

# Determinants of board composition in New Zealand: a simultaneous equations approach

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## Abstract

This paper models the composition of New Zealand boards of directors as a function of alternative corporate governance mechanisms, other control variables, and legislation designed to improve corporate monitoring. We find evidence that board composition and firm performance jointly impact each other in a positive manner. We document that the proportion of outsiders on the board is positively related to board size and is negatively related to future growth, nonlinearly related to inside ownership, and is not related to debt and ownership concentration. Firm performance is inversely related to firm size, positively impacted by future growth, and appears to be nonlinearly related to insider ownership. Passage of the new Companies Act in 1994 is associated with increased representation of outside board members. However, this increase is not associated with enhanced firm performance which may be a consequence of increased liability placed on directors.

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## 1. Introduction

The corporate governance literature recognizes the pivotal role played by the board of directors in maintaining an effective organization. This is especially true in the case of publicly held corporations that are characterized by agency problems arising from the separation of ownership and control. The top management of a corporation is generally

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responsible for suggesting and implementing major policy initiatives, while largely diffuse equity holders assume the bulk of the risk associated with those decisions. Because management does not bear a substantial portion of the wealth effects of their decisions, this leads to an agency problem between management and equity holders. Jensen and Meckling (1976) elaborate on these agency conflicts which include shirking, excessive perk consumption, and engaging in nonoptimal investments.

Fama and Jensen (1983a) discuss the role of market and organizational mechanisms in mitigating these agency conflicts and better aligning management interests with those of residual claimants. Among the most important of the organizational controls is the board of directors. As discussed by Fama and Jensen (1983a,b), the board reduces agency conflicts by separating the management and control aspects of the decision-making process. The management aspect includes the initiation and implementation of decisions, while the control aspect involves the ratification and monitoring of decisions. Thus, while management is delegated by the board to initiate and implement various decisions, it is the board that has the control and authority to ratify and monitor major policy initiatives and to hire, fire, and set the compensation of top level managers (Fama and Jensen, 1983a). In this regard, board composition becomes significant as the primary responsibility in keeping the board independent depends on outside disinterested members of the board (Fama, 1980; Fama and Jensen, 1983a; Weisbach, 1988; Zahra and Pearce, 1989).

The agency literature also recognizes that the board of directors is only one of several mechanisms that can mitigate agency conflicts within the firm. Capital structure, insider ownership, and block ownership are also useful in controlling agency problems. Empirical studies document that board composition is affected by these alternative corporate governance mechanisms. Additionally, it is found that board composition is impacted by other variables including firm size, firm diversification, and firm performance. This study focuses on the determinants of board composition in New Zealand but is distinguished from extant research in several respects. First, most studies have focused on US-based firms. It would be interesting to contrast findings in the US and other comparatively large countries such as the UK with those of other countries characterized by diverse institutional and market environments, and agency conflict aspects. New Zealand is a comparatively much smaller economy where the capital markets are not nearly as well developed, firms have smaller capitalizations, and ownership structures are very different. A further motivation of the paper is to ascertain the ability of governments to legislate the monitoring efficacy of outside board members. Specifically, we provide evidence relating to the Companies Act 1993, which codified preexisting legislation pertaining to the management and supervision of firms and contained significant implications for the monitoring role of the board.

From a methodological perspective, this study is different from most previous studies in that we use a simultaneous equations regression framework. Because the agency literature has assigned an important role to the impact of board composition on firm performance, there is a problem of endogeneity in a single equation regression model relating board composition to firm performance and other alternative control mechanisms. While outside board memberships may result in improved corporate performance, it is also plausible that more profitable firms may take on increased outside board members for political or other reasons (Agrawal and Knoeber, 1996). To control for this problem, we employ a two-

equation simultaneous equation regression framework with outside board composition and firm performance as the endogenous variables. The model also includes several variables to capture the effects of alternative corporate governance mechanisms on board composition and other control variables. Using a cross-sectional time-series sample of 607 firm-years of data, this study finds that the proportion of outside board members on the board is inversely related to commitment to capital expenditures (a proxy for growth), and it is positively related to firm performance and board size. We also find that the directional relationship between board composition and inside ownership depends on the level of inside ownership. Further, we find that the proportion of outsiders on the board increased following the passage of the 1993 Companies Act and related legislation. A second equation estimated simultaneously indicates that performance is positively related to the proportion of outside directors and commitment to capital expenditures, and is negatively related to firm size. We also find a nonlinear relation between inside ownership and firm performance. Finally, we document a negative coefficient for the interaction variable between outside board proportion and a dummy variable to capture the time period following the passage of the Companies Act in 1994. The latter finding implies that the sensitivity of firm performance to outside board representation declined following the passage of the reformed Companies Act.

## 2. Literature review

There are basically two related strands of the literature. The first examines the impact of board composition on firm performance either directly or indirectly, while the second models the determinants of board composition. We survey these related areas next.<sup>1</sup>

There are numerous studies that examine the impact of board composition on firm performance. These studies either examine the direct impact of board composition on firm performance in a regression framework, or, alternatively, test for an indirect effect by examining the relation between board composition and announcement returns to particular corporate events that are presumed to affect firm performance. The combined evidence of these two approaches may be characterized as mixed with the former approach generally evidencing an insignificant effect and the latter supporting a positive impact of board composition on firm performance.

Hermalin and Weisbach (1991) fail to find a significant relation between board composition and performance. However, they reason that if each board is optimally weighted between insiders and outsiders relative to a particular firm's individual situation, there should not be a cross-sectional relation between board composition and performance in equilibrium. On the other hand, Baysinger and Butler (1985) find weak evidence that firms with more outside directors in 1970 had higher industry-adjusted returns on equity in 1980, while Schellenger et al. (1989) also observe a positive relationship between outside director representation and corporate financial performance. Agrawal and Knoeber (1996) estimate a simultaneous system of firm performance, board composition, and other control mechanisms and obtain the puzzling result that more outsiders on the board of directors

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<sup>1</sup> For a recent survey of the theoretical and empirical literature on the role of board of directors in corporate governance, see John and Senbet (1998).

negatively affect performance. They surmise that boards may be expanded for political reasons (politicians, environmental activists, etc.) and that these “outsiders” either reduce performance directly or proxy for the underlying political constraints that led to their receiving board seats.

Several studies have examined the impact of board composition on corporate performance in countries with distinctive corporate governance characteristics. [Franks et al. \(1999\)](#) point out that nonexecutive directors in the UK have fewer obligations than in the US and primarily perform an advisory function. Not surprisingly, they do not find evidence of a link between the proportion of nonexecutives on boards and firm performance. In the Australian context, the role of independent nonexecutive directors has been discussed in guidelines published by, among others, the Australian Investment and Financial Services Association, the Business Council of Australia, and the Australian Stock Exchange throughout the 1990s. However, a recent study by [Lawrence and Stapledon \(1999\)](#) fails to find consistent evidence that independent directors either add or destroy value.

Unlike studies that attempt to directly link board composition to firm performance, indirect evidence has been documented in research concerning the relationship between board composition and the incidence of particular events that affect shareholder wealth. [Weisbach \(1988\)](#) finds that outsider-dominated boards are significantly more likely to remove the CEO on the basis of poor prior performance, and concludes that outsider-dominated boards increase firm value by effecting CEO changes. [Kosnik \(1987\)](#) uses the firm’s decision to pay greenmail as a proxy for the board’s ineffectiveness and finds that boards that resist greenmail had more outside directors. [Shivdasani \(1993\)](#) finds that outside directors have lower equity ownership in hostile targets and have fewer outside directorships; this leads him to conclude that the board of directors and hostile takeovers are substitute governance mechanisms for corporate control. Similarly, [Byrd and Hickman \(1992\)](#) find that bidding firms in which independent outside directors hold at least 50% of the seats have significantly higher acquisition announcement abnormal returns than other bidders. [Borokhovich et al. \(1996\)](#) find that shareholders benefit when outside CEOs are appointed and are harmed when insiders replace fired CEOs, which provides evidence that outside directors are effective corporate monitors.

