

# LEVELS OF OWNERSHIP STRUCTURE, BOARD COMPOSITION AND BOARD SIZE SEEM UNIMPORTANT IN NEW ZEALAND

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## Abstract

The relationship between firm performance and board composition, size and equity ownership structure are investigated in this paper for a sample of 426 annual observations of New Zealand firms across a five-year period. No statistically significant relationships could be found. These results are consistent with several previous studies and cast doubt on agency explanations used to relate board ownership to corporate performance. This may be due to endogenous factors or due to the small size of the New Zealand pool of corporate directors.

**Keywords:** firm performance, board composition, ownership structure

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## 1. Introduction

Finance literature assumes that managers are imperfect agents for investors (Jensen and Meckling (1976)). This assumption reflects circumstances in which managers of firms may attempt to pursue goals other than shareholder wealth maximization. As a result, agency costs arise from this divergence of interests. Several methods for controlling these agency costs have been advocated, such as the payment of dividends, the use of private debt and managerial stock ownership. However, another important dimension in the reduction of agency costs lies with the monitoring of managers by the board of directors. The board of directors is generally regarded as a crucial aspect of the corporate structure of any organization. In theory, they provide the link between those who provide the capital (shareholders) and the people who use the capital to create value – the managers (Monks and Minow (1995)). This link infers that boards are the overlap between the small and powerful group that runs the company and a large yet relatively powerless group that wishes to see company performance maximized.

The board's primary role is to monitor managers on behalf of shareholders. Numerous studies have

suggested that the effectiveness of this overseeing role is affected by the number of independent or 'outside' directors included on the board (see for example Kaplan and Reishus (1990)), the percentage of outstanding stock held collectively by the board (e.g. Morck et al. (1988)), and the size of the board of directors (e.g. Yermack (1996)). These studies have however primarily focused on firms based in the United States, which have been found to have a significant amount of their large, and medium-sized publicly traded firms being widely controlled (found to be at the 80% mark for large firms and 90% for medium-sized firms in a recent study by Porta et al (1999)). New Zealand was found however to have a corporate governance control base that was widely held of only 30% for large companies and 57% for medium-sized companies.

This unique situation means that a greater percentage of these firms are controlled by closely held groups, such as the family and the state. Under this setting, we would expect the agency costs of NZ firms to be lower than that of US firms (as similarly postulated by Eisenberg et al. (1998) in a study on Finnish firms). In light of this, we investigate three variables, being the percentage of outside directors, the percentage of outstanding stock held collectively

by the board, and board size, and more specifically investigate the effect that these variables might have on firm value within the New Zealand context. Specifically, an attempt is made to determine what levels of these variables enhance the ability of the board to effectively monitor the use of shareholder funds.

The paper is organized as follows: Section 2 provides a review of the previous literature that has focused on the monitoring effectiveness of boards of directors. The sample data and methodology are presented in Section 3. Section 4 deals with the data analysis and hypothesis testing and Section 5 concludes.

## 2. Literature review

### Ownership structure

Since initial work on the subject by Berle and Means (1932), much research has been carried out in the financial literature on the relationship between levels of equity ownership of managers and firm performance. It has been stated by Berle and Means (1932) and Jensen and Meckling (1976), that there may be a potential conflict of interest between managers and shareholders due to managers having an incentive to adopt investment and financing policies to benefit themselves, to the detriment of shareholder wealth maximization (see also Morck et al. (1988)).

A way to counter this conflict of interest has been postulated to be by increasing the equity ownership of managers in the firms they manage. By doing so, the managers will have a financial stake in the firm and will thus carry out less self-benefiting activities and instead work more effectively towards the job they were hired to do, which is to maximize shareholder wealth. This is known as the convergence of interest hypothesis (Berle and Means (1932), and Jensen and Meckling (1976)).

