSOWN	-11.85 ***	-0.27 ***	0.65 **	-0.30 ***
	-3.78	*-5.07*	*2.20*	*-6.22*
$INSOWN^2$	25.90 **		-0.79	
	2.07		*-0.72*	
$INSOWN^3$	-21.23 *		0.37	
	-1.72		*0.37*	
BLOCK	1.76 *	0.20 ***	-0.03	0.14 ***
	1.86	*5.77*	*-0.30*	*4.97*
DEBT	-1.15 ***	0.03	-0.03	-0.02
	-2.59	*0.88*	*-0.53*	*-0.52*
BOARD		0.00		0.00
		-0.27		*-0.52*
CAPEX	0.36	0.12	-0.08	0.04
	0.30	*1.19*	*-0.62*	*0.45*
SEGMENT		0.03 ***		0.01
		2.67		*1.34*
TA	-0.56 ***		0.05 ***	
	-3.19		*2.69*	
RISK	-0.68		-0.08	
	-1.28		*-1.45*	
INTERCEPT	22.14 [1]***	0.65 ***	-1.42 **	0.84 ***
	3.71	*10.24*	*-2.20*	*20.07*
Year fixed effects	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No [2]	Yes	No [2]
Chi^2 value	355	110.06	172.95 ***	110.06 ***
N	341	341	348	348

**** significant at 1%, ** significant at 5%, * significant at 10%*

Table 11: Model 5 – 3sls estimates of New Zealand firm performance and independent board representation over the sub-sample period 2004-2008

This table reports the results from model 4 - 3sls regression for a sample of New Zealand listed companies over the sub-sample period 2004-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. OD is also a dependent variable determined endogenously with firm performance measures. Variables are defined in table 1.

Z-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1] Industry effects are included in the reduced form of the OD equation but not the structural form.

Independent Variables	Endogenous dependent variables: Model 4a TOBIN'S Q	Model 4a INDD	Model 4b ROA	Model 4b INDD
INDD	-13.19 ***		0.24	
	-2.83		*0.53*	
TOBIN'S Q		0.16 ***		
		4.76		
ROA				-0.41 ***
				-3.35
INDDRISK	15.59 ***		-0.59	
	2.75		*-1.05*	
INDDIFEE	0.00 ***		0.00	
	3.10		*-1.13*	
INSOWN	-10.14 ***	-0.24 **	0.39	-0.27 ***
	-2.93	*-2.38*	*1.28*	*-3.54*
$INSOWN^2$	31.79 **		-0.64	
	2.42		*-0.59*	
$INSOWN^3$	-29.49 **		0.33	
	-2.30		*0.33*	
BLOCK	-0.80 **	0.11 *	0.06	0.01 ***
	-1.99	*1.77*	*1.45*	*0.31*
DEBT	-1.35 ***	0.18 ***	0.02	0.18 ***
	-3.07	*2.80*	*0.46*	*3.71*
BOARD		-0.02 **		0.00
		-2.20		*-0.33*
CAPEX	0.03	0.57 ***	0.06	0.51 ***
	0.03	*3.23*	*0.54*	*3.63*
SEGMENT		0.07 ***		0.02
		3.70		*1.54*
TA	-0.68 ***		0.06 ***	
	-3.58		*3.28*	
RISK	-8.97 ***		0.30	
	-2.72		*0.90*	
INTERCEPT	20.43 ***	0.26 **	-1.21 **	0.53 ***
	3.61	*2.12*	*-2.26*	*7.75*
Year fixed effects	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No[1]	Yes	No[1]
Chi^2 value	49 ***	49.21 ***	163.56 ***	59.02 ***
N	341	341	348	348

**** significant at 1%, ** significant at 5%, * significant at 10%*

Table 12: Model 3 – 3sls fixed effects estimates of New Zealand firm performance and outside board representation using alternate control variables 1997-2008