With regard to studies on the determinants of board composition, one of the earliest studies is by [Hermalin and Weisbach \(1988\)](#), who find that changes in board composition are influenced by the CEO succession process and firm performance. They find that insiders (outsiders) are more likely to leave (join) the board after a firm performs poorly and when a firm discontinues a business. [Bathala and Rao \(1995\)](#) examine board composition determinants in an agency framework and find that board composition is a substitute for alternative agency mechanisms such as debt, dividend policy, and insider ownership. [Agrawal and Knoeber \(1996\)](#) find that in their simultaneous equations estimates, the only significant causal relationship in the equation for outside board representation is that CEOs who are founders tend to be associated with fewer outside board members.

In the international context, [Dalton and Kesner \(1987\)](#) examine differences in board composition and CEO duality between Japan, the US, and the UK. The authors find that significantly fewer outside board members and fewer instances of CEO duality characterize Japanese boards. They attribute this to potential differences in the corporate governance structures among these countries; as they point out, ownership in Japan is largely

concentrated in a few large institutions that exercise control using a “behind-the-scenes” approach. Li (1994) contrasts the board composition and corporate governance characteristics of firms in the US, Canada, Australia, and several European nations. He finds that ownership structure differences such as equity ownership by a bank and state ownership have a bearing on board composition, and that the proportion of outside directors is inversely related to inside ownership, bank ownership of equity, and board size. Li also finds that outside board membership is positively related to state ownership in the firm and CEO duality but is not affected by firm performance, leverage, or size.

Overall, these two strands of research suggest that board composition may have an impact on firm performance and as well that firm performance may influence board composition. Given the potential simultaneity between the two variables, it would appear that modeling board composition as a single equation is not appropriate. Thus, a drawback of extant studies is their inability to control for the potential joint determination of board composition and firm performance. The one exception is the study by Agrawal and Knoeber (1996) that includes separate equations for six alternative corporate mechanisms including board composition and another equation for firm performance. We feel that such a complex system would be too unwieldy and prone to specification errors. Additionally, it is not clear from the corporate governance literature as to which variables are endogenous and which are exogenous (Whidbee, 1997). Consequently, in this study, we estimate a simultaneous system of two equations with board composition and firm performance as the endogenous variables. However, we do include variables for alternative agency mechanisms in the board composition equation along with other control variables.

### 3. Board composition in the New Zealand context

Studying board composition in New Zealand is interesting for several reasons. First, the ownership structure of New Zealand firms is markedly different than the comparatively well-studied US and UK environments. Ownership concentration tends to be extremely high with shareholders holding at least 5% of equity on average accounting for about 60% of share ownership in a given firm. Moreover, in 1995, approximately 50% of firms listed on the NZSE had a majority of equity held by one holder or a tightly knit group (Fox and Walker, 1995). Some New Zealand business commentators have argued that the highly concentrated nature of many New Zealand firms may have positive implications for firm performance. According to Brown and Freeman (1996), the potential for institutional shareholder activism has increased dramatically in New Zealand since the early 1990s: “Local institutions increasingly have close contact with the management of listed companies. A growing number of the major companies have equity management programmes which develop and foster strong relationships with analysts on a one-to-one basis”.<sup>2</sup> This could imply a diminished role for monitoring by external board

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<sup>2</sup> Brown and Freeman (1996) point to several examples in support of this conjecture. For instance,

In 1993 [institutional shareholders] played a significant role in Brierley Investments withdrawing an executive options scheme which was considered too generous. A year later, a revised scheme which was widely canvassed among institutions before its introduction was approved by shareholders.

members, assuming ownership concentration is an effective substitute for independent board monitoring. Indeed, this is what Dalton and Kesner (1987) observe for Japan where ownership concentration, especially by banks, tends to be high. Specifically, they find that the proportion of outside directors in Japan is lower than in the US and UK where ownership concentration is considerably lower. The preceding discussion suggests that the particular external and internal corporate governance environment of the firm may influence board structure and firm performance. Other studies find that the relationship between ownership concentration and firm performance is impacted by the corporate governance environment in which the firm operates (e.g. Gedajlovic and Shapiro, 1998). Thus, this study should provide insights into the differential impact of the external and internal corporate governance structure in New Zealand on the interrelatedness of board composition and firm performance.

On the other hand, other NZ commentators argue that the tightly held nature of many New Zealand firms has given rise to a market for corporate control that often protects incompetent management and is only beneficial for large majority shareholders. Unlike the UK and US, New Zealand has no statutory takeover code and there has been an ongoing debate over whether or not takeovers should be regulated. In particular, New Zealand lacks an “equal opportunity rule” stipulating that all shareholders participate equally in the control transfer process; as Gonski (1994) points out, the absence of a takeover code means that a “smaller shareholder [could] potentially find himself as an investor in a company whose custodians have changed without any input on his part, and without the ability for him to get a similar offer to allow an exit from the company on the same terms”. Given that over 80% (70%) of firms have one shareholder owning more than 20% (30%) of equity or more (Fitzsimons, 1997), corporate control transfers can conceivably take place in the large majority of companies without involving the general body of shareholders. The end result of tightly concentrated corporate ownership and the lack of a takeover code, as expressed by Securities Exchange commission chairman Euan Abernethy (Weir, 1995), is that “[a] takeover of most companies [can] go ahead only with the agreement of the main shareholder. Where the main shareholder [is] also the management of the company, there [is] little alternative when trying to change the [ostensibly inefficient] management.” Given a less than optimal external corporate governance mechanism, the onus for effective corporate governance falls on internal corporate mechanisms of which a significant element is the board of directors. Thus, we may potentially find that board structure is a significant aspect of the corporate governance structure of New Zealand firms and that it is significantly related to firm performance.

Finally, New Zealand offers us a unique opportunity to study the effects of a major reform of the laws governing securities and company law that was passed in July 1994 at which time directors of all public firms were subject to the obligations of the new Act. Corbett (1997) notes that “after the sharemarket crashed [in 1987],...the climate [towards reforming existing company law] changed. The plight of the small shareholder was viewed by many as the direct result of inadequacies in company law...Reforming the [previous] 1955 Companies Act suddenly became a hot political issue.” Specifically, these laws include the Companies Act, the Receiverships Act, the Companies Re-registration Act, the Securities Amendment Act, the Financial Reporting Act, the Takeovers Acts, as

well as repeals of earlier legislation. Of interest to this study are the implications of the reformed Act as it relates to board composition and firm performance.

The new legislation differed significantly from the 1955 Companies Act regarding a director's duty of care. In particular, the 1993 Companies Act expands on existing legislation regarding the boards' duties by explicitly stating the directors' obligations. According to [Panckhurst \(1996\)](#), its contents include Duty of Loyalty—a director must act 'in good faith and in what the director believes to be in the best interests of the company' (s. 131(1)), and Duty of Care—directors must 'exercise the care, diligence, and skill that a reasonable would exercise in the same circumstances' (s. 137). Additionally, the new Act mandates that directors exercise power for a proper purpose (s. 134), and never cause or allow the business of the company to be carried out in such a way that creates a risk of serious loss to the company's creditors (s. 135).