Whilst some empirical work carried out has reported that such a relationship is unfounded (see for instance Demsetz (1983) and Mikkelsen et al. (1997)) much empirical work carried out in this area has shown a positive relationship between the level of equity ownership and firm performance. For instance, Mehran (1995) in an examination of the executive compensation structure of 153 randomly-selected manufacturing firms found that firm performance was positively related to the percentage of equity held by managers as well as to the percentage of their compensation that is equity-based. In another study carried out by Ang et al. (2000) that related agency costs to ownership structure, it was reported that agency costs were found to be inversely related to the proportion of shares owned by managers.

In addition, there have been many papers that have indicted that the positive relationship between the level of equity ownership and firm performance only goes up to a point, after which the performance of the firm drops. This drop at high levels of equity ownership has been said to be due to managers and

directors being free from checks on their control and they subsequently indulge their preference for non-value maximizing behaviour. This is known as the entrenchment hypothesis. Many empirical studies have reported the confirmation of this hypothesis. For instance, Hermalin and Weisbach (1991) found a nonmonotonic relationship between Tobin's Q (an indicator of firm performance) and the fraction of stock owned by CEOs still on the board of directors. More specifically, the relationship was found to be positive between 0% and 1%, negative between 1% and 5%, positive between 5% and 20%, and negative after that. In a subsequent study of 371 Fortune 500 firms for 1980, Morck et al (1988) found that Tobin's Q was found to first rise as insider ownership increased up to 5%, then fell as ownership increases to 25%, then rose only slightly at higher ownership levels. McConnell and Servaes (1990) found a similar curvilinear relation between Tobin's Q and the fraction of common stock owned by corporate insiders, being positive up till ownership reached 40% to 50%, then it became slightly negative. A recent study by Rosenstein and Wyatt (1997) found that stock-market reactions to the announcement of inside director appointments was found to be significantly negative when inside directors owned less than 5% of common stock; significantly positive when the ownership level was between 5% and 25%; and insignificantly different from zero when ownership exceeded 25%. Other work carried out showing a similar rise-fall relationship between managerial equity ownership and firm performance include Stulz (1988) and Hermalin and Weisbach (1991).

It is thus hypothesized that a similar rise-fall relationship will be observed between board equity ownership and firm performance in the sample of New Zealand listed firms in this study. The null hypothesis being that the rise-fall relationship will not be observed.

### Board composition

The existence of outside directors on the board of directors has been stated to be important in order to provide a monitoring role over the board (see Fama (1980), Fama and Jensen (1983)). Shivdasani and Yermack (1999), in a study on whether CEO involvement in the selection of new directors influences the nature of appointments to the board, found that fewer independent outside directors were appointed when the CEO was involved suggesting that this was a mechanism used by them to reduce active monitoring pressure. Dahya et al. (2002) investigated the relationship between CEO turnover and corporate performance following the Cadbury Committee issuance of the Code of Best Practice in 1992.

To improve board oversight, the Code recommended that boards of UK corporations include at least three outside directors and the positions of Chairman and CEO be held by different directors. The study found that there was a significant increase

in the sensitivity of management turnover to corporate performance following the adoption of the Code and the increase in sensitivity of turnover to performance was due to an increase in outside board members (similar to the finding of Weisbach (1988)). It has been thus postulated that boards comprising a majority of independent outsider directors are more likely to make decisions consistent with shareholder wealth maximization. Many empirical studies have reported the postulation to be true. For instance, Cotter et al. (1997) carried out a study examining the role of target firm's independent outside directors during takeover attempts by tender offer and found that independent outside directors enhanced target shareholder gains. In addition, boards with a higher majority of independent directors were more likely to use resistance strategies to enhance shareholder wealth.

In a similar study, Byrd and Hickman (1992) found in an investigation of 128 tender offer bids from 1980-1987 that bidding firms on which independent outside directors held at least 50% of the seats had significantly higher announcement date abnormal returns than other bidders. Weisbach (1988) found that the higher the proportion of outsiders on a board, the more likely it was that the board will replace the firm's CEO after a period of poor corporate performance. In addition, Rosenstein and Wyatt (1990) report direct evidence of a positive stock price reaction at the announcement of the appointment of an additional outside director.