This table reports the results of model 3 using alternate specification of some control variables. It is a 3sls regression of a sample of New Zealand listed companies over the sample period 1997-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. OD is also a dependent variable determined endogenously with firm performance measures. The alternate control variables are defined as follows: INSOWN2 is the sum of shares owned by directors held beneficially and by associated persons, divided by total equity outstanding. BLOCK2 is the cumulative percentage ownership of the largest five outside shareholders, excluding shares held by directors. DEBT2 is the proportion of the book value of long term debt to the book value of total assets. Other variables are defined in table 1. *Z*-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1] In order for the intercepted term to be included in the model the dummy variables for years 1999, 2001, 2003, 2005 and 2007 were removed. This has a minimal impact on the point estimates and standard errors, and as such does not materially affect results.

[2] Firm fixed effects are not included for the OD equation for two reasons. i) The number of parameters needing to be estimated greatly reduces the degrees of freedom, leading to insignificance of most parameters. ii) fixed effects are included in the first stage of the 3sls regressions in order to obtain the predicted value of OD measures, so unobserved firm heterogeneity is sufficiently controlled for.

Independent Variables	Endogenous dependent variables			
	Model 3a		Model 3b	
	TOBIN'S Q	OD	ROA	OD
OD	3.64 ***		-0.28	
	2.78		*-0.77*	
TOBIN'S Q		-0.020 ***		
		-3.21		
ROA				-0.08 ***
				-3.00
CODE	1.51 ***	0.02	0.05	0.02 ***
	3.87	*1.16*	*0.49*	*0.89*
ODCODE	-1.50 ***		-0.05	
	-2.96		*-0.42*	
ODRISK	0.00		0.00	
	0.58		*0.64*	
ODFEE	0.00		0.00	
	0.26		*-0.39*	
INSOWN2	0.20	-0.09 ***	-0.45 **	-0.08 ***
	0.22	*-4.31*	*-2.07*	*-3.83*
$INSOWN2^2$	-0.90		1.26 **	
	-0.34		*1.97*	
$INSOWN2^3$	0.33		-0.92 *	
	0.17		*-1.91*	
BLOCK2	0.00	0.14 ***	0.10 ***	0.14 ***
	-0.01	*7.23*	*3.21*	*7.46*
DEBT2	-0.23	0.08 ***	-0.17 ***	0.09 ***
	-1.07	*2.94*	*-2.68*	*3.33*
BOARD		0.00 *		0.01 **
		1.69		*2.11*
CAPEX	0.62	0.01	-0.04	0.03
	1.53	*0.14*	*-0.48*	*0.36*
CCH	-0.11	-0.09 ***	-0.10 **	-0.09 ***
	-0.73	*-4.35*	*-2.49*	*-4.34*
SEGMENT		-0.01		0.00
		-1.22		*-0.27*
TA	-0.33 ***		0.08 ***	
	-5.76		*5.59*	
RISK	-0.12		-0.01	
	-0.86		*-0.24*	
INTERCEPT	4.35 [1]*	0.75 [1]***	-1.32 **	0.71 ***
	1.91	*28.31*	*-2.26*	*23.97*
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	No [2]	Yes	No [2]
Chi^2 value	6647 ***	30146 ***	1857 ***	162 ***
N	880	880	900	900

**** significant at 1%, ** significant at 5%, * significant at 10%*

Table 13: Model 5 – 3sls estimates of New Zealand firm performance and independent board representation using alternate control variables 2004-2008

This table reports the results of model 5 using alternate specification of some control variables. It is a 3sls regression of a sample of New Zealand listed companies over the sub-sample period 2004-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. INDD is also a dependent variable determined endogenously with firm performance measures. The alternate control variables are defined as follows: INSOWN2 is the sum of shares owned by directors held beneficially and by associated persons, divided by total equity outstanding. BLOCK2 is the cumulative percentage ownership of the largest five outside shareholders, excluding shares held by directors. DEBT2 is the proportion of the book value of long term debt to the book value of total assets. Other variables are defined in table 1. *Z*-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1] Time dummies are removed to ensure the intercept term is included in the model. The intercept is omitted if any time dummies are incorporated into this model due to collinearity.