In addition to explicitly defining the duties of the directors, the new law also imposes penalties on directors for improper execution of their fiduciary role. For example, under the new law, directors have to certify that the company meets the solvency test prior to voting affirmatively on a distribution; failure to do so can subject them to monetary penalties.<sup>3</sup>

Finally, the Act expanded disclosure of directors' activities and business interests in the annual report. Under the 1993 Act, names and remuneration of each director were to be included, as were all directors' disclosures of interest during the period covered by the annual report. Directors' share dealings were also to be disclosed in each report. Overall, the reform package implicitly places a greater burden of accountability on the board and elevates its role as a monitoring agent. This could have two possible impacts on board composition and firm performance that are not necessarily mutually exclusive. Since disaffected board members (outsiders) are most likely the best monitors, this would imply that the passage of the Companies Act and related legislation in New Zealand should result in increased presence of outside members on the board. In addition, it could also mean that the impact of outside board representation on firm performance might be enhanced following the adoption of the reformed Companies Act and related legislation. Specifically, outside directors may now take their fiduciary responsibilities more seriously rather than simply "rubber stamping" management's decisions. On the other hand, it is plausible that firms view the new legislation as having little practical consequence since it does not mandate an increase in outside board representation. Consequently, we may not find a significant increase in outside board representation following the passage of the 1993 Companies Act. Boards may also view the penalties of not exercising their fiduciary responsibility as fairly benign so much so that the new legislation does not significantly alter the sensitivity of firm performance to board composition. This could be because the penalties are not severe enough or because enforcement may be difficult.

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<sup>3</sup> Other examples of the statutory liabilities include fines of up to \$100,000 for each director if a company does not prepare proper financial statements on time, imprisonment for up to 5 years, or a fine of up to \$200,000 for a director who makes false or misleading statements in relation to the Financial Reporting Act, and fines of up to \$50,000 for a director and \$500,000 for a company for breaching the Commerce Act ([Goulter, 1997](#)).

## 4. Empirical methodology and data

### 4.1. Empirical methodology

Prior literature suggests that while outside board memberships may result in improved corporate performance, it is also plausible that more profitable firms may take on outside board members for political or other reasons. To control for the possible endogenous relationship between board composition and firm performance, it is deemed that the most appropriate methodology is a simultaneous equations approach. A two-equation model with outside board representation and firm performance as dependent variables is employed, with firm performance appearing as a regressor in the board composition equation and vice versa. Thus, the causal relationship between firm performance and board composition may be determined by estimating these two variables simultaneously.

The simultaneous equations model is estimated using a three-stage least squares (3-SLS) system approach methodology. Several independent variables are common to the board composition and firm performance equations, including insider stock ownership, leverage, ownership concentration, and growth. In the board composition equation, we also include board size, CEO duality, extent of firm diversification, and the impact of the Companies Act on the proportion of outsiders on the board as additional control variables. In the firm performance equation, we add firm size as an explanatory variable as well as an interaction term measuring the impact of the 1993 Companies Act on the efficacy of outside board representation. The system we estimate, along with expected signs for the coefficients and a discussion of the specific variables used, is as follows:

$$\begin{aligned} \text{OUTDIR} = & a_0 + a_1 \overset{+}{q\text{-ratio}} + a_2 \overset{+}{\text{INSOWN}} + a_3 \overset{+}{\text{BLOCK}} + a_4 \overset{+}{\text{DEBT}} \\ & + a_5 \overset{+}{\text{BDSIZE}} + a_6 \overset{+}{\text{CAPEXP}} + a_7 \overset{+}{\text{CEODUALITY}} \\ & + a_8 \overset{+}{\text{BUSSEG}} + a_9 \overset{+}{\text{LEGIS}} + e \end{aligned} \quad (1)$$

$$\begin{aligned} q\text{-ratio} = & a_0 + a_1 \overset{+}{\text{OUTDIR}} + a_2 \overset{+}{\text{INSOWN}} + a_3 \overset{+}{\text{BLOCK}} + a_4 \overset{+}{\text{DEBT}} \\ & + a_5 \overset{+}{\text{SIZE}} + a_6 \overset{+}{\text{CAPEXP}} + a_7 \overset{+}{\text{OUTDIR} * \text{LEGIS}} + e \end{aligned} \quad (2)$$

#### 4.1.1. Board composition equation

The endogenous variable, OUTDIR, is defined as the percentage of outsiders on the board. Our classification of outside directors is similar to the procedure developed by Baysinger and Butler (1985). Byrd and Hickman (1992) claim that the traditional two-way classification scheme of ‘inside’ (corporate employee) or ‘outside’ (nonemployee) does not consider potential conflicts of interest when board members are not employed by the firm but nonetheless have business ties or affiliations. Depending on the affiliations, directors are placed into one of three categories: inside directors, affiliated outside directors, or independent outside directors. We define outside directors as individuals who (1) are not an active or retired employee of the firm; (2) do not have close business ties (e.g. consultant,

supplier, etc.) with the firm; and (3) are not a representative of or appointed by a majority shareholder of the firm.

The first explanatory variable is the other endogenous variable measuring firm performance,  $q$ -ratio. Following the common practice in the agency literature (e.g. Hermalin and Weisbach, 1988; Agrawal and Knoeber, 1996; McConnell and Servaes, 1990), we choose Tobin's  $q$ -ratio as the measure of firm performance. Hermalin and Weisbach (1991, p. 104) state that in the absence of market power, "a divergence of  $q$  from one represents the value of the assets *not* included in the denominator of  $q$ , such as the value of the internal organization or the value of expected agency costs. A  $q$  above one indicates that the market views the firm's internal organization as exceptionally good or the expected agency costs as particularly small." Measuring performance with Tobin's  $q$  then is appropriate since  $q$  reflects the effect of corporate governance structures on performance within an agency framework. Because of the impracticality of calculating the theoretical  $q$  as estimated by Lindenberg and Ross (1981) and Lang and Litzenberger (1989), we follow Chung and Pruitt (1994), who develop an alternative formula for approximating  $q$  as follows:

$$\text{Approximate } q = (\text{MVE} + \text{PS} + \text{DEBT})/\text{TA}$$

where MVE is the market value of equity calculated as the product of the firm's share price and the number of common stock shares outstanding, PS is the liquidating value of the firm's outstanding preferred stock, and DEBT is the value of the firm's short-term liabilities net of its short-term assets, plus the book value of the firm's long-term debt. Chung and Pruitt find that at least 96.6% of the total variability in the theoretical  $q$  is explained by approximate  $q$ .

The first three exogenous variables of Eq. (1) are measures of alternative mechanisms to control agency problems and are expected to have substitute roles in corporate governance. INSOWN refers to the proportion of equity beneficially held by all members of the board of directors including top officers of the firm who are members of the board.<sup>4</sup> It is hypothesized that the monitoring role of external board members would be less critical for firms with greater insider ownership if external board membership and insider ownership are viewed as substitute corporate governance mechanisms. Therefore, we predict a smaller proportion of external members in firms with higher insider ownership proportions.

BLOCK is the ownership concentration variable defined as the percentage of equity held by shareholders with at least a 5% equity stake. BLOCK can have two possible effects on board composition. (1) If high ownership concentration insulates inefficient management from the external control market in New Zealand, as discussed previously, it would follow that outside director monitoring would take on an increased role in the absence of a credible threat of efficiency-enhancing takeovers and BLOCK would be expected to have a positive sign. (2) On the other hand, large blockholders of tightly held

<sup>4</sup> Beneficially held shares are those in which the director/insider has a beneficial interest solely or as a joint holder. We would have preferred to have used a measure of inside ownership based on stock holdings of the top officers of the company, unfortunately, such a measure is not available for New Zealand firms.

firms could instead function as a mechanism to control agency problems. In this case, ownership concentration would behave as a substitute in corporate governance and an inverse relationship would be expected between OUTDIR and BLOCK. Finally, DEBT is defined as the long-term debt divided by the book value of total assets. In the agency literature, debt also is given a significant role in controlling agency conflicts. [Jensen \(1986\)](#) suggests that the contractual obligations associated with debt reduce management's discretionary control over the firm's free cash flow and their incentive to engage in nonoptimal activities. [Grossman and Hart \(1982\)](#) assert that debt forces managers to consume fewer perks and become more efficient in order to lessen the probability of bankruptcy, the loss of control, and loss of reputation. In an extensive and critical review of the literature, [Harris and Raviv \(1991\)](#) find that the evidence is broadly consistent with the view that debt can mitigate agency conflicts. Consequently, we expect an inverse relationship between OUTDIR and DEBT.