A reason for these results has been said to be that those who are perceived to be better managers tended to become outside directors (Fama (1980), Fama and Jensen (1983), Kaplan and Reishus (1990)). Fama and Jensen (1983) and Ricardo-Campbell (1983) argue that outside directors who hold multiple directorships have greater incentives to monitor corporate decisions on behalf of the shareholders as they have made a significant investment in establishing their reputations in the market place for decision experts.

Some studies have suggested however, that outsiders may not have any effect over the monitoring of managerial decisions. In practice, the CEO has a dominant role in choosing outside directors (see Mace (1986)), possibly casting doubt about the ability of outside directors to make independent judgments on the performance of the firm. Indeed, some studies have suggested that it is possible to have too many independent outside directors on a board.

Byrd and Hickman (1992) reported that boards in their sample with over 60% outsider composition produced negative shareholder wealth effects. A reason for this is because corporate boards have a variety of responsibilities and thus require a diverse set of talents to carry them out effectively (Baysinger and Butler (1985)). In addition, Klein (1995) also found a negative relationship between the presence of outsiders and firm performance.

Due to the results of the majority of past studies mentioned earlier, it is hypothesized that firm performance will have a positive correlation to the percentage of outside directors on the board of directors. The null hypothesis being that the positive correlation between firm performance and the percentage of outside directors on the board will not be observed. It is not expected that the decline in firm performance, as found by Byrd and Hickman (1992) will be observed with the sample studied in this paper, as New Zealand firms were found to not be held as widely as US firms (see Porta et al. (1999)).

### Board size

Board size has been argued to have an inverse relationship with the degree of effective monitoring provided by the board of directors. This is known as the board size effect and has been said to be due to problems that arise in group coordination and the ability to process problems efficiently as group size increases (Lipton and Lorsch (1992), Jensen (1993)). This argument is drawn from organizational behaviour research that suggests that as work groups grow larger, total productivity exhibits diminishing returns (for instance see Steiner (1972) and Hackman (1990)). Holthausen and Larcker (1993) consider board size among a number of variables that might influence executive compensation and company performance, but failed to find consistent evidence of a negative relationship between company performance and board size.

In contrast however, using a sample of 452 large US industrial companies from 1984 to 1991, Yermack (1996) found an inverse relationship between firm value, as measured by Tobin's Q, and the size of the board of directors. Yermack's findings were confirmed by similar findings of a board size effect by Eisenberg et al. (1998) within their sample of small and midsize Finnish firms. In addition, an empirical study carried out by Tufano and Sevik (1997) found that mutual fund boards with smaller boards and boards with a larger fraction of independent members tended to negotiate and approve lower fees (being a proxy for higher efficiency of the board of directors).

The implications of the board size effect could be seen to lead to a trend for the average size of boards to shrink over time. For instance Bacon (1990) reported that the number of board members at large companies in the sample studied declined from a median of 14 in 1972 to a median of 12 in 1989. In addition, Huson et al. (2001) found in a study examining CEO turnover at large public firms over a 24 year period from 1971 to 1994 that board size was relatively constant at 14 directors through to the late 1980s but declined to 12 directors from 1989 to 1994.

From the work carried out previously, it is hypothesized that a similar inverse relationship between board size and firm performance will be ob-

served in the sample of New Zealand listed firms studied in this paper. The null hypothesis being that such an inverse relationship will not be observed.

### Endogeneity

Whilst it can be helpful to find relationships between firm performance and levels of equity ownership, board composition, and board size such conclusions cannot be said to be econometrically conclusive due to firm performance being endogenously determined by exogenous (however only partly observed) changes in the firm's contracting environment in ways consistent with the predictions of principal-agent models (Himmelberg et al. (1999)). There is even question as to whether any of the three factors are exogenously determined.