[2] Industry effects are included in the reduced form of the OD equation but not the structural form.

Independent Variables	Endogenous dependent variables: Model 5a TOBIN'S Q		Model 5a INDD		Model 5b ROA		Model 5b INDD	
INDD	-14.26	**			0.19			
	-2.44				*0.36*			
TOBIN'S Q			0.15	***				
			4.77					
ROA							-0.65	***
							-4.65	
INDDRISK	16.48	**			-0.69			
	2.34				*-1.06*			
INDDIFEE	0.00	***			0.00			
	2.83				*-1.14*			
INSOWN2	-11.29	***	-0.21	***	0.61	*	-0.22	***
	-2.59		*-2.65*		*1.67*		*-3.56*	
$INSOWN2^2$	34.26	**			-1.56			
	2.39				*-1.35*			
$INSOWN2^3$	-31.43	**			1.10			
	-2.39				*1.08*			
BLOCK2	-0.05		0.01		0.11	***	0.08	
	-0.11		*0.24*		*2.65*		*1.59*	
DEBT2	-0.17		0.32	***	0.10		0.38	***
	-0.23		*4.08*		*1.57*		*5.86*	
BOARD			-0.02	***			0.00	
			-2.77				*0.00*	
CAPEX	0.35		0.55	***	0.13		0.52	***
	0.28		*3.16*		*1.14*		*3.59*	
SEGMENT			0.06	***			0.02	
			3.44				*1.37*	
TA	-0.74	***			0.05	***		
	-3.13				*2.67*			
RISK	-9.55	**			0.36			
	-2.37				*0.97*			
INTERCEPT	21.73	***	0.35	***	-1.20	**	0.47	***
	3.05		*3.24*		*-2.00*		*6.67*	
Year fixed effects	No[1]		No[1]		No[1]		No[1]	
Industry Dummies	Yes		No [2]		Yes		No [2]	
Chi^2 value	36	***	63.35	***	186	***	85.44	***
N	341		341		348		348	

**** significant at 1%, ** significant at 5%, * significant at 10%*

Table 14: Model 3 – 3sls fixed effects estimates of New Zealand firm performance and outside board representation using lagged control variables. Sample period 1997-2008

This table reports the results of model 3 using the first lag of control variables to ensure these variables are pre-determined. It is a 3sls regression of a sample of New Zealand listed companies over the sample period 1997-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. OD is also a dependent variable determined endogenously with firm performance measures. Variables are defined in table 1. *Z*-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1] In order for the intercepted term to be included in the model the dummy variables for years 2005 and 2007 were removed. This has a minimal impact on the point estimates and standard errors, and as such does not materially affect results.

[2] Firm fixed effects is not included for the OD equation for two reasons. i) The number of parameters needing to be estimated greatly reduces the degrees of freedom, leading to insignificance of most parameters. ii) Fixed effects are included in the first stage of the 3sls regressions in order to obtain the predicted value of OD measures, so unobserved firm heterogeneity is sufficiently controlled for.