Several additional variables control for other factors which may have a significant impact on board composition. BDSIZE refers to the number of directors on the board. As [Dalton and Kesner \(1987\)](#) report, there is evidence in the US and other countries that larger boards are associated with greater proportions of outside directors. Future growth is proxied by CAPEXP which is defined as commitment to capital expenditures scaled by total assets.<sup>5</sup> It has been argued that agency costs can be fairly high for growth firms as managers have greater flexibility with regard to future investments ([Myers, 1977](#)). As a result, firms with significant growth opportunities may have a stronger presence of outsiders on their boards. However, [Bathala and Rao \(1995\)](#) document an inverse relationship between growth and outside proportion on the board. They argue that investment decisions of high growth firms are associated with greater uncertainties, require information that may be highly specialized, and decisions that are very subjective such that only insiders can properly assess the value of the investments. Since internal directors are expected to possess superior knowledge to assess such situations better than external directors, one would expect the top management of growth firms to prefer more internal directors on their boards. Further, according to [Baysinger and Hoskisson \(1990, pp. 78–79\)](#), "...inside directors, as part of the decision-making process, have relatively greater access to subjective information about top managers' performance. ... Therefore, in terms of information processing, it is expected that the insider part of any board will evaluate and reward top management on the basis of strategic controls." Consequently, if decision-making in high growth firms involves a great deal of subjectivity and strategic choices, top management of high growth firms may prefer more insiders on their boards. The foregoing discussion suggests that the firm's growth rate and the proportion of outside directors may be indeterminate.

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<sup>5</sup> Specifically, commitment to capital expenditure includes R&D and fixed asset expenditures for projects likely to be undertaken in the following year and is disclosed in the footnotes to the annual report every year. We use commitment to capital expenditures as a measure of growth rather than one of the traditional measures of growth such as a historical growth rate in sales or total assets due to data constraints. Using a historical growth rate, say, over a 3-year period, would mean that each equation can only be estimated over 1994–1997 instead of 1991–1997; additionally, it would mean that the time series of growth rates for a given firm would be based on overlapping data.

CEODUALITY is a dummy variable that takes on the value 1 if the CEO is also the chairman of the board. We include this variable to see if CEOs, who also assume the dual role of board chairmanship, stack the board in their favor with insiders who are unlikely to be critical of their performance. BUSSEG controls for the level of diversification in a firm's operations which is represented by the number of business segments the firm is engaged in. It is hypothesized that greater diversification may require more monitoring expertise brought by outside board members. The final independent variable is a dummy variable to capture the effect of the Companies Act and related legislation passed in 1994. The LEGIS dummy variable takes on the value of 1 for years 1995–1997. To the extent that the legislation increases the fiduciary responsibility of the board, one could make a case for greater representation of outsiders on the board.

#### 4.1.2. Firm performance equation

The dependent endogenous variable,  $q$ -ratio, is the measure of firm performance previously discussed. The primary variable of interest in Eq. (2), OUTDIR, is the other endogenous variable in the system. As noted in the literature review, more profitable firms may take on more outside board members due to political considerations. Alternatively, as [Hermalin and Weisbach \(1988\)](#) document, firm performance has a bearing on whether more insiders or outsiders join the board. Specifically, they find that insiders (outsiders) are more likely to leave (join) the board after a firm performs poorly. Consequently, we expect a positive sign for the OUTDIR in the firm performance equation.

The next three independent variables are measures of alternative mechanisms to control agency problems. INSOWN refers to the proportion of equity held by the board of directors including top officers of the firm who are members of the board. This variable also appears in the board composition equation. [Jensen and Meckling \(1976\)](#) note that as the proportion of equity held by the manager increases, their propensity to undertake excessive perquisite consumption declines thereby aligning managerial and shareholder interests. Because the measure of ownership we use includes equity held by all directors, it is hypothesized that directors with shareholdings are more likely to act in the best interests of shareholders. Therefore, we predict a positive relationship between INSOWN and Tobin's  $q$ -ratio. However, empirical evidence in the US suggests that there may be nonlinearities in the relation between inside ownership and firm performance. [Morck et al. \(1988\)](#) document such a nonlinear relationship for a cross-sectional sample of 371 US firms. Using a piecewise linear specification, they document a positive impact on Tobin's  $q$  for managerial and board ownership proportions between 0% and 5%, a negative impact for proportions between 5% and 25%, and a positive impact for proportions exceeding 25%. Morck et al. suggest that the initial positive coefficient reflects managerial and board ownership incentive to maximize shareholder value in the 0–5% range of insider ownership. They interpret the negative coefficient in the 5–25% to mean that increases in inside ownership in this range are associated with managerial entrenchment. They are careful to point out that managerial and board ownership of stock engenders both an incentive and an entrenchment effect and the negative coefficient probably indicates that the entrenchment effect dominates the incentive effect. At levels of inside ownership greater than 25%, it appears that once again, the “convergence of interests” effect is dominant. [McConnell and Servaes \(1990\)](#) also document a significant nonlinear relationship between inside ownership and the

$q$ -ratio, but the nature of the nonlinearity is different from that observed in Morck et al. Using the piecewise specification in a cross-sectional sample of over 1000 US firms each for 1976 and 1986, McConnell and Servaes find a significantly positive coefficient for the 0–5% range, a positive but insignificant coefficient for the 5–25% range, and, essentially, a 0 coefficient for ownership levels greater than 25%.

In view of the potential for a nonlinear relation between inside ownership and firm performance, we use a simple linear as well as a piecewise specification for the INSOWN variable. In the simple linear specification, INSOWN is entered in the model as is, while in the piecewise model, we use a specification similar to the one used by Morck et al. Specifically, we divide ownership levels into four regions: less than 1% (INSOWN\_L1), between 1% and 5% (INSOWN\_15), between 5% and 20% (INSOWN\_520), and over 20% (INSOWN\_G20).

As in the OUTDIR equation, there are two possible outcomes for the impact of BLOCK on Tobin's  $q$ -ratio: (1) increasing levels of BLOCK would have a negative impact on  $q$ -ratio if high ownership concentration serves to insulate firms from efficiency-improving takeovers; (2) BLOCK may instead be indicative of the incentive of large shareholders to monitor management. Beginning with the theoretical models postulated by Grossman and Hart (1980) and Shleifer and Vishny (1986), a large body of empirical evidence has developed which shows that shareholder wealth increases when large blocks of equity are acquired by outside shareholders.<sup>6</sup> While we postulate that the coefficient for BLOCK may have a positive or a negative sign, it is conceivable that the marginal impact of BLOCK on firm performance may depend on the level of ownership concentration. At low levels of ownership concentration, large shareholder ownership may be associated with a positive impact on firm performance due to the presence of the external monitoring effect. However, at very high levels of ownership concentration, as noted previously, takeovers may be difficult to effect without the cooperation of the large shareholders. To the extent that the large shareholders prefer incumbent management or large shareholders have different objectives, at high levels of ownership concentration, an inverse relationship between BLOCK and the  $q$ -ratio is possible. To allow for this possibility, BLOCK is specified in the regression in its unadjusted form and also as a piecewise specification. For the piecewise specification, we use the following ranges: 0–30%, 30–50%, 50–70%, and greater than 70%.<sup>7</sup> Finally, DEBT should be positively associated with Tobin's  $q$ -ratio if leverage functions as a control mechanism to disperse free cash flow and, consequently, to mitigate potential agency problems (Jensen, 1986).