Cho (1998) reported finding that investment affects corporate value which in turn affects ownership structure and not the reverse. Indeed, as Denis and Sarin (1999) suggest, determination of ownership and board structure (at least) is a more dynamic process than previously understood with changes being part of a process that reallocates assets to different uses and to different management teams in response to a change in business conditions. There is great importance in understanding there may be unobserved heterogeneity in the contracting environment across firms that may be excluded unknowingly by methodology. For instance, if some of the unobserved determinants of Tobin's Q are also determinants of managerial ownership, then managerial ownership might spuriously appear to be a determinant of firm performance (as suggested by Himmelberg et al. (1999)). We shall return to this analysis following the empirical results.

### 3. Data and methodology

#### Data

The data sample studied included all firms listed on the New Zealand Stock Exchange for a five-year period from 1996 to 2001. Information on director stock ownership, the percentage of outside directors on boards, and board size was gathered and collated from printed annual reports and annual reports available from firms' websites. Financial information on firms in the sample was obtained from Datex, a database for financial information on New Zealand companies. In addition, Datastream and annual reports were used to obtain financial information required where information was not available on Datex. Where information was incomplete, the firm would be excluded from the sample. The final sample included the following number of firms for each year, with the number in the brackets representing the total number of firms listed on the New Zealand Stock Exchange for that year: 1997 - 73 firms (224), 1998 - 76 firms (229), 1999 - 87 firms (218), 2000 - 97 firms (231), and 2001 - 93 firms (220). This com-

prises a total of 426 annual observations over the five-year study period.

The level of director ownership on each board in each year was calculated as the total amount of common stock held collectively by the directors, divided by total outstanding common stock at fiscal year end. Stock options were not considered in this study, as they are very rare in the New Zealand context. Board size represents the number of members on the board of directors at the fiscal year end of their respective organizations. Outside directors were defined as those who were not current or former employees of the company. The percentage of outside directors was calculated by the number of outside directors divided by the number of members on the board of directors (board size).

#### Methodology

Following the methodology of several recent related studies such as Morck et al. (1988) and Yermack (1996), the value of the firm was measured by Tobin's Q, defined as:

$$\text{Tobin's } Q = \text{Market value of assets} / \text{Replacement cost of assets}$$

Market values of assets were calculated as the year-end value of market equity. This measurement is limited as no value is included for the market value of long-term debt for which reliable estimates could not be obtained. The replacement costs of assets were assumed to be equal to the book value of tangible assets. This assumption reflects the lack of information on company depreciation rates available for firms in the sample. Although Tobin's Q is undoubtedly a noisy proxy of the effectiveness of board monitoring, it is well suited to the purpose of this investigation. An alternative approach that could be used is the event study methodology, for which the analysis of unexpected changes in levels of firm performance, board equity ownership, board composition, and board size could be conducted. However, the event study methodology is also limited by several problems such as noise which can contaminate the experiment. Descriptive statistics were calculated from the sample of firms studied over the five-year period, on a yearly and total basis, consisting of the mean, median and standard deviation.

#### Relationship between outside directors and performance

Many empirical studies have reported a positive relationship between the percentage of outside directors and firm performance (see Cotter et al. (1997), Byrd and Hickman (1992), Weisbach (1988), and Rosenstein and Wyatt (1990)). This positive relationship is believed to be due to the improvement in monitoring the decisions made by firms' management teams. Outside directors have an incentive to ensure that

shareholder wealth-maximizing decisions are made, due in great part to their reputational capital in the market for decision experts (Fama and Jensen 1983).

In order to investigate the relationship between firm performance and levels of outside directors present on firms' boards, we compare separately the mean of Tobin's Q among subsets of levels of outside directors. An ordinary least squares regression analysis is performed to ascertain if any relationship between the variables exists.

### Relationship between board size and performance

The board size effect is an effect found in past studies by researchers such as Yermack (1996), Eisenberg et al. (1998), and Tufano and Sevick (1997). It shows an inverse relationship between board size and firm performance due to the breakdown in group dynamics and communication problems that occurs in increasingly large groups. In this study we try to ascertain if such a relationship exists in our sample of New Zealand firms, by averaging the Tobin's Q across different board sizes. Ordinary least squares regressions are performed to see if any relationship between the variables exists.