Independent Variables	Endogenous dependent variables			
	Model 3a		Model 3b	
	TOBIN'S Q	OD	ROA	OD
OD	16.20 *		-0.22	
	1.91		*-0.22*	
TOBIN'S Q		-0.01		
		-1.25		
ROA				-0.04
				-1.01
CODE	4.14 *	0.03	0.08	0.04
	1.67	*1.56*	*0.30*	*1.58*
ODCODE	-5.08		-0.06	
	-1.53		*-0.15*	
ODRISK	0.00 **		0.00 **	
	2.07		*2.19*	
ODFEE	0.00		0.00	
	-0.97		*0.19*	
LAG_INSOWN	1.03	-0.30 ***	-0.18	-0.32 ***
	0.33	*-7.81*	*-0.47*	*-7.91*
LAG_INSOWN^2	13.01		0.83	
	0.91		*0.44*	
LAG_INSOWN^3	-23.53		-1.14	
	-1.34		*-0.49*	
LAG_BLOCK	-0.41	0.14 ***	0.08 **	0.14 ***
	-1.22	*6.91*	*2.02*	*6.96*
LAG_DEBT	-0.23	-0.02	0.12	-0.03
	-0.38	*-0.96*	*1.45*	*-1.19*
LAG_BOARD		0.00		0.01 **
		1.49		*2.01*
LAG_CAPEX	0.21	0.02	-0.08	0.01
	0.32	*0.30*	*-1.09*	*0.21*
LAG_CCH	0.93 *	-0.12 ***	0.00	-0.11 ***
	1.85	*-5.34*	*-0.04*	*-5.10*
LAG_SEGMENT		0.00		0.00
		-0.88		*-0.73*
LAG_TA	0.00		-0.03	
	-0.01		*-0.99*	
LAG_RISK	-0.41 *		0.00	
	-1.78		*0.04*	
INTERCEPT	-13.31	0.78 [1]***	0.75	0.77 ***
	0.35	*25.05*	*0.53*	*24.41*
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	No [1]	Yes	No [1]
Chi^2 value	841.29 ***	204.91 ***	972.60 ***	208.21 ***
N	701	701	704	704

**** significant at 1%, ** significant at 5%, * significant at 10%*

Table 15: Model 5 – 3sls estimates of New Zealand firm performance and independent board representation using lagged control variables. Sample period 2004-2008

Table 15 reports the results of model 5 using the first lag of control variables to ensure these variables are pre-determined. It is a 3sls regression of a sample of New Zealand listed companies over the sub-sample period 2004-2008. Tobin's Q and ROA are the dependent variables measuring firm performance. INDD is also a dependent variable determined endogenously with firm performance measures. Variables are defined in table 1. *Z*-statistics are reported below the regression coefficients. * denotes significance at the 10% level, ** denotes significance at the 5% level, *** denotes significance at the 1% level.

[1] Industry effects are included in the reduced form of the INDD equation but not the structural form.

	Endogenous dependent variables			
Independent	Model 5a		Model 5b	
Variables	TOBIN'S Q	INDD	ROA	INDD
INDD	-10.02 ***		0.64	
	-2.90		*1.54*	
TOBIN'S Q		0.15 ***		
		4.81		
ROA				-0.26 *
				-1.89
INDDRISK	5.38 ***		-0.44 *	
	2.97		*-1.86*	
INDDIFEE	0.00 ***		0.00	
	2.94		*-1.41*	
LAG_INSOWN	-17.91 ***	-0.36 ***	0.64	-0.31 ***
	-3.33	*-3.02*	*0.94*	*-3.05*
LAG_INSOWN^2	73.48 ***		-1.35	
	2.99		*-0.44*	
LAG_INSOWN^3	-82.39 ***		1.72	
	-2.79		*0.46*	
LAG_BLOCK	-0.70 *	0.15 **	0.07	0.03
	-1.65	*2.16*	*1.27*	*0.58*
LAG_DEBT	-0.67	0.30 ***	0.03	0.25 ***
	-1.38	*3.96*	*0.57*	*4.08*
LAG_BOARD		-0.02 **		-0.01
		-2.21		*-1.40*
LAG_CAPEX	0.63	0.46 ***	0.02	0.38 ***
	0.58	*2.68*	*0.15*	*2.63*
LAG_SEGMENT		0.07 ***		0.03 *
		3.46		*1.73*
LAG_TA	-0.73 ***		0.06 ***	
	-3.61		*2.60*	
LAG_RISK	-1.44 ***		0.08	
	-2.62		*1.01*	
INTERCEPT	19.02 ***	0.23 *	-1.50 **	0.54 ***
	3.71	*1.91*	*-2.51*	*7.01*
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	No [1]	Yes	No [1]
Chi^2 value	52.32 ***	51.70 ***	100.14 ***	45.79 ***
N	231	231	239	239

**** significant at 1%, ** significant at 5%, * significant at 10%*