We also include several control variables in Eq. (2). The size variable (SIZE) is included to control for differences in firm size. SIZE is defined as the log of the book value of total assets. Previous literature documents that stock performance is inversely related to

<sup>6</sup> Representative US-based work in this area includes Bethel et al. (1998), Choi (1991), Mikkelsen and Ruback (1985), and Holderness and Sheehan (1985). In countries with less dispersed share ownership, the relationship is not as clear. For example, Thoenet and Poensgen (1979) find that owner-controlled German firms have higher growth rates while Prowse (1994), on the other hand, finds no relation between ownership concentration and performance in Japanese firms.

<sup>7</sup> We also tried slight changes to these cutoff points with qualitatively similar outcomes.

size (e.g. Fama and French, 1992 in the US, Chan et al., 1991 in Japan). CAPEXP is the measure of future growth which is also an explanatory variable in the board composition equation. Since the Tobin's  $q$ -ratio reflects future growth opportunities (Lang et al., 1989), we expect it to be positively associated with CAPEXP.

Finally, we capture the impact of the 1993 Companies Act on the sensitivity of firm performance to board composition by including an interaction term (OUTDIR\*LEGIS) between OUTDIR and a dummy variable (LEGIS) that takes on the value of 1 for 1995–1997.<sup>8</sup> A positive coefficient for OUTDIR\*LEGIS is consistent with the hypothesis that the legislation that took effect in 1994 had the intended consequence of enhancing the relationship between outside board representation and firm performance. An insignificant coefficient for the interaction term signifies that the legislation had a benign effect, while a negative coefficient implies that the legislation may have resulted in a detrimental impact on the board's monitoring role.

#### 4.2. Data

Data for this study is obtained for a sample of firms listed on the New Zealand Stock Exchange (NZSE) for the years 1991 through 1997. Data on board composition and insider ownership are taken from two sources: questionnaire surveys sent to listed companies and from company annual reports.<sup>9</sup> This results in a sample of 607 firm-years with the number of firms ranging from a low of 63 in 1991 to a high of 105 in 1995. Table 1 provides overall sample descriptive statistics. With respect to board characteristics, the mean (median) proportion of outside directors over the sample period is 55.7% (60.0%). This proportion is similar to that reported for the US and most European countries by Li (1994), who points out that countries with single board structures tend to have outsider-dominated boards. The typical board consists of six or seven members, which is considerably smaller than that observed in the US or other comparatively larger countries. For example, Shivdasani and Yermack (1999) report a median board size of 11 for a random sample of 341 firms in the US, and Peasnell et al. (1999) document an average size of 8 for boards in the UK. However, this is consistent with board sizes in other relatively small countries; for example, Eisenberg et al. (1998) report that the mean (median) board size of a large sample of firms in Finland is only 3.0 (3.7).

<sup>8</sup> The 1993 Companies Act did not become effective until July 1994. Consequently, we do not include 1994 in the post-Companies Act time period. While LEGIS captures 3 years of the post-legislation period, it is possible that we have not allowed for sufficient time to elapse to capture the full effects of the legislation on board composition and the subsequent impact on the sensitivity of outside board representation on firm performance. This is a potential limitation of the study.

<sup>9</sup> The original request for annual reports and questionnaire survey was conducted by one of the authors pursuant to an unrelated dissertation topic covering the 1991–1995 time frame. We supplement this with data from annual reports on additional firms and extend the time period to 1997. A potential cause for concern is whether the data on board composition and inside ownership taken from the surveys and from the annual reports are different. We do not detect any biases between the two sources and therefore are confident that combining these two sources of data has no material impact on our findings.

Table 1  
Summary statistics of governance and financial characteristics

| Variable                  | Mean    | Standard deviation | Minimum | Median | Maximum    |
|---------------------------|---------|--------------------|---------|--------|------------|
| OUTDIR                    | 0.557   | 0.257              | 0.000   | 0.600  | 1.000      |
| <i>q</i> -ratio           | 1.124   | 1.241              | – 0.995 | 0.838  | 14.709     |
| INSOWN                    | 0.064   | 0.136              | 0.000   | 0.006  | 0.801      |
| BLOCK                     | 0.599   | 0.213              | 0.000   | 0.614  | 0.999      |
| TOP1                      | 0.408   | 0.213              | 0.000   | 0.395  | 0.992      |
| DEBT                      | 0.181   | 0.164              | 0.000   | 0.168  | 0.789      |
| BDSIZE                    | 6.600   | 2.154              | 2       | 6      | 14         |
| SIZE (NZ\$ mill.)         | 689.458 | 2232.648           | 0.103   | 88.879 | 20,961.662 |
| CAPEXP                    | 0.029   | 0.077              | 0.000   | 0.005  | 0.978      |
| CEODUALITY (no. of cases) | 130     |                    |         |        |            |
| BUSSEG                    | 1.959   | 1.583              | 1       | 1      | 11         |
| No. of observations       | 607     |                    |         |        |            |

OUTDIR is the proportion of independent outside board members to total board size and *q*-ratio is Tobin's *q* approximated by taking the sum of book value of long-term debt, book value of net short-term debt, liquidation value of preferred stock, and the market value of common equity divided by the book value of total assets. INSOWN is the proportion of common shares held by all members of the board of directors including top officers of the firm who are members of the board. BLOCK is the proportion of shares held by shareholders holding at least 5% of the firm's equity and TOP1 is the proportion of equity held by the largest block shareholder. DEBT is the proportion of debt defined as long-term debt to total assets. SIZE is the log of total assets. BDSIZE is the size of the board of directors. CAPEXP is the commitment to capital expenditure scaled by total assets. CEODUALITY is a dummy variable equal to 1 if the CEO is also the chairman of the board. In this table, we simply report the number of cases where the CEO is also the chairman of the board, i.e. dummy variable equal to 1. BUSSEG is the number of lines of business the firm is engaged in.

With regard to ownership structure, the mean (median) proportion of equity held by the board of directors including officers who are board members (INSOWN) is 6.4% (0.6%). In comparison, [Bhagat and Black \(1998\)](#) report a mean (median) combined top management and director stock ownership of 9% (3%) in the US. Thus, the mean values we report are comparable to the US, but the median values are substantially smaller. The mean (median) proportion of equity held by shareholders holding at least 5% of equity (BLOCK) is 60.1% (61.5%). As mentioned previously, the tightly concentrated nature of New Zealand's market is distinct from the widely held US and UK environments, but is quite similar to a number of Continental European countries; for example, [Renneboog \(2000\)](#) reports that blockholders holding at least 5% have an average equity stake of about 65% in the Belgian market. In contrast, [Demsetz and Lehn \(1985\)](#) report that the largest five shareholders hold about 25% in US firms. Further, the single largest blockholder in our sample holds about 40% of equity. Similarly, [Bianchi et al. \(1997\)](#) report that the largest shareholder's equity stake of a sample of listed Italian companies is approximately 50%, while [Köke \(2000\)](#) reports that the largest shareholding among a sample of listed German companies is about 58%. As in the closely held European countries, high ownership statistics in New Zealand could imply that corporate governance mechanisms such as board structure and inside ownership might play a diminished role in controlling agency problems.

Turning to the remaining control variables, the mean (median) proportion of long-term debt to total assets (DEBT) is 18.1% (16.4%). Slightly over a fifth of the sample exhibits

CEO duality. This proportion is similar to other countries with relatively high ownership concentrations, e.g. Lawrence and Stapledon (1999) report that 29% of Australian boards have boards with a combined CEO/chairperson, and Roth (1996) reports that about 26% of a sample of Canadian firms exhibit this characteristic. The mean (median)  $q$ -ratio is approximately 1.1 (0.84), while the mean (median) ratio of commitment to capital expenditures is 2.9% (7.7%) during the sample period. Firm size (book values of total assets) has a mean (median) value of NZ\$689 (NZ\$89) million with a significant amount of dispersion between minimum and maximum observations. Finally, the median New Zealand firm is involved in only one line of business.