### Relationship between board ownership and performance

Prior studies have suggested that board ownership has both positive and negative effects on the value of the firm depending on the ranges of board ownership studied. For example, Rosenstein and Wyatt (1997) found that stock-market reactions to the announcement of inside director appointments was found to be significantly negative when inside directors owned less than 5% of common stock; significantly positive when the ownership level was between 5% and 25%; and insignificantly different from zero when ownership exceeded 25%. Morck et al. (1988) used similar ranges and found that Tobin's Q was found to first rise as insider ownership increased up to 5%, then fell as ownership increased to 25%, then rose only slightly at higher ownership levels. Using these ranges of board ownership (<5%, 5-25% and >25%), we try to ascertain if a similar relationship exists with the New Zealand data sample using regressions and non-parametric testing. Within these ranges and the sample as a whole, regressions were calculated between Tobin's Q and three variables for each year and the total sample pooled together. The regression formula consists of:

$$\text{Tobin's } Q = \alpha + \beta \text{ Variable} + \varepsilon$$

Where:

Variable is either level of director stock ownership (DSO), percentage of outside directors (OD) or board size (BS). The Spearman rank correlation non-parametric test was also conducted within these ranges and the sample as a whole, and using Tobin's

Q and each of the three variables for each year and the total sample pooled together. The Spearman rank correlation checks for differences between the ranks to ascertain if there are any relationships between the variables at various levels of board ownership.

$$r_s = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n(n^2 - 1)}$$

Where:

$d_i$  = rank( $X_i$ )-rank( $Y_i$ ), and  $X_i$  and  $Y_i$  are paired observations

$n$  = number of observations

## 5. Results

### Descriptive statistics

As Table 1 highlights, the percentage of equity owned by directors appears to increase from 1997 to 2000 and then decrease slightly in 2001, with a mean for the period of 7.24% and a median of 0.66%. This is in contrast to the study by Morck et al. (1988) who documented mean and median values of 10.60% and 3.40% respectively.

Yermack (1996) also detected slightly higher percentage values for his sample of US firms, reporting a mean level of ownership of 9.10% and a median of 2.80%. Our findings are consistent with the findings by Porta et al. (1999). In addition, Table 1 highlights the fact that board size seems fairly stable over the period of the study obtaining a mean of 6.5 members. Nevertheless, there are indications of a slight shrinking of board size by small percentages from 1997 (6.68 members) to 2001 (6.31 members). This is consistent with the findings of Bacon (1990) and Huson et al. (2001) who both found a decrease in the size of boards of directors in their sample of firms over a longer time period than this study (a 24 year period in Huson et al.'s case). The percentage of outsiders seems to have decreased over the first four years of the period studied, and indeed decreased by approximately 7.5% from 1997 to 2001. This is in contrast to Huson et al. (2001) who found an increasing level of outsiders in the sample studied, from 70.6% in the period 1971-1982 to 78.6% in 1983-1994.

### Relationship between outside directors and performance

Table 2 shows the mean Tobin's Q for different percentages of outside directors including the correlation coefficient of the mean Tobin's Q to percentage of outsider directors. Figure 1 shows the relationship of the percentage outsiders to mean Tobin's Q.