## 5. Discussion of results

Tables 2 and 3 contain estimates of the regression model. Table 2 shows the results with INSOWN and BLOCK specified in their simple linear form, while Table 3 presents the results using their piecewise linear specifications. There are two panels in each table. Panel A (Panel B) contains the 3-SLS (OLS) estimates. The focus of our discussion is on the 3-SLS estimates; the OLS estimates will also be discussed but are presented mainly for comparative purposes.

### 5.1. Results using the simple linear specification

Table 2, panel A provides 3-SLS estimates where INSOWN and BLOCK are specified in their unadjusted forms. The system weighted  $R$ -square is 22.4% with a mean square error of 2.751. Generally, the signs of the variables in each equation are as predicted. With regard to the board composition equation, we find that the jointly endogenous  $q$ -ratio variable is positive and significant at the 1% level ( $t = 2.94$ ). The significance of the  $q$ -ratio variable in the board composition equation indicates our findings are consistent with the view that more profitable firms take on more outside board members for political or other reasons.

The board equation estimates also reveal that higher inside ownership (INSOWN), ownership concentration (BLOCK), and leverage (DEBT) have little effect on board composition. Thus, in New Zealand, these alternative corporate governance mechanisms are not found to be substitutes for board composition within the agency framework. This is in contrast to the substitution effects documented by Bathala and Rao (1995) for the US and Li (1994) for the US, Japan, and Western Europe, although neither study uses a simultaneous equation framework. Our results are, however, consistent with US findings by Agrawal and Knoeber (1996) that the typical agency mechanisms are not significant in the board equation estimated within a simultaneous equations framework. Agrawal and Knoeber (1996) and Demsetz (1983) argue that the lack of significant coefficients for these variables could simply arise from firms' optimizing these variables to maximize firm value given their specific environment; thus, in equilibrium, there may not be any systematic relation between these variables.<sup>10</sup>

<sup>10</sup> We wish to thank an anonymous reviewer for pointing this out.

Table 2

Estimated coefficients for the outside board composition and  $q$ -ratio equations, base-case model

| (A) 3-SLS system estimates  |                      |                      | (B) OLS estimates           |                      |
|-----------------------------|----------------------|----------------------|-----------------------------|----------------------|
| Independent Variable        | OUTDIR               | $q$ -ratio           | OUTDIR                      | $q$ -ratio           |
| Intercept                   | 0.218<br>(1.69)*     | 0.581<br>(1.61)      | 0.620<br>(11.74)***         | 3.092<br>(7.85)***   |
| OUTDIR                      |                      | 3.194<br>(11.02)***  |                             | 0.153<br>(0.66)      |
| $q$ -ratio                  | 0.210<br>(2.94)***   |                      | 0.007<br>(0.90)             |                      |
| INSOWN                      | −0.195<br>(−1.38)    | 0.647<br>(1.75)*     | 0.003<br>(0.05)             | 0.383<br>(1.04)      |
| BLOCK                       | −0.001<br>(−0.01)    | −0.405<br>(−1.73)*   | −0.209<br>(−4.34)***        | −1.033<br>(−4.41)*** |
| DEBT                        | 0.056<br>(0.51)      | 0.045<br>(0.14)      | −0.026<br>(−0.43)           | 0.331<br>(1.02)      |
| BDSIZE                      | 0.012<br>(1.85)*     |                      | 0.009<br>(1.62)             |                      |
| SIZE                        |                      | −0.080<br>(−2.76)*** |                             | −0.137<br>(−4.64)*** |
| CAPEXP                      | −0.703<br>(−2.77)*** | 2.593<br>(3.98)***   | −0.373<br>(−2.90)***        | 1.793<br>(2.78)***   |
| CEODUALITY                  | −0.007<br>(−0.29)    |                      | −0.124<br>(−4.86)***        |                      |
| BUSSEG                      | −0.007<br>(−0.77)    |                      | −0.012<br>(−1.66)*          |                      |
| LEGIS                       | 0.124<br>(3.50)***   |                      | 0.126<br>(6.42)***          |                      |
| OUTDIR*LEGIS                |                      | −0.636<br>(−3.11)*** |                             | 0.003<br>(0.02)      |
| System weighted MSE         | 2.751                |                      | $F$ -value<br>( $p$ -value) | 12.88<br>0.00        |
| Degrees of freedom          | 1196                 |                      | $R$ -square                 | 0.163                |
| System weighted $R$ -square | 0.224                |                      | Adj. $R$ -square            | 0.150                |
| $N$                         | 607                  |                      |                             | 0.066                |

OUTDIR is the proportion of independent outside board members to total board size and  $q$ -ratio is Tobin's  $q$  approximated by taking the sum of book value of long-term debt, book value of net short-term debt, liquidation value of preferred stock, and the market value of common equity divided by the book value of total assets. INSOWN is the proportion of common shares held by all members of the board of directors including top officers of the firm who are members of the board. BLOCK is the proportion of shares held by shareholders holding at least 5% of the firm's equity. DEBT is the proportion of debt defined as long-term debt to total assets. SIZE is the log of total assets. BDSIZE is the size of the board of directors. CAPEXP is the commitment to capital expenditure scaled by total assets. CEODUALITY is a dummy variable set equal to 1 if the CEO is also chairman of the board; otherwise, the dummy variable is set equal to 0. BUSSEG is the number of lines of business the firm is engaged in. LEGIS is a dummy variable set equal to 1 for years 1995–1997; otherwise, it is set equal to 0. OUTDIR\*LEGIS is an interaction term between the OUTDIR variable and the LEGIS dummy variable. For each model, coefficients and the associated  $T$ -statistic for the significance of the coefficient in parenthesis are shown. The asterisks next to the  $T$ -statistic denote the significance level for a two-tailed test, the coefficient is different from 0.

\* Denotes significance at the 10% level.

\*\* Denotes significance at the 5% level.

\*\*\* Denotes significance at the 1% level.

Board size (BDSIZE) has a positive coefficient that is significant at the 10% level. This is consistent with evidence in the US that larger boards are associated with greater proportion of outsiders on the board. The coefficient for growth, proxied by CAPEXP, is negatively significant at the 1% level. As noted in previous discussion, a negative coefficient is consistent with the view that high growth firms prefer to have a greater proportion of insiders on the board presumably because of the requisite specialized background needed to evaluate complex, specialized, and uncertain nature of their projects. The negative coefficient is consistent with the findings for the US observed by Bathala and Rao (1995). CEO duality and the extent of firm diversification (BUSSEG) do not appear to be significant determinants of board composition.

Finally, the coefficient for the legislation dummy variable, LEGIS, is significantly positive at the 1% level. This evidence is consistent with the view that the legislation is associated with an increase in outside board memberships. It appears that the increased disclosure requirements and emphasis on the fiduciary responsibilities of the board have caused firms to strengthen their corporate governance structure by increasing outside representation on the boards.<sup>11</sup>

With regard to the performance equation, the endogenous OUTDIR variable is positive and highly significant ( $t=11.02$ ); this is consistent with Byrd and Hickman (1992) and Rosenstein and Wyatt (1990) who find that increased representation by outside directors on the board is positively associated with firm performance and shareholder wealth.<sup>12</sup> The joint significance of the two endogenous variables suggests that performance and board composition impact each other. Thus, it appears that independent directors exert a positive influence on firm performance and, at the same time, the more profitable firms seek to increase outside director representation on the board.

The INSOWN variable is positive and significant at the 10% level which is similar to findings of Han et al. (1999) for several European countries and Japan and suggests that insider ownership may be important even in countries where the likelihood of problems arising from dispersed ownership is presumably lower. The ownership concentration variable BLOCK is negative and weakly significant which suggests that higher concentration in New Zealand firms may negatively affect performance by serving to entrench management. However, Table 2's results are based on the simple linear specification of these variables which may obfuscate any nonlinear relationships between this variable and the  $q$ -ratio. The results using the piecewise specification are more insightful and will be discussed later.

Among the control variables, we find that firm size (SIZE) has a strong negative association with Tobin's  $q$  which is significant at the 1% level. This demonstrates that a size

<sup>11</sup> The anticipation of the 1993 Companies Act prior to its passage could affect the interpretation of our results. Indeed, a draft of the new Act was made public in 1989 and was widely discussed in the business press thereafter. However, we found that most of the discussion in the press pertaining to directors' liabilities under the new legislation occurred during the 1994–1997 period which suggests that the implications of the new Act were not widely transparent until around 1994.

<sup>12</sup> The strong significance of OUTDIR in the performance equation is also suggestive of a failure of firms to choose the composition of the board optimally.

Table 3

Estimated coefficients for the outside board composition and  $q$ -ratio equations, piecewise model

| (A) 3-SLS system estimates  |                        |                        | (B) OLS estimates           |                        |
|-----------------------------|------------------------|------------------------|-----------------------------|------------------------|
| Independent variable        | OUTDIR                 | $q$ -ratio             | OUTDIR                      | $q$ -ratio             |
| Intercept                   | 0.073<br>(0.39)        | 1.148<br>(2.05)**      | 0.528<br>(5.95)***          | 3.609<br>(6.15)***     |
| OUTDIR                      |                        | 3.187<br>(11.04)***    |                             | 0.258<br>(1.09)        |
| $q$ -ratio                  | 0.226<br>(3.46)***     |                        | 0.011<br>(1.44)             |                        |
| INSOWN_L1                   | 1.852<br>(0.28)        | − 21.478<br>(− 1.20)   | − 4.059<br>(− 1.17)         | − 41.957<br>(− 2.33)** |
| INSOWN_15                   | − 3.348<br>(− 1.58)    | 11.768<br>(2.08)**     | − 1.568<br>(− 1.42)         | 8.164<br>(1.45)*       |
| INSOWN_520                  | − 1.306<br>(− 1.77)*   | 5.163<br>(2.62)***     | − 0.397<br>(− 1.03)         | 3.222<br>(1.650)*      |
| INSOWN_G20                  | 0.822<br>(2.46)**      | − 2.930<br>(− 3.23)*** | 0.541<br>(3.10)***          | − 1.324<br>(− 1.47)*   |
| BLOCK_L30                   | 0.586<br>(1.03)        | − 2.524<br>(− 1.63)*   | 0.365<br>(1.22)             | − 1.926<br>(− 1.25)    |
| BLOCK_3050                  | 0.272<br>(0.67)        | − 1.465<br>(− 1.35)    | − 0.209<br>(− 0.98)         | − 1.927<br>(− 1.78)*   |
| BLOCK_5070                  | − 0.135<br>(− 0.41)    | 0.090<br>(0.10)        | − 0.215<br>(− 1.22)         | − 0.685<br>(− 0.75)    |
| BLOCK_G70                   | − 0.528<br>(− 1.75)*   | 1.462<br>(1.74)*       | − 0.661<br>(− 4.12)***      | − 0.496<br>(0.59)      |
| DEBT                        | 0.022<br>(0.20)        | 0.128<br>(0.39)        | − 0.051<br>(− 0.85)         | 0.356<br>(1.10)        |
| BDSIZE                      | 0.011<br>(1.71)*       |                        | 0.007<br>(1.25)             |                        |
| SIZE                        |                        | − 0.078<br>(− 2.58)*** |                             | − 0.147<br>(− 4.70)*** |
| CAPEXP                      | − 0.724<br>(− 2.92)*** | 2.553<br>(3.92)***     | − 0.389<br>(− 3.08)***      | 1.707<br>(2.65)***     |
| CEODUALITY                  | − 0.012<br>(− 0.56)    |                        | − 0.122<br>(− 4.75)***      |                        |
| BUSSEG                      | − 0.005<br>(− 0.63)    |                        | − 0.010<br>(− 1.44)         |                        |
| LEGIS                       | 0.110<br>(3.63)***     |                        | 0.114<br>(5.92)***          |                        |
| OUTDIR*LEGIS                |                        | − 0.569<br>(− 2.82)*** |                             | − 0.020<br>(− 0.12)    |
| System weighted MSE         | 3.066                  |                        | $F$ -value<br>( $p$ -value) | 10.48<br>4.96          |
| Degrees of freedom          | 1184                   |                        | $R$ -square                 | 0.00<br>0.098          |
| System weighted $R$ -square | 0.244                  |                        | Adj.<br>$R$ -square         | 0.190<br>0.078         |
| $N$                         | 607                    |                        |                             |                        |

effect is present in New Zealand as has been well documented in the US and elsewhere. Future growth, as represented by CAPEXP, is significant and positive at the 1% level. This is consistent with the [Lang et al. \(1989\)](#) interpretation that Tobin's  $q$  ratio reflects future growth opportunities.

Finally, the performance equation reveals that the interaction variable OUTSIDE\*LEGIS is negative and significant at the 1% level. It seems that although outside board representation increased following passage of the Companies Act (as evidenced by the positive coefficient for LEGIS in the board equation), the increased liability imposed on directors may have proven to be a deterrent to enhanced monitoring as implied by the reduced sensitivity of firm performance to outside representation on the board. This intriguing result may not be totally unexpected. It is conceivable that the threat of litigation may have driven away well-qualified directors from seeking board positions and/or made them overly cautious in the conduct of their duties resulting in lowered performance. Indeed, the New Zealand popular business press (particularly during the period 1994–1997) is replete with ominous commentary that reflects the business community's concern that the increased accountability imposed by the Act would have an adverse effect on directors and, in particular, professional outside board members. Much of this trepidation is centered around the perception that the Companies Act greatly increased the risk of personal liability associated with the ability of shareholders to bring actions against directors ([Main, 1994](#)).

Additionally, some NZ commentators believed that professional directors would bear a disproportionate share of this increased risk; [Slade \(1997\)](#), quoting Auckland barrister Alan Sorrell) articulates this view: "In the past the burden fell more heavily on the company's executives. Now [non-executive] directors have a very real prospect of being sued if things go wrong." In sum, many in the New Zealand business press feared that the Companies

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#### Notes to Table 3:

OUTDIR is the proportion of independent outside board members to total board size and  $q$ -ratio is Tobin's  $q$  approximated by taking the sum of book value of long-term debt, book value of net short-term debt, liquidation value of preferred stock, and the market value of common equity divided by the book value of total assets. INSOWN\_L1, INSOWN\_15, INSOWN\_520, and INSOWN\_G20 are piecewise representations of inside ownership for values less than 1%, 1% to less than 5%, 5% to less than 20%, and greater than 20%, respectively. BLOCK\_L30, BLOCK\_3050, BLOCK\_5070, and BLOCK\_G70 are piecewise representations of block ownership (shareholders that own at least 5% of the stock) for values less than 30%, 30% to less than 50%, 50% to less than 70%, and greater than 70%, respectively. DEBT is the proportion of debt defined as long-term debt to total assets. SIZE is the log of total assets. BDSIZE is the size of the board of directors. CAPEXP is the commitment to capital expenditure scaled by total assets. CEODUALITY is a dummy variable set equal to 1 if the CEO is also the chairman of the board; otherwise, the dummy variable is set equal to 0. BUSSEG is the number of lines of business the firm is engaged in. LEGIS is a dummy variable set equal to 1 for years 1995–1997; otherwise, it is set equal to 0. OUTDIR\*LEGIS is an interaction term between the OUTDIR variable and the LEGIS dummy variable. For each model, coefficients and the associated  $T$ -statistic for the significance of the coefficient in parenthesis are shown. The asterisks next to the  $T$ -statistic denote the significance level for a two-tailed test, the coefficient is different from 0.