**Table 1.** Levels of Director Stock Ownership, Board Composition and Board Size for the Period 1997 To 2001

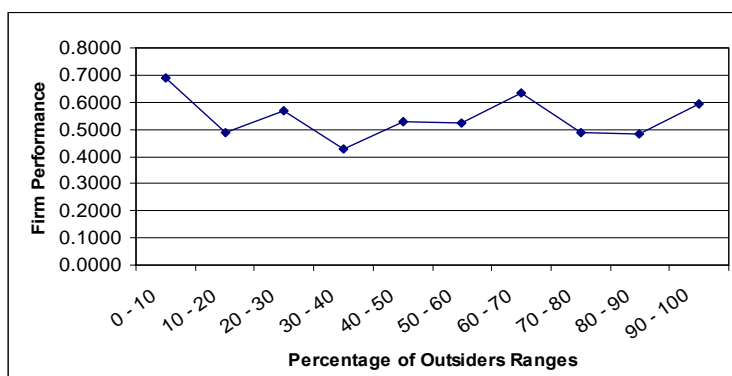
The sample consists of 426 annual observations for the following number of firms for each year, 1997 (73 firms), 1998 (76 firms), 1999 (87 firms), 2000 (97 firms), and 2001 (93 firms). Director stock ownership is total stock owned collectively by directors divided by total outstanding common stock. Outside directors are those that are independent of the company. Board size represents the number of directors as outlined in annual reports.

	<u>1997</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>
Director Stock Ownership (%)	6.18	0.54	12.44	
Outside Directors (%)	79.74	83.33	19.14	
Board Size	6.68	6.00	2.03	
	<u>1998</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>
Director Stock Ownership (%)	5.64	0.43	11.63	
Outside Directors (%)	77.39	80.91	20.22	
Board Size	6.66	6.00	2.04	
	<u>1999</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>
Director Stock Ownership (%)	7.39	0.66	13.61	
Outside Directors (%)	72.57	80.00	24.01	
Board Size	6.63	6.00	1.99	
	<u>2000</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>
Director Stock Ownership (%)	8.32	1.07	14.92	
Outside Directors (%)	71.89	80.00	24.74	
Board Size	6.30	6.00	1.84	
	<u>2001</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>
Director Stock Ownership (%)	8.10	0.68	14.17	
Outside Directors (%)	72.23	80.00	26.09	
Board Size	6.31	6.00	1.87	
	<u>1997-2001</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>
Director Stock Ownership (%)	7.24	0.66	13.51	
Outside Directors (%)	74.43	80.00	23.37	
Board Size	6.50	6.00	1.95	

**Table 2.** Mean Tobin's Q for Ranges of Percentages of Outside Directors on Firms' Boards.

N represents the number of observations used to calculate mean Tobin's Q in each range of percentage outsiders.

Range	Mean Tobin's Q	N
0 - 10	0.6883	2
10 - 20	0.4896	7
20 - 30	0.5692	20
30 - 40	0.4258	14
40 - 50	0.5307	14
50 - 60	0.5236	36
60 - 70	0.6342	51
70 - 80	0.4870	47
80 - 90	0.4841	122
90 - 100	0.5948	113
Correlation	0.03	



**Fig. 1.** The Relationship between Firm Performance and the Percentage of Outside Directors

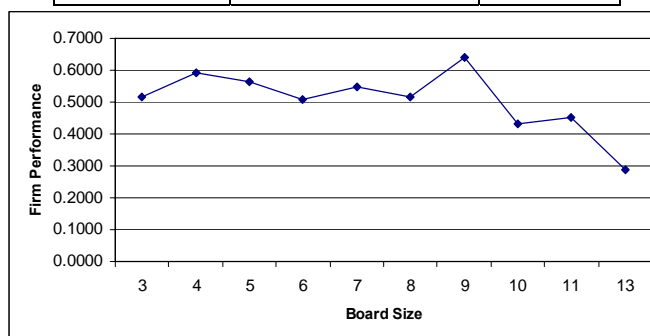
Overall interpreting the results in Table 2 and Figure 1 is difficult. Although there were some positive spikes in the results we cannot reject the null hypothesis that there is no relationship between firm performance and an increasing number of outsiders. A particular level of percentage of outsiders on a firm's board of directors cannot be ascertained as no obvious relationship trends are seen in the results and thus stating a level of percentage outsiders would merely be an inconclusive guess. While some studies suggest there should be a positive relationship and others a negative one, this study finds very little relationship.