\* Denotes significance at the 10% level.

\*\* Denotes significance at the 5% level.

\*\*\* Denotes significance at the 1% level.

Act and related legislation would make directors overly cautious and cut company profits.<sup>13</sup> Thus, while we may find that the proportion of independent directors on boards increased following passage of the new legislation, we surmise that the increased accountability and potential for lawsuits placed on nonexecutive directors may have driven away qualified directors from seeking board appointments or made them overly cautious at the expense of maximizing shareholders' wealth.

For comparative purposes, we next discuss the OLS estimates for the two regression equations. The OLS estimates shown in Table 2, panel B are notable in that the endogenous variables are not significant whereas they are significant using the system estimation method. This points to the value of the 3-SLS methodology. In panel A, firm performance and board composition are positively related to each other and that they are jointly determined. This inference would not have been evident from the OLS estimates. With regard to the other independent variables, the results of panels A and B are similar but with some exceptions. In the board equation, BDSIZE is significantly positive in the two-equation system, but is insignificant in the OLS estimates. Ownership concentration appears to be a substitute for outside directors in the OLS framework as revealed by the significant negative coefficient for BLOCK; this is in contrast to the insignificant relationship borne out in the 3-SLS estimates. Also, CEODUALITY is significantly negative in the board equation when OLS is used but is insignificant when 3-SLS is used. In the firm performance equation, INSOWN and the interaction term, OUTDIR\*LEGIS, are no longer significant under the OLS method in contrast to the significant coefficients documented under the 3-SLS method.

## 5.2. Results using the piecewise specification

Table 3 presents the 3-SLS (panel A) and OLS (panel B) estimates using the piecewise linear specifications for INSOWN and BLOCK variables. Recall from Table 2, panel A that using the simple linear specification, INSOWN and BLOCK were not significant in the board equation but had significant positive and negative coefficients, respectively, in the firm performance equation. The results in Table 3 on the other hand suggest that INSOWN and BLOCK may be related to the two endogenous variables in a nonlinear fashion. The impact of the piecewise specifications for INSOWN and BLOCK on the *q*-ratio are especially interesting. As noted earlier, the piecewise specification for INSOWN covers the following ranges: less than 1% (INSOWN\_L1), 1–5% (INSOWN\_15), 5–20% (INSOWN\_520), and greater than 20% (INSOWN\_G20). As shown in Table 3, panel A, the coefficients for the latter three ranges are significant at conventional levels but with mixed signs. The coefficient is negative but insignificant for INSOWN\_L1, significantly positive for INSOWN\_15 and INSOWN\_520, and significantly negative for INSOWN\_G20. This implies that at very low levels of INSOWN, increases in inside ownership are negatively related to firm performance but the impact

<sup>13</sup> As an example, the New Zealand Press Association (December 14, 1994) reported that “directors [of a public health organization] were cautious about borrowing [\$14 million for a new health center] in light of their liability under the new act”.

turns positive for INSOWN levels between 1% and 20% and finally becomes negative at levels of INSOWN greater than 20%. Thus, at the two extreme levels of inside ownership, the firm does not have an incentive to maximize shareholder wealth. While the lack of significance of INSOWN\_L1 limits its explanatory value, it appears that at extremely low levels of inside ownership, marginal increases in inside ownership serve to provide little incentive to enhance shareholder value possibly because the stakes are not “significant” enough to impact insider behavior in a positive manner. Also, it appears that at extremely high levels of inside ownership, i.e. beyond 20%, the entrenchment effect dominates the shareholder wealth maximizing effect. At high levels of INSOWN, insiders are not likely to be subject to the discipline of takeovers; thus, it is plausible that at these levels, the incentive effect is not strong enough. Our results for INSOWN support the conclusions of Morck et al. (1988) and McConnell and Servaes (1990), albeit for a different country, that the relation between INSOWN and firm performance may not be a simple linear one, rather, the relationship appears to be dependent on the level of insider ownership.

In the case of the ownership concentration variable, BLOCK, the piecewise specification covers the following ranges: less than 30% (BLOCK\_L30), 30–50% (BLOCK\_3050), 50–70% (BLOCK\_5070), and greater than 70% (BLOCK\_G70). The coefficient for BLOCK\_L30 is negative and significant at the 10% level, while the coefficient for BLOCK\_G70 is positive and significant at the same level. Similar to evidence found for countries with more dispersed equity ownership, these results suggest that ownership concentration does have some bearing on firm performance: very low levels may exacerbate manager–shareholder agency problems arising from more dispersed ownership and very high levels mitigate these problems through blockholder monitoring.

In the case of the OUTDIR equation, INSOWN has an insignificant positive impact on board composition for values less than 1% and becomes negative for INSOWN values between 1% and 5% and between 5% and 20%, but only the latter is significant. At INSOWN values greater than 20% the impact is significantly positive. These findings are suggestive of a weak substitution effect between inside ownership and board composition for INSOWN values between 1% and 20%, but for inside proportions greater than 20%, it appears that firms add more outside directors perhaps as means to mitigate concerns over managerial entrenchment at high levels of inside ownership. The fear of an entrenchment effect for INSOWN greater than 20% is supported by the significant negative coefficient for INSOWN\_G20 in the firm performance equation. With regard to the piecewise specification for the BLOCK variable, the coefficients are positive at lower levels and negative at higher levels, but are insignificant with the exception of BLOCK\_G70 which is negatively significant at the 10% level. This parallels the finding for BLOCK\_G70 in the Tobin's  $q$  equation, and suggests that very high levels of BLOCK ownership reduce the need for outside board monitoring by acting as a substitute in corporate governance. Further, we find no evidence to support the view that very high concentration in the New Zealand setting is detrimental to firm performance by insulating management from the external control market. The results for the INSOWN and BLOCK piecewise variables using the OLS procedure (Table 3, panel B) are qualitatively similar.

## 6. Conclusions

The empirical findings of this study on a sample of New Zealand firms are consistent with some of the implications of the agency theory literature. Using a systems approach that explicitly controls for potential endogeneity between board composition and firm performance, we find that firm performance and board composition are jointly determined with each having a positive influence on the other. Specifically, our findings support the notion that outside board members have a positive influence on firm performance and that better performing firms are motivated to add independent members to the board. From estimates of the board equation, we find some evidence of a nonlinear relation between alternative governance mechanisms and board composition. Specifically, we document that outside directors may function as a substitute in corporate governance for lower levels of inside ownership. We also find that very high levels of inside ownership are associated with higher outside directors. This suggests that firms increase their use of outside directors in order to mitigate the potential negative entrenchment effect brought about by high inside ownership. Among the additional control variables, we find that the proportion of outsiders on the board is directly related to board size and is indirectly related to future growth. Finally, the study documents that the passage of the reformed company and securities law legislation in 1994 is associated with an increase in outside representation on the board. Viewed in conjunction with the negative OUTDIR\*LEGIS interaction variable in the firm performance equation, it appears that while the Companies Act prompted a secular (and evidently cosmetic) rise in outsiders on boards, the increased liability imposed on directors by the Act did not improve their role as corporate monitors. In the firm performance equation, we find that inside ownership has a nonlinear impact on firm performance and that ownership concentration has little systematic effect on firm performance. Additionally, we find that size and future growth are significant determinants of firm performance in New Zealand.

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