### Relationship between board size and performance

The means of Tobin's Q for each different sized board of directors are reported in Table 3 and shown in Figure 2. The performance fluctuates between the three and nine members and then waivers downward once the board size reaches ten members. The level of board size likely to provide effective monitoring appears to be optimal at around nine members which is when performance is the highest. This is supported by Lipton and Lorsch (1992) who believed, based on their sample of US firms, that a board composed of 8 or 9 members is more likely to provide effective monitoring.

**Table 3.** Mean Tobin's Q based On the Number of Members on the Board of Directors  
N represents the number of observations used to calculate mean Tobin's Q for each board size.

Board Size	Mean Tobin's Q	N
3	0.5166	17
4	0.5906	49
5	0.5657	62
6	0.5065	111
7	0.5490	74
8	0.5171	42
9	0.6409	38
10	0.4312	17
11	0.4506	14
13	0.2878	2
Correlation	-0.0389	



**Fig. 2.** The Relationship between Firm Performance and the Size of the Board of Directors.

The data yielded a correlation coefficient of  $-0.04$ , indicating a slight inverse relationship between board size and firm performance. Yet this correlation coefficient is not only very small, it is also based on pooled data in the sample, therefore no firm conclusions can yet be drawn. Therefore a more detailed analysis follows in the next section.

### Relationship between board ownership and performance

Regression and non-parametric correlations relating Tobin's Q to director stock ownership (DSO), percentage of outside directors (OD) or board size (BS) were calculated by year and first categorized into the

three ranges of stock ownership previously discussed. Table 4 reports these results.

Very few statistically significant relationships were found. In fact, Table 3 shows there is little or no relationship between performance and the percentage of outside directors or board size in all stock ownership ranges. There also appears to be no significant relationships between performance the percentage of director stock ownership within each levels of director ownership. To see if this latter relationship, or indeed a relationship with the percentage of outside directors or board size, may exist across all ranges of stock ownership occurs across all levels of stock ownership, the relationship between performance and the three variables are tested on a year-by-year basis with the results shown in Table 5.

**Table 4.** Regression Coefficients and Spearman Rank Correlations between Variables and Performance based on Director Ownership Levels

1997	Level of Ownership								
	<5%			5-25%			>25%		
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>
DSO	0.000	0.004	-0.141	0.000	-1.143	-0.207	-0.001	-0.074	0.263
OD	-0.003	-0.657	0.195	-0.003	-0.394	0.004	0.001	0.151	-0.528
BS	0.030	0.644	-0.127	0.030	-1.545	-0.206	-0.119	-2.577**	-0.749*
1998	<5%			5-25%			>25%		
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>
DSO	0.043	1.381	0.015	-0.013	-1.188	-0.042	-0.008	-0.752	0.086
OD	0.000	0.248	0.220	-0.008	-2.405*	-0.388	-0.008	-1.392	-0.754*
BS	-0.018	-0.853	-0.241	-0.057	-1.608	-0.128	-0.024	-0.601	-0.478
1999	<5%			5-25%			>25%		
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>
DSO	0.026	0.997	0.196	-0.030	-0.852	0.209	0.006	2.425*	-0.175
OD	0.001	1.159	-0.049	-0.008	-0.740	0.011	0.000	0.057	0.000
BS	-0.029	-2.080*	-0.144	0.128	1.460	0.003	0.002	0.138	-0.226
2000	<5%			5-25%			>25%		
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>
DSO	0.038	1.242	0.024	0.009	0.531	0.129	0.004	1.922	0.191
OD	0.000	0.015	0.016	-0.001	-0.140	0.027	0.000	0.025	-0.033
BS	-0.026	-1.363	-0.158	-0.028	-0.559	-0.064	-0.009	-0.462	-0.288
2001	<5%			5-25%			>25%		
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>
DSO	0.022	0.693	-0.003	0.017	0.476	0.112	0.003	0.924	0.242
OD	-0.001	-0.404	0.018	0.011	1.207	0.379	-0.002	-0.954	-0.284
BS	-0.040	-2.011*	-0.238	0.053	0.439	0.096	-0.013	-0.527	-0.096

\* Correlation is significant at the .05 level (2-tailed). \*\* Correlation is significant at the .05 and the .01 level (2-tailed).

**Table 5.** Regression Coefficients and Spearman Rank Correlations between Variables and Performance by Year

	1997			1998			1999		
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>
DSO	-0.003	-0.532	-0.085	0.000	-0.128	-0.016	-0.002	-0.928	0.013
OD	-0.002	-0.550	0.112	-0.001	-0.342	0.082	0.001	0.657	-0.039
BS	0.011	0.330	-0.203	-0.020	-1.210	-0.236*	-0.007	-0.427	-0.045
	2000			2001					
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>			
DSO	0.001	0.633	0.012	0.001	0.439	0.014			
OD	0.000	-0.005	0.015	0.001	0.573	0.074			
BS	-0.025	-1.627	-0.131	-0.008	-0.350	-0.133			

\* Correlation is significant at the .05 level (2-tailed).

Again we see there are no significant relationships emerging on a year-by-year basis. Finally, we test the whole sample (1997-2001) based on the level

of director ownership with the results reported in Table 6.

**Table 6.** Regression Coefficients and Spearman Rank Correlations between Variables and Performance by Year

Total Sample	Level of Ownership								
	<5%			5-25%			>25%		
	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>	Coeff.	T Stat	r <sub>s</sub>
DSO	0.030	1.426	-0.013	-0.001	-0.064	0.014	0.003	0.654	0.128
OD	0.000	0.358	0.080	0.000	0.102	0.057	0.001	0.398	0.000
BS	-0.007	-0.534	-0.136*	-0.009	-0.253	-0.054	-0.007	-0.310	-0.197
	Total								
	Coeff.	T Stat	r <sub>s</sub>						
DSO	-0.001	-0.502	-0.009						
OD	0.001	0.591	0.066						
BS	-0.005	-0.495	-0.121*						



This also yields few significant results. Therefore while the Figure 2 showed that there appeared to be a weak relationship between performance and board size, Tables 4 to 6 statistically show that a firm's performance does not seem to be reliant on the director stock ownership levels, the percentage of outside directors or the size of the firm's board. As a result, we find it difficult to reject any of our three hypotheses. Namely, there does not seem to be a rise-fall relationship in performance relating to ownership structure, nor to the percentage of outside directors, nor to the board size.

## 6. Conclusion

This study investigates the effect three variables (percentage of outsiders, percentage of stock held collectively by the board, and board size) have on firm performance for a sample of firms over a five-year period between 1997 and 2001. Many empirical studies are based upon US firms which are mainly widely held and controlled, contrast to New Zealand's significantly less proportion of large and medium-sized publicly traded firms being widely-held. This paper therefore tests New Zealand's unique situation. As was discussed earlier, the issues with regard to endogeneity are important to consider. Cho (1998) reported finding that investment affects corporate value, which in turn affects ownership structure and not the reverse. In addition, as Himmelberg et al. (1999) suggests, if some of the unobserved determinants of Tobin's Q are also determinants of managerial ownership, then managerial ownership might spuriously appear to be a determinant of firm performance. This perspective is consistent with our findings and could indeed be the main reason for these results. Our results are interesting in that they seem to support several other studies in the small market New Zealand environment. Consistent with Demsetz (19983) and Mikkelson et al. (1997), we find no relationship between firm performance and ownership structure. Similar to Mace (1986) and Byrd and Hickman (1992), we find that the percentage of outside directors has little impact on overall firm performance. And we failed to find consistent evidence of a negative relationship between company performance and board size. Beyond the endogeneity issue discussed above, these results may also be understood in terms of the smallness of the New Zealand market. This lack of overall size may in fact contribute to a smaller pool of directors as well as creating a small 'community' of directors who all sit on multiple boards and consult with each other. This is a possible area for future research.

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